

# Nationwide Public Safety Broadband Network

## Final Programmatic Environmental Impact Statement

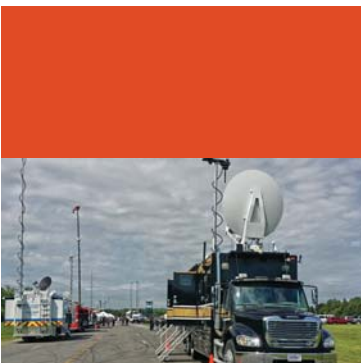
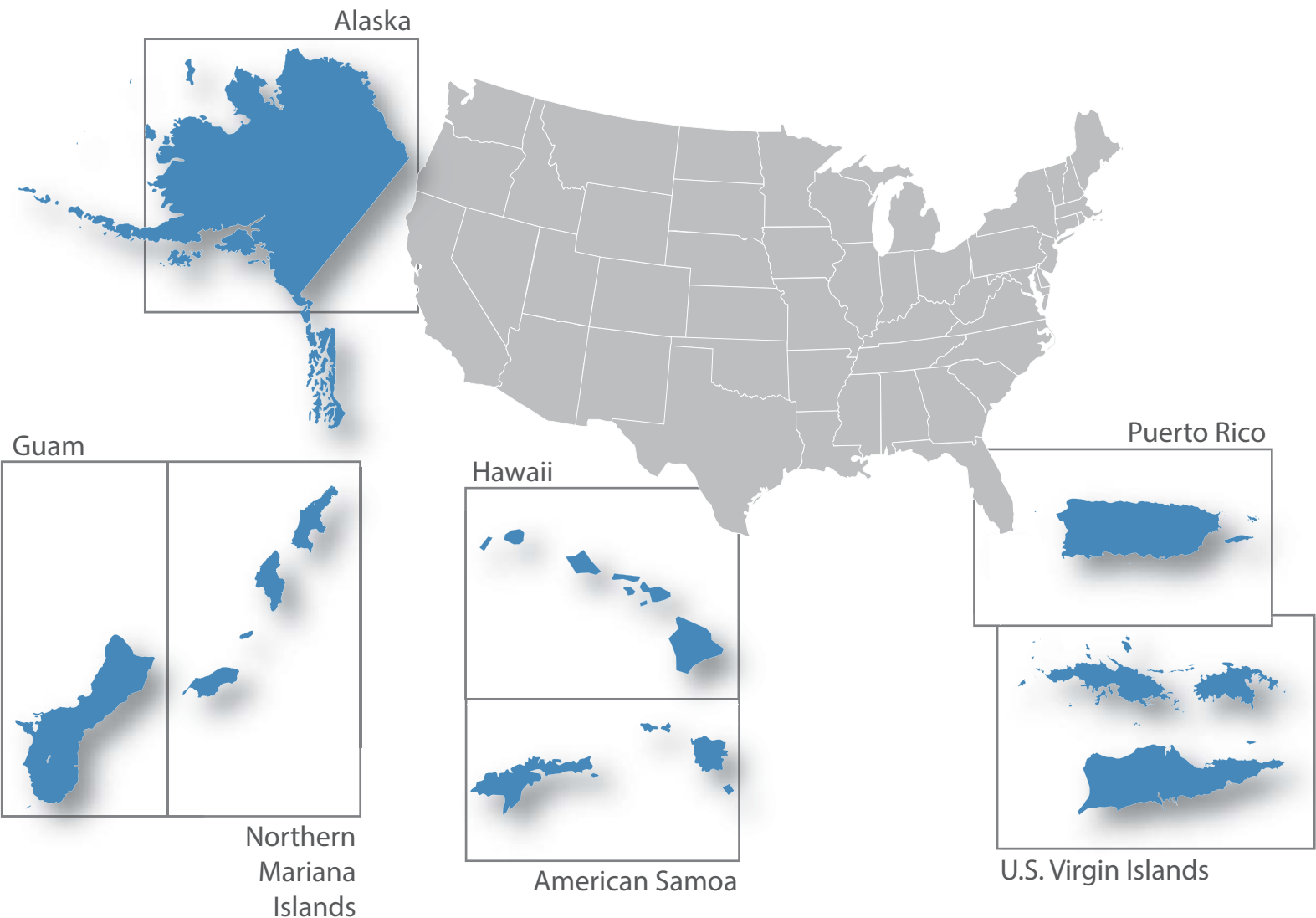
### for the Non-Contiguous United States



## First Responder Network Authority

Volume 8 - Chapters 10-18 & Appendices

- Alaska
- Hawaii
- American Samoa
- Guam
- Northern Mariana Islands
- Puerto Rico
- U.S. Virgin Islands



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# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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#### **Cooperating Agencies**

Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

May 2017

Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
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- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>



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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |

|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |

|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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## 10. CUMULATIVE EFFECTS

National Environmental Policy Act (NEPA) regulations (*40 CFR §§ 1500-1508*), as issued by the Council on Environmental Quality, require addressing the incremental impact of a federal agency's action (in this case, FirstNet's Proposed Action) when added to other past, present, and reasonably foreseeable future actions no matter which agency (federal or non-federal) or person undertakes such other actions. These incremental impacts are referred to as cumulative impacts. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time by various agencies or individuals (*40 CFR § 1508.7*).

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the timeframe in which the effects could be expected to occur, as well as a description of what resources could potentially be cumulatively affected. When applying the concept of cumulative impacts to a programmatic analysis such as this Final Programmatic Environmental Impact Statement (Final PEIS), additional consideration must be given to existing uncertainty associated with specific project locations that will be selected in the future. The design, construction, and operation of the Nationwide Public Safety Broadband Network (NPSBN) would occur throughout the non-contiguous region of the United States, and specific project sites have not yet been identified. Furthermore, there is currently a wide range of technologies that FirstNet and/or their partners may use to implement and deploy the NPSBN, ranging from new and existing fixed assets to mobile, deployable infrastructure. The range of technologies to be implemented and/or deployed for the NPSBN would consist of individual components at specific locations that are relatively small in size, would likely result in being fairly dispersed in their distribution, and would cover large geographies to achieve the connectivity of the program. As such, it is not possible to quantify the cumulative effects of these projects when combined with other potential projects. Therefore, this Final PEIS addresses cumulative impacts qualitatively.

A cumulative impact results from the additive effect of all projects in the same geographical area. Generally, an impact can be considered cumulative if: 1) effects of several actions occur in the same location, 2) effects on a particular resource are the same in nature, and 3) effects are long-term in nature. The common key factor to cumulative assessment is identifying any potential temporally and/or spatially overlapping or successive effects that may significantly affect resources occurring in the analysis areas (*CEQ 1997; USEPA 1999*).

In evaluating the cumulative impacts of an action, an agency considers the total effects on a resource, ecosystem, or human community of that action and all other activities affecting that resource, no matter what entity (federal, non-federal, or private) is taking the action. Cumulative impacts involve the combined, incremental effects of human activity (*USEPA 1999*). In accordance with NEPA and to the extent reasonable and practical, this Final PEIS considers the combined effects of the No Action Alternative, Preferred Alternative, and Deployable Technologies Alternative at the programmatic level with other past, present, and reasonably foreseeable actions that may affect the resources identified.

The geographic extent of the Proposed Action considered for the cumulative impact analysis includes the area under the jurisdiction of the FirstNet program, specifically the non-contiguous region that is the subject of this Final PEIS. The timeframe considered for this analysis is 50 years.

At the programmatic level, it is not practical to include a list of all possible infrastructure projects in the non-contiguous region. Instead, this cumulative impacts analysis describes projects similar to the Proposed Action with common potential impacts that could have additive effects. States and territories within the non-contiguous region have continued to develop their broadband infrastructure in recent years, with several having completed projects funded through the Broadband Technology Opportunities Program (*BroadbandUSA 2015*). Additional broadband infrastructure projects are underway or have been proposed. Examples of such projects are provided in Table 10-1 below.

**Table 10-1: Additional Broadband Infrastructure Projects**

| Name                                                            | Location       | Sponsor                                                                                                                                                                     | Brief Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Completion Year        |
|-----------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Public Safety Interoperable Communications (PSIC) Grant Program | Nationwide     | Department of Commerce (DOC) National Telecommunications and Information Agency (NTIA) and Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA) | \$1 billion grant program to U.S. states and territories for the acquisition of, deployment of, or training for the use of interoperable communications systems that use (or enable interoperability with communications systems that use) reallocated public safety spectrum in the 764-776 megahertz (MHz) and 794-806 MHz bands. Grants were awarded for 6,750 projects, including the installation of 133 new freestanding and 11 new guyed towers, collocation of equipment at 2,710 existing towers and 2,710 existing facilities, 112.9 miles of fiber optic cable, more than 350 training events, and acquisition of over 75,000 radios. ( <i>NITA 2016</i> ) | Concluded in 2012      |
| TERRA                                                           | Alaska         | General Communication, Inc.                                                                                                                                                 | Development of a broadband communications network across the state, including remote regions. Projects have been completed in the Southwest and more recently in the Northwest Arctic with additional construction in 2014 in the Northwest and along the Yukon River ( <i>CGI 2015</i> ).                                                                                                                                                                                                                                                                                                                                                                            | 2011-2014              |
| Broadband Linking the American Samoa Territory (BLAST) Project  | American Samoa | American Samoa TeleCommunications Authority                                                                                                                                 | The BLAST project includes build-out of a land-based fiber network combined with a 350 kilometers interisland submarine cable network connecting Fogagogo, Tu'tuila, Ofu, Luma, Ta'u and Aunu'u Islands ( <i>WFN Strategies 2016</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                               | Largely completed 2015 |
| Gigabit Island Plan                                             | Puerto Rico    | Puerto Rico Broadband Taskforce (a public-private partnership)                                                                                                              | Establishes strategic goals to further expand high speed broadband networks island-wide across Puerto Rico, involving new infrastructure as a component ( <i>PRBT 2015</i> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2020                   |

| Name                       | Location | Sponsor                                                            | Brief Description                                                                                                                                                                                                                                                                                                                                                                                                                                        | Completion Year |
|----------------------------|----------|--------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Measuring Broadband Hawaii | Hawaii   | State of Hawaii Department of Commerce and Consumer Affairs (DCCA) | In collaboration with the Federal Communications Commission's (FCC) Measuring Broadband America, the goal of this project is to "better inform Hawaii consumers about their Internet service performance and to collect broadband performance data that DCCA can use in its efforts to improve access to broadband service across the State." DCCA activities include supporting public-private efforts to develop broadband infrastructure. (DCCA 2016) | Ongoing         |

The analysis herein considered the alternatives discussed in Chapter 2, Description of the Proposed Action and Alternatives, and other programmatic-scale actions. Cumulative effects analysis of individual projects and other past, present, and reasonably foreseeable future actions relevant at the local level can be addressed as part of future project-specific NEPA reviews. Project-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work.

The potential impacts associated with the Proposed Action would result from the collocation on existing infrastructure; construction of new infrastructure and/or accessory components; use of existing fiber facilities; installation of new conduit; deployment of satellite phones and/or satellite technology; installation of microwave facilities; and utilization of deployable technologies. As described in Chapters 3 through 9, the effects as a result of the Proposed Action would not result in potentially significant impacts at the programmatic level based on the impact significance criteria and ratings presented in this Final PEIS. Impacts could occur as a result of other ongoing telecommunications infrastructure development, including those projects described above as well as others in the future; however, when combined with the potential impacts associated with the Proposed Action, incremental impacts to the natural and human environment<sup>1</sup> are not expected to be significant at the programmatic level. The project types that involve new construction and/or ground-disturbing activities would tend to be limited by their nature in the extent and duration of their effects, and these projects would typically implement appropriate best management practices and/or mitigation measures to further reduce the already limited potential impacts. Similarly, effects associated with project operations are not expected to be significant at the programmatic level. Taken together, these projects are not expected to result in significant incremental cumulative impacts to either human health or the environment.

<sup>1</sup> The human environment is the natural and physical (e.g., structures) environment, and the association of people and their activities to those environments.

## REFERENCES

- BroadbandUSA. 2015. *Grants Awarded: Broadband Infrastructure Projects*. Accessed: November 4, 2015. Retrieved from: <http://www2.ntia.doc.gov/infrastructure>
- CEQ (Council on Environmental Quality). 1997. *Considering Cumulative Effects under the National Environmental Policy Act*. Executive Office of the President. Washington, D.C. January 1997. Accessed: September 29, 2015. Retrieved from: [http://energy.gov/sites/prod/files/nepapub/nepa\\_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf](http://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf)
- DCCA (Department of Commerce and Consumer Affairs). 2016. *Measuring Broadband Hawaii*. Accessed: February 3, 2016. Retrieved from: <http://cca.hawaii.gov/broadband/mbh>
- GCI (General Communications Inc.). 2015. *Project: TERRA*. Accessed: November 4, 2015. Retrieved from: <http://terra.gci.com/project>
- NTIA (National Telecommunications and Information Administration). 2016. *Public Safety Interoperable Communications (PSIC) Grant Program*. Accessed: February 3, 2016. Retrieved from: <https://www.ntia.doc.gov/legacy/psic/index.html>
- PRBT (Puerto Rico Broadband Task Force). 2015. *Governor Garcia Padilla Announces a Gigabit Island Plan for Fast Broadband Across Puerto Rico by 2020*. February 17, 2015. Accessed: November 4, 2015. Retrieved from: <http://www.prbroadband.org/news/governor-garcia-padilla-announces-a-gigabit-island-plan-for-fast-broadband-across-puerto-rico-by-2020>
- USEPA (U.S. Environmental Protection Agency). 1999. *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*. Office of Federal Activities (2252A). EPA 315-R-99-002/May 1999. Accessed: September 29, 2015. Retrieved from: <http://www.epa.gov/sites/production/files/2014-08/documents/cumulative.pdf>
- WFN Strategies. 2016. *BLAST*. Accessed: February 3, 2016. Retrieved from: <http://wfnstrategies.com/portfolio/blast>

# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

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Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
<[https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)>
- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |

|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |

|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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## 11. BMPS AND MITIGATION MEASURES

This chapter provides examples of best management practices (BMPs) and mitigation measures that FirstNet and/or their partners would recommend or require to be implemented during deployment and operation of the Proposed Action to help avoid or minimize potential impacts to various resources, or potential impacts to deployed infrastructure from various hazards. Specifically, FirstNet and/or their partners would be required to implement mitigation measures, as defined through permitting and/or consultation with appropriate resource agencies. Unlike mitigation measures, however, BMPs would not necessarily be required in every project activity but would be applied as practicable or feasible during deployment and operation of the Proposed Action. The BMPs and mitigation measures outlined in this chapter have been developed based on initial consultation with other agencies as well as through independent research conducted by FirstNet and their environmental contractors. It is possible that other or additional site-specific BMPs and mitigation measures not included in this chapter may be recommended or required to be implemented as a result of consultation with resource agencies, permits, and/or additional environmental reviews.<sup>1</sup> The example BMPs and mitigation measures in this chapter are organized by resource area and, where applicable, each of the following project types:<sup>2</sup>

- Wired Projects
  - New Build – Buried Fiber Optic Plant
  - Use of Existing Conduit – New Buried Fiber Optic Plant
  - New Build – Aerial Fiber Optic Plant
  - Collocation on Existing Aerial Fiber Optic Plant
  - Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable
  - New Build – Submarine Fiber Optic Plant
  - Installation of Optical Transmission or Centralized Transmission Equipment
- Wireless Projects
  - New Wireless Communication Towers
  - Collocation on Existing Wireless Tower, Structure, or Building
- Deployable Technologies
  - Cell on Wheels; Cell on Light Truck; System on Wheels
  - Deployable Aerial Communications Architecture

---

<sup>1</sup> Site-specific analysis or environmental reviews may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work.

<sup>2</sup> The resource areas are ordered in this chapter consistent with how they appear in each of the state/territory-specific chapters (Chapters 3 through 9). Additional information and details regarding the Proposed Action infrastructure and project types can be found in Section 2.1.2, Proposed Action Infrastructure, and each respective section within the state/territory chapters.

- Satellites and Other Technologies
  - Satellite-Enabled Devices and Equipment
  - Deployment of Satellites

## **11.1. INFRASTRUCTURE**

### **11.1.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to infrastructure. The following BMPs and mitigation measures would apply to all project types:

- Follow all applicable federal, state/territory, and local requirements for construction on or near public roads.
- Follow all applicable federal, state/territory, and local laws concerning traffic speed and safety during the transport of equipment.
- Schedule deployment activities outside of peak traffic hours.
- Avoid roads with heavy traffic volumes and peak travel hours, to the extent possible, when scheduling the transport of heavy equipment or construction materials.
- Design staging areas to minimize unnecessary equipment and material mobilizations.
- Repave and restore disturbed roads and public road rights-of-way (ROWs), applicable to federal, state/territory, and local laws, as quickly as possible to avoid any traffic impediments that may potentially hinder access to local health, public safety, and emergency facilities, and so traffic capacity and safety conditions could return to their pre-construction condition.
- Design new deployment activities within existing ROWs to the extent possible and outside of roadways and thoroughfares to minimize potential impacts on traffic flow or safety.
- Coordinate with federal, state/territory, and local government agencies as appropriate, as well as with public safety officials, emergency and medical facilities, and existing telecommunications providers to the extent practicable to facilitate awareness of deployment activities and accompanying schedule.
- Schedule new construction outside of seasons known to cause more accidents (e.g., tsunami/hurricane/tropical cyclone season or times of the year when wildfires are more likely to occur) so that potential service disruptions are less likely to coincide with times of increased demand.
- Confirm or otherwise install detection systems so that if and when a disruption to utility services or telecommunications systems occurs, it can be identified and repaired quickly.
- Implement a backup telecommunications system, as needed, which allows first responders to communicate with each other and the public during deployment activities until the new nationwide public safety broadband network (NPSBN) has been successfully implemented.



- Complete deployment activities as quickly and safely as possible to avoid any possible disruptions to utility services.
- Complete those deployment activities that could interrupt power during non-peak times for power or water.
- Follow all applicable state/territory and local one-call laws and procedures for buildouts.
- Follow all applicable federal, state/territory, or local requirements regarding utilities (water, sewer, power, and electricity) and construction within a utility ROW.

### **11.1.2. Project-Type Specific BMPs and Mitigation Measures**

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

## **11.2. SOILS**

### **11.2.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to soil resources. The following BMPs and mitigation measures would apply to all project types:

- Follow all applicable federal, state/territory, and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize erosion and sedimentation and restore disturbed soil.
- Avoid construction in areas with steep or unstable slopes or with soils known to be particularly susceptible to soil erosion, (see Affected Environment Soils sections) and construct facilities in alternate locations to avoid these areas, if practical.
- Develop a soil erosion and sedimentation control plan for disturbed areas, and use silt fences,<sup>3</sup> erosion control blankets,<sup>4</sup> retention ponds, straw and sandbag barriers, and/or other controls as needed to reduce soil erosion, storm water runoff, and sedimentation.
- Schedule construction activities to avoid, to the extent possible, soil disturbance activities during periods or months with heavy rainfall and snowmelt.<sup>5</sup>
- Cover exposed areas with tarps or similar materials to prevent rainfall exposure to the extent possible.
- Minimize the area of bare soil exposed at any one time as much as possible by constructing in stages.

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<sup>3</sup> Silt fences are designed to trap sediment in the area where construction or soil disturbance is taking place to minimize or avoid soil erosion and sedimentation. The fence is typically 2- to 3-feet tall, buried 8 to 12 inches into the soil, and secured with stakes.

<sup>4</sup> Erosion control blankets are biodegradable or synthetic sheet-like materials that are rolled out onto disturbed areas to protect soil from wind and water erosion.

<sup>5</sup> See Affected Environment Climate Change sections for an explanation of seasonal climate and weather patterns.

- Revegetate disturbed areas with native plants, to the extent practicable, as progressively and quickly as practicable to achieve stabilization.<sup>6</sup>
- Minimize soil disturbance to the extent practicable, especially in wetland and designated natural resource areas.
- Maintain topsoil by segregating topsoil or surface soil from subsurface layers and implementing temporary topsoil storage areas during construction.<sup>7</sup>
- Replace topsoil as soon as possible following construction.
- Remove and store topsoil with a woven weed barrier or similar material for post-construction site restoration for areas.
- Pay particular attention to areas identified as having soils that are vulnerable to compaction (see Affected Environment Soils sections) and select alternate locations to construct facilities if practical.
- Implement deep tillage procedures where practical to loosen compacted soils.
- Restore soil surface to original or improved contours.
- Use timber mats or similar infrastructure as deemed necessary to distribute vehicle and heavy equipment weight.
- Use existing roads or previously disturbed areas to the maximum extent practicable.

### **11.2.2. Project-Type Specific BMPs and Mitigation Measures**

There are no project-specific BMPs and mitigation measures for soils beyond those listed above for all project types.

## **11.3. GEOLOGY**

### **11.3.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to geologic resources or potential impacts to the Proposed Action as a result of geologic hazards. The following BMPs and mitigation measures would apply to all project types:

- Avoid, to the extent practicable, deployment in areas that undergo significant geomorphological changes, such as within active glacial valleys (in Alaska) or streams and rivers.

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<sup>6</sup> Plant roots play a significant role in stabilizing soils. Seeding disturbed areas quickly after construction activities would allow for faster plant and root development and would therefore provide better erosion protection.

<sup>7</sup> Topsoil is segregated from subsoil layers by stripping the uppermost soil from the area being excavated and storing it separately from the subsurface soil. Once construction is completed, the topsoil is replaced as the uppermost soil unit.

- Avoid construction in seismically active areas, locations with karst topography or that have shown recent subsidence, or steep or unstable slopes that are susceptible to erosion; construct facilities in alternate locations if practical.
- Construct all infrastructure to standards that meet or exceed state/territory seismic requirements.
- Avoid rock ripping to the extent practicable to preserve bedrock resources, topography, and physiography.
- Minimize the area/volume of disturbed/removed terrain during deployment/construction.
- Restore topographic features and grades to pre-construction/deployment conditions.
- Limit construction to areas that are not actively mined or undergoing mineral or other material or petroleum extraction activities, or coordinate planning and deployment with mining and extraction plans and activities in active areas.
- Follow all relevant federal, state/territory, and local laws and regulations as they apply to paleontological, mineral, and fossil fuel resources.
- Develop a Paleontological Monitoring and Mitigation Plan outlining areas with high likelihood for encountering significant fossil resources and plans for avoidance and appropriate response if previously unknown resources are encountered.
- Avoid areas with significant fossil resources, if practicable.
- Suspend all work if paleontological resources are encountered on a project construction site until a certified paleontologist has been brought on-site to oversee project activities and ensure that fossil resources are handled properly.
- Locate construction/deployment activities outside of high risk seismic hazard zones, active faults, and away from low coastal areas that could potentially be impacted from tsunamis.
- Follow all applicable federal, state/territory, and local requirements for construction codes, seismic criteria, and geotechnical designs, and construct/deploy all infrastructure to standards that meet or exceed state/territory seismic requirements.
- Design and deploy resilient infrastructure to withstand earthquakes typical to the region.
- Locate construction/deployment activities outside of high-risk volcanic hazard zones.
- Locate construction/deployment activities away from steep slopes with unconsolidated material and other areas prone to landslides, to the extent practicable.
- Locate construction/deployment activities outside of areas identified as having karst topography, loosely compacted soils, and low density sediments prone to subsidence or compaction, to the extent practicable.
- Consider alternate methods to trenching for placement of fiber optic cable and transmission lines in sensitive areas.

### **11.3.2. Project-Type Specific BMPs and Mitigation Measures**

There are no project-specific BMPs and mitigation measures for geology beyond those listed above for all project types.

## **11.4. WATER RESOURCES**

### **11.4.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to water resources. The following BMPs and mitigation measures would apply to all project types:

- Minimize ground disturbance in or near waterbodies during construction, as practicable, particularly in areas prone to erosion.
- Follow all applicable federal, state/territory, and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize inputs of eroded materials into waterbodies.
- Develop a storm water pollution prevention plan.
- Include engineered or site-designed methods to control storm water.
- Include any forested riparian areas along the stream in the length of the bore to minimize impacts to forested habitat when using directional bores to cross a stream.
- Ensure the cleared width through any forested area is the minimum needed to install the line; the width should be no more than 20 feet wide through the forested area to allow the canopy to close over the line.
- Restore disturbed stream banks using bioengineering bank stabilization methods and revegetate disturbed banks with native trees, shrubs, and herbaceous plants.
- Restore stream bank slopes after project completion to stable-slope steepness (not steeper than 2:1).
- Use graded stone or riprap to protect the section of trench below the normal water level from scour or erosion if using directional boring under a stream. Any stone or riprap fill in the streambed must not be placed above the existing streambed elevation to avoid creating a fish passage obstruction. As an alternative to using stone or riprap, allow sufficient separation distance between the directional boring and the stream bottom to minimize the potential for scour or erosion to affect the installed line.

- Implement storm water reduction methods for large-scale construction activities, including minimizing impervious surfaces, using porous materials, or collecting and reusing storm water (e.g., extended detention ponds, storm water wetlands, filtration structures,<sup>8</sup> and infiltration [or recharge] basins).<sup>9</sup>
- Direct water to storm water drains for large-scale construction activities or to constructed bioretention areas,<sup>10</sup> rain gardens, or other storage and retention areas designed to slow water and allow sediments to settle out.
- Stabilize and revegetate disturbed areas as progressively and quickly as practicable to achieve stabilization and minimize the potential for erosion.
- Avoid construction of roads and other impervious surfaces in floodplain areas to the extent practicable; where necessary in floodplains, construct roads and other impervious surfaces level with existing grades, as practicable, to not change or restrict water flow.
- Station all deployables and aboveground structures outside of floodplains, to the extent practicable; if deployables or aboveground structures must be placed in floodplains, station them such that they are not vulnerable to be damaged by flood flows and do not themselves impede or restrict flood flows, as practicable.
- Restore native vegetation/wetlands to stabilize stream banks and stop erosion.
- Minimize the use of riprap and the use of alternative erosion protection materials whenever possible.
- Place only enough riprap to provide stream bank toe protection, such as from the toe of the bank, where riprap must be used. Consider using bioengineered bank stabilization methods instead of riprap.
- Meet state/territory or local regulations for development proposed in a floodway or floodplain.
- Avoid construction, where feasible, in areas with steep or unstable slopes with soils known to be particularly susceptible to soil erosion and construct facilities in alternate locations if practical.
- Develop a soil erosion and sedimentation control plan for disturbed areas, and implement BMPs, as appropriate, including the use of silt fences, erosion control blankets, progressive revegetation, and other controls as needed to reduce soil erosion, storm water runoff, and sedimentation.

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<sup>8</sup> Storm water filtration structures use a filtering media (sand, soil, gravel, peat, or compost) in storm water filtration structures to remove pollutants from storm water runoff.

<sup>9</sup> Infiltration basins (also known as recharge basins) are considered a treatment BMP because they can remove pollutants from surface discharges by capturing the storm water runoff volume (typically, larger volumes than an infiltration trench) and infiltrating it directly to the soil rather than discharging it to an aboveground drainage system.

<sup>10</sup> Bioretention is a structural storm water control measure that captures and temporarily stores storm water runoff using soils and vegetation in shallow basins or landscaped areas to provide enhanced removal of dissolved storm water pollutants, including nutrients, pesticides, organics, metals, and biological constituents.

- Seed and protect disturbed stream banks that are 3:1 or steeper with heavy-duty, net-free biodegradable erosion control blankets to minimize the entrapment and snaring of small wildlife such as snakes and turtles (follow manufacturer's recommendation for installation); seed and apply mulch on all other disturbed areas.
- Use weed-free erosion control mechanisms (such as straw wattles or straw or hay bales).
- Avoid construction activities (especially activities resulting in soil disturbance), to the extent possible, during rainy or snowmelt seasons when streamflow, rainfall, and runoff are highest.
- Minimize the total area of bare soil exposed at any one time as much as possible by constructing in stages.
- Minimize clearing of riparian and streamside vegetation, including trees, as practicable.
- Establish and clearly mark all waterbody buffers in the field with signs or highly visible flagging until construction-related ground disturbing activities are complete.
- Stabilize and revegetate disturbed areas as progressively and quickly as practicable to achieve stabilization.
- Monitor site restoration following ground disturbance activities, as required by law or permit; implement contingency measures if site restoration should fail and soil erosion occurs.
- Retain vegetative buffers, wherever possible, to prevent runoff into waterbodies.
- Revegetate all bare and disturbed areas along stream banks or shorelines with a mixture of grasses (excluding all varieties of tall fescue), legumes, and native shrub and hardwood tree species as soon as possible upon completion.
- Minimize in-stream work to the extent practicable, and when working in streams, restore streambeds and banks to original contours.
- Construct all stream crossings (roads and trenching) as close as perpendicular to the axis of the waterbody channel as engineering and routing conditions permit.
- Use standard upland construction techniques when crossing waterbodies when they are dry or frozen and not flowing or as required by permit or law, provided that it is not likely for flow to resume during construction and prior to post-construction stabilization.
- Route the stream crossing to minimize the number of waterbody crossings where waterbodies meander or have multiple channels, as practicable.
- Prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan to prevent, contain, and report accidental spills.
- Inspect and maintain tanks and equipment containing oil, fuel, or chemicals for drips or leaks to prevent spills to the ground or directly into waterbodies.
- Maintain and repair all equipment and vehicles on impervious surfaces, as practicable, away from all sources of surface water.

- Park vehicles at least 50 feet from any stream or wetland unless authorized by a permit or on an existing roadway, as practicable.
- Deposit and stabilize all excavated material not reused in an upland area outside of floodplains and streams.
- Design any structures located in floodplains, as feasible, with structural hardening to withstand flooding and to not increase the risk of flooding for other areas of the floodplain.
- Space and size culverts properly.
- Stabilize approaches to streams and stream crossings with clean rock or steel plates during construction to minimize erosion and sedimentation, as practicable.
- Place materials storage and staging areas outside of waterways and floodplain.
- Maintain adequate waterbody flow rates to protect aquatic life and prevent the interruption of existing downstream users, as practicable, if conducting in-stream construction (trenching or roads if necessary) during times that streams have flow.

#### **11.4.2. Project-Type Specific BMPs and Mitigation Measures**

The following project-specific BMPs and mitigation measures apply to Wired Projects in addition to those listed above for all project types:

- Wireless Projects
  - New Wireless Communication Towers
    - Do not permit underwater blasting and pile driving activities in any waterbody.

### **11.5. WETLANDS**

#### **11.5.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to wetlands. The following BMPs and mitigation measures would apply to all project types:

- Follow all BMPs and mitigation measures related to minimizing soil erosion, sedimentation, and soil compaction presented in Section 11.2, Soils.
- Develop management plans such as, but not limited to, wetland and vegetation management and restoration, water quality protection, and erosion and sediment control plans for the management of wetland habitat, vegetation, water quality, and soils/erosion control.
- Follow any BMPs and mitigation measures for work in or near wetlands developed by state/territory and local agencies, such as state/territory departments of transportation.
- Conduct a detailed baseline study of the wetland to be impacted to aid in restoration of pre-impact condition, including, as appropriate or required by law, a survey of wetland contours; soil texture and profile; plant species, structure, and cover; and hydrology.

- Develop a storm water pollution prevention plan.
- Time construction to outside the breeding and migratory seasons of wetland wildlife when construction is unavoidable.
- Preserve existing tree canopies and natural areas in and around wetlands as much as possible.
- Cut wetland vegetation by hand (chain or hand saw) instead of using large equipment when cutting is unavoidable.
- Use timber mats when working in or near wetlands.
- Use weed-free erosion control mechanisms (such as straw wattles or straw or hay bales).
- Prepare an SPCC Plan to prevent, contain, and report accidental spills.
- Avoid both above and belowground wetland crossings unless necessary.
- Take advantage of already disturbed areas such as easements, roads, roadway shoulders, bridges, or old railroad beds when crossing a wetland is unavoidable.
- Span a wetland by locating telecommunication poles on either side of the wetland instead of disturbing the interior, where practicable or feasible.
- Avoid diversion of surface water and groundwater sources, which could affect nearby wetlands.
- Include engineered or site-designed methods to control storm water.
- Create and maintain buffer zones around wetlands to protect their functions and values.
- Follow all applicable federal, state/territory, and local requirements related to potential wetland impacts and permitting to avoid or minimize potential wetland impacts, compensate for unavoidable impacts to wetlands, and restore impacted wetlands.
- Position deployment activities to avoid wetlands to the greatest extent practicable and to minimize the project footprint while safely and practically implementing the Proposed Action.
- Clearly mark the boundaries of wetland areas to be avoided during construction using flagging, and maintain markers until reclamation is complete (as applicable). Train equipment operators on the activities to avoid within or near wetlands.
- Segregate and salvage all topsoil up to a maximum of 12 inches of topsoil from the area disturbed in dry wetlands, where practicable, and restore topsoil to its approximate original stratum after backfilling is complete.
- Avoid temporarily storing or stockpiling materials in wetland areas or in areas that could alter wetland hydrology (causing damming and flooding) or impede or divert water (causing drying). When unavoidable, place temporary fill on geotextile fabric.
- Minimize vegetation clearing in or near wetlands. If vegetation clearing is required, minimize ground disturbance and maintain low groundcover vegetation, as well as the roots of taller vegetation.



- Install and maintain sediment barriers, as appropriate, at saturated wetlands or wetlands with standing water across the entire construction ROW upslope of the wetland boundary and where saturated wetlands or wetlands with standing water are adjacent to the construction ROW as necessary to prevent sediment flow into the wetland.
- Time construction using heavy equipment to avoid periods of heavy moisture, as appropriate, when construction within wetlands is unavoidable.
- Do not maintain, store, wash, or repair equipment in or near (within 100 feet of) wetland areas to avoid spills or contamination, where practicable. Do not use heavy equipment within wetlands, even temporarily, and do not travel through wetlands, where practicable. Use wide-tracked or low-ground pressure construction equipment and/or conventional equipment operating from the ROW, timber mats, or prefabricated equipment mats. Prohibit storage of hazardous materials, chemicals, fuels, and lubricating oils in wetlands. Use existing access roads whenever possible. Where construction is required, maintain natural drainage patterns to the extent practicable by installing culverts in sufficient number and size to prevent ponding, diversion, or concentrated runoff. Use gravel for road surfaces where possible to avoid an increase in permeable surfaces and use proper drainage structures to minimize sedimentation and erosion to adjacent wetlands.
- Consult local wetland restoration guidance, including communicating with the appropriate local agency, if one exists. Use suggested up-to-date published restoration manuals to ensure that appropriate wetland restoration measures are followed and to increase restoration success.
- Conduct a detailed baseline study of the wetland to be impacted to aid in restoration of pre impact condition, including, as appropriate or required by law, a survey of wetland contours; soil texture and profile; plant species, structure, and cover; and hydrology.
- Stockpile wetland topsoil and sod mats used during facility installation after initial use when working in areas where wetlands would be restored. Use standard reclamation protocol. Re-use the topsoil and sod mats in the post-construction wetland restoration.
- Revegetate, as applicable, bare areas as progressively and quickly as possible (preferably within the same growing season) to stabilize soils, reduce sedimentation, and avoid the spread of invasive species. Install erosion protection and leave in place until the area is revegetated and the soil is stabilized.
- Prohibit use of herbicides or pesticides within 100 feet of any wetland (unless allowed or required by the appropriate land management, tribal, or state/territory agency).
- Conduct post-construction monitoring inspections after the first growing season to determine success of revegetation, as applicable, unless otherwise required by a permit.
- Determine restoration to be successful if the surface condition is similar to adjacent undisturbed communities or found acceptable by the applicable regulatory body.

### 11.5.2. Project-Type Specific BMPs and Mitigation Measures

The following project-specific BMPs and mitigation measures apply to Wired Projects in addition to those listed above for all project types:

- New Build –Buried Fiber Optic Plant
  - Avoid, as appropriate, stockpiling material from directional drilling in a wetland, or where the stockpile could cause sedimentation into a wetland or dam water, causing flooding of a wetland area; avoid, as appropriate, setting up drilling equipment in a wetland.
  - Conduct dewatering in a manner to prevent erosion and to prevent heavily silt-laden water from flowing directly into any wetland or waterbody if dewatering an excavation.
  - Replace topsoil and restore original contours to the greatest extent practicable.
  - Install buried cable along existing road ROWs wherever possible to minimize vegetation clearing and other potential impacts to wetlands.
  - Use structures or devices to prevent subdraining or groundwater movement along new trenched-in buried conduit such as anti-seepage collars, intermittent clay barriers, trench plugs, or clay saddles.
- New Build – Aerial Fiber Optic Plant
  - Coordinate with U.S. Fish and Wildlife Service (USFWS) during site-specific reviews as required to assess whether it may be preferable and less impactful to implement line burial instead of installing lines overhead. However, depending on site conditions, installation of overhead transmission lines along existing road ROWs may minimize vegetation clearing and other potential impacts to some (but not all) wetlands.
- New Build – Submarine Fiber Optic Plant
  - Avoid, as appropriate, stockpiling material from directional drilling in a wetland, or where the stockpile could cause sedimentation into a wetland or dam water, causing flooding of a wetland area; avoid, as appropriate, setting up drilling equipment in a wetland.
  - Conduct dewatering in a manner to prevent erosion and to prevent heavily silt-laden water from flowing directly into any wetland or waterbody if dewatering an excavation.
  - Replace topsoil and restore original contours to the greatest extent practicable.

## 11.6. BIOLOGICAL RESOURCES

### 11.6.1. Terrestrial Vegetation

#### *11.6.1.1. BMPs and Mitigation Measures for All Project Types*

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to terrestrial vegetation. The following BMPs and mitigation measures would apply to all project types:

- Engage in early consultation with appropriate agencies and stakeholders, including but not limited to the USFWS and state/territory agencies.
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce vegetation loss.
- Avoid high-quality habitat.<sup>11</sup>
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss and habitat fragmentation. Control fugitive dust generated by the use of unpaved roads and construction.
- Limit construction equipment and vehicles to approved roads or ROWs.
- Avoid construction/deployment in areas with sensitive vegetation (i.e., woodlots and wetlands), unique habitat (i.e., shorelines and stream banks), or designated natural resources, if practical.
- Close and revegetate any temporary and unnecessary roads after project completion.
- Segregate topsoil or surface soil from subsurface layers during construction for reuse during post-construction seeding.
- Restore disturbed areas as progressively and quickly as possible to pre-construction use; grade and apply vegetation cover using appropriate and certified seed mixes and seed dispersal, management, and maintenance processes, as applicable.
- Revegetate with native species that approximate pre-disturbance plant community composition.
- Use existing roads and regularly maintained areas when conducting routine maintenance and inspections to the extent feasible.
- Follow all applicable federal, state/territory, and local requirements for vegetation removal, disturbance, and restoration.

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<sup>11</sup> High-quality habitats contain high plant diversity and low numbers of non-native or invasive plants; are left in a natural state; and have high-quality plants or ones that are very valuable to wildlife. Disturbed habitats generally contain non-native, invasive species and extremely low plant diversity; are under regular maintenance; and consist of low quality or unsuitable habitat. Professional biologists can typically provide a basic assessment of the quality of the site based on one or more site visits. Private consultants can also evaluate habitat quality through a standardized assessment tool, the Floristic Quality Assessment. This assessment provides a quantitative assessment score, rating sites on a scale from 0 to 10 (10 being the highest quality).

- Obtain all appropriate permits and comply with conditions to minimize or avoid impacts to vegetation.
- Minimize or avoid forest removal whenever possible.
- Identify all areas within the proposed construction footprint that contain noxious or invasive plants and use pre-construction treatments such as mowing or herbicide applications (in consultation with appropriate agencies and stakeholders) prior to ground disturbance activities.
- Store soil containing noxious or invasive plants in a location away from clean topsoil and subsoil.
- Inspect and clean all construction equipment and deployable vehicles with high-pressure washing equipment to remove soil and plant matter prior to moving to the next job site or staging location.
- Locate staging areas and construction sites in previously disturbed areas.

#### ***11.6.1.2. Project-Type Specific BMPs and Mitigation Measures***

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

### **11.6.2. Wildlife**

#### ***11.6.2.1. BMPs and Mitigation Measures for All Project Types***

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to wildlife. The following BMPs and mitigation measures would apply to all project types:

- Engage in early consultation with appropriate agencies and stakeholders as necessary, including but not limited to USFWS, the National Marine Fisheries Service (NMFS), and relevant state/territory wildlife and natural resource agencies.
- Give preference to development options that involve use of existing physical infrastructure, and/or that do not involve new aboveground structures (e.g., collocation on existing structures, etc.).
- Minimize vehicular harm of animals migrating between seasonal habitats by locating activities, roads, and infrastructure away from these areas or installing barriers along roadsides.
- Locate project activities, facilities, and roads away from key habitats (e.g., wetlands, cays,<sup>12</sup> and stream sites) for amphibians and reptiles.

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<sup>12</sup> Cays are small, low-elevation, sandy islands on the surface of a coral reef.

- Control the spread of invasive animals and plants by coordinating mowing schedules and assisting agencies and groups with ROW permits, washing mowers and equipment between sites, and educating staff.
- Consolidate facilities as much as possible (e.g., collocation and use of existing ROWs).
- Avoid known calving/lambing areas in Alaska during critical life stages when undertaking deployment and associated activities (these times vary greatly depending on region, species, and habitat).
- Assess locations of roost sites for bats and timing of critical life stages (e.g., maternity and weaning periods), hibernation for deployment and associated activities (these times vary greatly depending on region, species, and habitat).
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall habitat fragmentation.
- Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship, lambing/calving, pupping and molting [haulout period], spring/fall migrations) seasons.
- Do not permit pets on site in order to avoid harassment and disturbance of wildlife.
- Report observations of potential wildlife interactions, including wildlife mortality, to the appropriate agency immediately.
- Avoid known marine mammal haulouts or concentration areas as locations for deployment and associated activities.
- Provide for passage of fish and wildlife in new crossings and avoid reducing the efficiency of a structure to allow passage.
- Avoid roads and ROWs that provide access to critical wildlife habitat and near known migration routes (especially terrestrial and semi-aquatic wildlife routes), stopover sites, and large blocks of habitat.
- Assess critical life stages of marine mammals hauled out near locations (1 mile) selected for deployment and associated activities.
- Avoid development in areas that contain high densities of breeding or wintering birds, in high wildlife use areas, migratory staging areas, woodlots, riparian corridors, Audubon Important Bird Areas, nature preserves, state and national parks, state forests, fish and wildlife areas, and other publicly owned properties.
- Reduce habitat fragmentation, minimize the number of new roads constructed, and maximize use of existing corridors, roads, disturbed or developed areas.
- Assess potential noise impacts to migrating whales and local pinnipeds if deployment and activities would occur over sea ice. Control the spread of invasive animals and plants by coordinating mowing schedules, assisting agencies and groups with ROW permits, washing mowers and equipment between sites, and educating staff.

- Develop “good housekeeping” procedures to ensure that sites are kept clean of debris, garbage, and/or waste.
- Follow food and waste management protocols to minimize attractants to proposed network deployment sites.
- Restore habitat in construction zones, staging areas, etc. once construction is complete.
- Follow recommendations outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC 2006*; *APLIC and USFWS 2005*; *APLIC 2012*) for any aboveground lines or cables (e.g., use of diverters and anti-nesting devices).
- Install bat exclusions and/or deterrents on existing and new structures.
- Turn off all unnecessary lighting at night.
- Minimize or avoid the need for or use of specific types of illumination (e.g., sodium vapor lights) at site facilities to reduce attraction of migratory birds.
- Determine during site-specific reviews the feasibility and effectiveness of implementing construction timing windows to avoid or minimize adverse effects to bird nests, eggs, and young birds and implement if practicable or feasible.
- Monopole structures should be considered in place of lattice structures, to the extent practicable or feasible. If lattice structures are to be used, FirstNet and/or their partners would work with the USFWS to incorporate anti-nesting devices into project design, as practicable or feasible.
- Work with USFWS to choose appropriate markers when towers requiring guy wires are necessary. Markers should be regularly maintained for the life of the project.
- Use outdoor security or safety lights, as practicable or feasible, that are motion-triggered, downcast and/or down-shielded, and directed inward whenever possible to prevent “star” effects when viewed offsite during construction/deployment and operation, particularly in coastal areas.
- Use structures containing the fewest perching options in areas where raptors and raven predation of sensitive resources is a concern.
- Use structures and components compatible with the guidance in *APLIC 2006* where raptor electrocution is a concern.
- Follow, as practicable or feasible, the suggested practices by the APLIC to minimize impacts to migratory birds through collision and electrocution.

The following BMPs and mitigation measures are recommended by USFWS, including guidelines on communications tower siting (2012a, 2013b):

“1. Collocation of the communications equipment on an existing communication tower or other structure (e.g., billboard, water and transmission tower, distribution pole, or building mount) is strongly recommended. Depending on tower load factors and communication needs, from 6 to 10 providers should collocate on an existing tower or structure provided that frequencies do not overlap/‘bleed’ or where frequency length or broadcast distance requires higher towers. New towers should be designed structurally and electronically to accommodate the applicant’s antenna, and antennas of at least 2 additional users—ideally 6 to 10 additional users, if possible—unless the design would require the addition of lights and/or guy wires to an otherwise unlit and/or unguyed tower. This recommendation is intended to reduce the number of towers needed in the future.

2. If collocation is not feasible and a new tower or towers are to be constructed, it is strongly recommended that the new tower(s) should be not more than 199 feet above ground level (AGL), and that construction techniques should not require guy wires. Such towers should be unlighted if Federal Aviation Administration (FAA) regulations and lighting standards (*FAA 2007, Patterson 2012, FAA 2013 lighting circular anticipated update* [<sup>13</sup>]) permit. Additionally, the Federal Communications Commission (FCC) through recent rulemaking now requires that new towers > 450 ft AGL contain no red-steady lights. FCC also recommends that new towers 350-450 ft AGL also contain no red-steady lights, and they will eventually recommend that new towers < 350 ft AGL convert non-flashing lights to flash with existing flashing lights. LED lights are being suggested as replacements for all new construction and for retrofits, with the intent of future synchronizing the flashes. Given these dynamics, the Service recommends using lattice tower or monopole structures for all towers < 200 ft AGL and for taller towers where feasible. The Service considers the less than 200 ft AGL option the ‘gold standard’ and suggests that this is the environmentally preferred industry standard for tower placement, construction and operation—i.e., towers that are unlit, unguyed, monopole or lattice, and less than 200 ft AGL.

3. If constructing multiple towers, the cumulative impacts of all the towers to migratory birds—especially to Birds of Conservation Concern (*[US]FWS 2008*) and threatened and endangered species, as well as the impacts of each individual tower, should be considered during the development of a project.

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<sup>13</sup> Current FAA guidance (*FAA 2016a*) requires lighting for towers greater than 200 feet.

4. The topography of the proposed tower site and surrounding habitat should be clearly noted, especially in regard to surrounding hills, mountains, mountain passes, ridge lines, rivers, lakes, wetlands, and other habitat types used by raptors, Birds of Conservation Concern, and state and federally listed species, and other birds of concern. Active raptor nests, especially those of Bald and Golden Eagles, should be noted, including known or suspected distances from proposed tower sites to nest locations. Nest site locations for Golden Eagles may vary between years, and unoccupied, inactive nests and nest sites may be re-occupied over multiple years. The Service's 2013 Eagle Conservation Plan Guidance, Module 1, Land-based Wind Energy, Version 2, available on our website, is a useful document (*USFWS 2013[a]*).

5. If at all possible, new towers should be sited within existing 'antenna farms' (i.e., clusters of towers), in degraded areas (e.g., strip mines or other heavily industrialized areas), in commercial agricultural lands, in Superfund sites, or other areas where bird habitat is poor or marginal. Towers should not be sited in or near wetlands, other known bird concentration areas (e.g., state of federal refuges, staging areas, rookeries, and Important Bird Areas), in known migratory, daily movement flyways, areas of breeding concentration, in habitat of threatened or endangered species, or key habitats for Birds of Conservation Concern (*[US]FWS 2008*). Disturbance can result in effects to bird populations which may cumulatively affect their survival. The Service has recommended some disturbance-free buffers, e.g., 0.5 mi around raptor nests during the nesting season, and 1-mi disturbance free buffers for Ferruginous Hawks and Bald Eagles during nesting season in Wyoming (*[US]FWS WY Ecological Services Field Office, referenced in Manville 2007:23*). The effects of towers on 'prairie grouse,' 'sage grouse,' and grassland and shrub-steppe bird species should also be considered since tall structures have been shown to result in abandonment of nest site areas and leks, especially for 'prairie grouse' (*Manville 2004*). The issue of buffers is currently under review, especially for Bald and Golden Eagles. Additionally, towers should not be sited in areas with a high incidence of fog, mist, and low cloud ceilings.

6. If taller (> 199 ft AGL) towers requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used.<sup>[14]</sup> Unless otherwise required by the FAA, only white strobe or red strobe lights (red preferable since it is generally less displeasing to the human eye at night), or red flashing incandescent lights should be used at night, and these should be the minimum number, minimum intensity (< 2,000 candela), and minimum number of flashes per minute (i.e., longest duration between flashes/'dark phase') allowable by the FAA. The use of solid (non-

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<sup>14</sup> This guidance (*USFWS 2013b*) was based on earlier FAA guidance that has since been updated. Current FAA guidance (*FAA 2016a*) now requires lighting for towers greater than 200 feet.



flashing) warning lights at night should be avoided (*Patterson 2012, Gehring et al. 2009*)—see recommendation #2 above. Current research indicates that solid red lights attract night-migrating birds at a much higher rate than flashing lights (*Gehring et al. 2009, Manville 2007, 2009*). Recent research indicates that use of white strobe, red strobe, or red flashing lights alone provides significant reductions in bird fatalities (*Patterson 2012, Gehring et al. 2009*).

7. Tower designs using guy wires for support, which are proposed to be located in known raptor or waterbird concentrations areas, daily movement routes, major diurnal migratory bird movement routes, staging areas, or stopover sites, should have daytime visual markers or bird deterrent devices installed on the wires to prevent collisions by these diurnally moving species. The efficacy of bird deterrents on guy wires to alert night migrating species has yet to be scientifically validated. For guidance on markers, see *Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines - State of the Art in 2006*. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, DC, and Sacramento, CA. 207 pp, and APLIC. 2012. *Reducing Avian Collisions with Power Lines – the State of the Art in 2012*. Edison Electric Institute and APLIC. Washington, DC. 159 pp. Also see [www.aplic.org](http://www.aplic.org), [www.energy.ca.gov](http://www.energy.ca.gov), or call 202-508-5000.

8. Towers and appendant facilities should be designed, sited, and constructed so as to avoid or minimize habitat loss within and adjacent to the tower ‘footprint.’ However, a larger tower footprint is preferable to the use of guy wires in construction. Several shorter, un-guyed towers are preferable to one, tall guyed, lighted tower. Road access and fencing should be minimized to reduce or prevent habitat fragmentation, disturbance, and the creation of barriers, and to reduce above ground obstacles to birds in flight.

9. If, prior to tower design, siting and construction, if it has been determined that a significant number of breeding, feeding and roosting birds, especially of Birds of Conservation Concern (*[US]FWS 2008*), state or federally-listed bird species, and eagles are known to habitually use the proposed tower construction area, relocation to an alternate site is highly recommended. If this is not an option, seasonal restrictions on construction are advised in order to avoid disturbance, site and nest abandonment, especially during breeding, rearing and other periods of high bird activity.

10. Security lighting for on-ground facilities, equipment and infrastructure should be motion- or heat-sensitive, down-shielded, and of a minimum intensity to reduce nighttime bird attraction and eliminate constant nighttime illumination, but still allow safe nighttime access to the site (*USFWS 2012[b], Manville 2011*).

11. Representatives from the USFWS or researchers from the Research Subcommittee of the Communication Tower Working Group should be allowed access to the site to evaluate bird use; conduct dead-bird searches; place above ground net catchments below the towers (*Manville 2002*); and to perform studies using radar, Global Position System, infrared, thermal imagery, and acoustical monitoring, as necessary. This will allow for assessment and verification of bird movements, site use, avoidance, and mortality. The goal is to acquire information on the impacts of various tower types, sizes, configurations and lighting protocols.

12. Towers no longer in use, not re-licensed by the FCC for use, or determined to be obsolete should be removed from the site within 12 months of cessation of use, preferably sooner.

13. In order to obtain information on the usefulness of these guidelines in preventing bird strikes and better understanding impacts from habitat fragmentation, please advise USFWS personnel of the final location and specifications of the proposed tower, and which measures recommended in these guidelines were implemented. If any of these recommended measures cannot be implemented, please explain why they are not feasible. This will further advise USFWS in identifying any recurring problems with the implementation of the guidelines, which may necessitate future modifications.”

Additional tower lighting BMPs are described in Section 11.6.2.2, Project-Type Specific BMPs and Mitigation Measures.

#### ***11.6.2.2. Project-Type Specific BMPs and Mitigation Measures***

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Deployable Technologies
  - Avoid activities within migratory bird flyways and in the immediate vicinity of bat roosts to the extent practicable.
  - Site towers away from known communal bat use areas and high bird use areas to the extent practicable or feasible.
  - Do not operate aircraft at an altitude that could disturb known natural roosting sites of bats, with the exception only for severe weather conditions.
  - Do not operate aircraft at an altitude lower than 1,500 feet within 0.5 mile of known walrus observed on land or ice, with the exception only for severe weather conditions.

- Wired Projects
  - New Build – Aerial Fiber Optic Plant
    - Follow recommendations outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC 2006; APLIC and USFWS 2005; APLIC 2012*) for any aboveground lines or cables (e.g., use of diverters and anti-nesting devices).
    - Install bat exclusions and/or deterrents on existing and new structures.
  - Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable
    - Follow recommendations outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC 2006; APLIC and USFWS 2005; APLIC 2012*) for any aboveground lines or cables (e.g., use of diverters and anti-nesting devices).
- Wireless Projects
  - New Wireless Communication Towers
    - Follow USFWS Guidelines For Recommendations On Communications Tower Siting, Construction, Operation, and Decommissioning (*USFWS 2012a*).
    - Insert anti-nesting devices on existing or new structures.
    - Site towers away from known communal bat use areas and high bird use areas to the extent practicable or feasible.
    - Construct new towers more than 3 miles from any ocean (or Great Lake shoreline), as practicable or feasible. If towers must be closer than 3 miles from the shoreline:
      - Conduct site-specific studies;
      - Ensure towers are self-standing (un-guyed); and
      - Ensure towers are short enough to not require lighting, as practicable or feasible. If towers do require lighting, install lighting that does not include steady-burning lights, as practicable or feasible.
    - Follow the FAA requirements to eliminate steady-burning flashing obstruction lights and use only flashing obstruction lights in accordance with FAA Advisory Circulars AC 70/7460-1L and AC 150/5345-43H (*FAA 2016a; FAA 2016b; FCC 2017*).
  - Collocation on Existing Wireless Tower, Structure, or Building
    - Follow the FAA requirements to eliminate steady-burning flashing obstruction lights and use only flashing obstruction lights in accordance with FAA Advisory Circulars AC 70/7460-1L and AC 150/5345-43H (*FAA 2016a; FAA 2016b; FCC 2017*).

### 11.6.3. Fisheries and Aquatic Habitats

#### 11.6.3.1. BMPs and Mitigation Measures for All Project Types

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to fisheries and aquatic habitats. The following BMPs and mitigation measures would apply to all project types:

- Avoid construction, as practicable, during sensitive seasons for fish such as migration, spawning, egg development (including intra-gravel development) and larval fish (benthic<sup>15</sup> or pelagic<sup>16</sup>) development (sensitive seasons/time periods vary by species and location).
- Consolidate facilities as much as possible.
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts.
- Revegetate and restore riparian areas and other vegetated areas around aquatic resources to the extent possible once construction activities are complete.
- Report spills or other observed pollutants to the appropriate agency immediately.
- Prepare an SPCC Plan to prevent, contain, and report accidental spills.
- Instruct all construction employees to avoid harassment and disturbance of fish and other aquatic species, and report any signs of mortality to the appropriate agency immediately.
- Avoid productive habitats to the extent practicable, such as coastal wetlands, inland waterways, essential fish habitats, spawning areas, and reefs.
- Minimize sedimentation and turbidity in fish habitats by implementing sediment and erosion control measures, as practicable; the use of such measures (e.g., silt fences, silt curtains,<sup>17</sup> and erosion control blankets) could reduce erosion and sedimentation.
- Minimize the amount of fill placed in wetlands and streams when constructing access roads by installing bridges and or culverts; work with the appropriate agency to use culverts and bridges that are appropriately designed and sized for fish passage.
- Use set-backs when clearing vegetation for construction, where appropriate, from riparian zones to avoid removal of important fish cover such as vegetation, boulders, and large woody debris.
- Perform regular maintenance checks of equipment near coastal areas, waterways, and other protected areas to minimize detachment of components reaching critical habitat.
- Consider tidal regimes when deploying near coastal areas to help prevent loss of equipment and marine debris in nearby coastal fish habitat.

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<sup>15</sup> Benthic means anything associated with or occurring on the bottom of a body of water.

<sup>16</sup> Pelagic means anything that inhabits the water column as opposed to being associated with the sea floor, generally occurring anywhere from the surface to 1,000 meters (*NOAA 2006*).

<sup>17</sup> Silt curtains are floating barriers used in marine construction and remediation to control silt and sediment in a body of water.

- Utilize buffer zones, temporary or permanent native seeding on disturbed ground, ground cover, plastic sheeting, and/or matting to minimize sedimentation.
- Develop a storm water pollution prevention plan.
- Avoid construction/deployment, as practicable, in productive riparian zones, marine preserves, and wetlands since construction could potentially result in less refuge for fish, fundamental changes in channel structure (e.g., loss of pool habitats), instability of stream banks, and alteration of nutrient and prey sources within the shoreline aquatic community (*Hanson et al. 2003*).
- Implement an emergency response plan for fuel spills and environmental emergencies.
- Include secondary containment for hazardous materials such as fuels and use uplands, as feasible, away from streams and waterbodies for refueling of construction or operations equipment.
- Implement invasive species plans to minimize introduced aquatic plant and animal species into the Proposed Action areas (e.g., wash and inspect equipment and vehicles before moving from one drainage basin or watershed to the next).
- Minimize construction noise in and near fish habitats, as practicable.
- Avoid physical barriers in waterbodies, to the extent practicable, during installation and operation to allow for the migration of invertebrates and other aquatic fauna.
- Follow all applicable federal and state/territory requirements for construction activities near fish and fish habitat.

#### ***11.6.3.2. Project-Type Specific BMPs and Mitigation Measures***

The following project-specific BMPs and mitigation measures apply to Wired Projects in addition to those listed above for all project types:

- New Build – Buried Fiber Optic Plant
  - Use horizontal directional drilling where possible and appropriate, for stream crossings to avoid potential impacts to the streambed, banks, and associated fish habitat.

### **11.6.4. Threatened and Endangered Species and Species of Conservation Concern**

#### ***11.6.4.1. BMPs and Mitigation Measures for All Project Types***

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to threatened and endangered species and species of conservation concern. The following BMPs and mitigation measures would apply to all project types:

- Fully adhere to the compliance requirements of the Endangered Species Act.
- Engage in early consultation with appropriate agencies and stakeholders including, but not limited to, USFWS, NMFS, and state/territory wildlife and natural resources agencies.
- Avoid conducting deployment activities in areas with known locations or habitats for threatened and endangered plants.
- Instruct all construction employees to identify and report any sightings of listed species, to avoid harassment and disturbance of wildlife, and to not disturb or enter any nearby caves or mines.
- Follow food and waste management protocols to minimize attractants to the deployment site.
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall habitat fragmentation.
- Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts.
- Prohibit any pets on site during construction or deployment.
- Report observations of sensitive species that are injured, dead, or entangled to the appropriate agency immediately.
- Consolidate Proposed Action facilities as much as possible (e.g., collocation and use of existing ROWs).
- Implement seasonal and spatial buffer zones for construction and other potentially disturbing activities during sensitive periods for listed species such as breeding, nesting, calving/pupping, haulout, migration, spawning, and egg development as identified by USFWS, the NMFS, and/or relevant state/territory agency.
- Avoid removal or disturbance of forest to the maximum extent practicable and ensure that any unavoidable forest impacts do not result in the loss of listed snails, butterflies, bird breeding habitat, or bat roost sites or hibernacula.<sup>18</sup>
- Avoid activities within seagrass beds and control turbidity to minimize potential indirect impacts on seagrass.
- Avoid potential impacts to known grouper spawning sites.
- Avoid potential impacts within coastal estuarine habitats.
- Train construction and deployment staff in the Proposed Action BMPs and mitigation measures and incentivize reporting of any lapses in BMP and mitigation measure implementation.
- Implement a strict policy prohibiting pets on site and prohibiting hunting or fishing or any other action that would result in any avoidable disturbance of listed species.

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<sup>18</sup> Hibernacula are the habitats within which animals hibernate or otherwise seek refuge for extended periods.

- Use setbacks from riparian zones when clearing vegetation for construction to avoid removal of important fish cover such as vegetation boulders and large woody debris.
- Follow all applicable federal and state/territory requirements for construction activities near fish and fish habitat.
- Use appropriate sediment and erosion control measures to minimize sedimentation and turbidity in fish habitats.
- Minimize the use of coastal lighting, particularly in the vicinity of known turtle nesting areas. If the use of coastal lighting in sea turtle use areas is unavoidable, use turtle safe lighting instead of normal lights (low-pressure sodium-vapor lighting or red lights that emit a very narrow portion of the visible light spectrum) and consult with local sea turtle experts on the design of the coastal lighting plan.
- Implement an emergency response plan for fuel spills and environmental emergencies.
- Include secondary containment for hazardous materials and use non-wetland sites away from streams and waterbodies for refueling of construction or operations equipment.
- Implement invasive species plans to minimize introduced aquatic plant and animal species into the areas affected by the Proposed Action (e.g., wash and inspect equipment and vehicles before moving from one drainage basin or watershed to the next).
- Implement the same construction and deployment BMPs and mitigation measures for any operational activities that involve any major infrastructure replacement as part of ongoing system maintenance.
- Implement seasonal and spatial buffer zones for operational activities that involve potentially disturbing activities in listed species use areas.
- Implement “good housekeeping” procedures to ensure that during operation the sites would be kept clean of debris, garbage, and fugitive trash or waste.
- Turn off all unnecessary lighting at night.
- Avoid or minimize the use of sodium vapor lights at site facilities to reduce attraction of migratory birds.
- Develop and implement operational monitoring and adaptive management procedures.
- Prepare an SPCC Plan to prevent, contain, and report accidental spills.
- Post and enforce speed limits on access roads, particularly within areas where a listed animal may be struck by construction and/or maintenance vehicles.

#### **11.6.4.2. Project-Type Specific BMPs and Mitigation Measures**

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- **Wired Projects**
  - New Build – Aerial Fiber Optic Plant
    - Follow recommendations outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC 2006; APLIC and USFWS 2005; APLIC 2012*) for any aboveground lines or cables (e.g., use of diverters and anti-nesting devices).
  - Collocation on Existing Aerial Fiber Optic Plant
    - Follow recommendations outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC 2006; APLIC and USFWS 2005; APLIC 2012*) for any aboveground lines or cables (e.g., use of diverters and anti-nesting devices).
- **Wired Projects**
  - Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable
    - Minimize underwater construction noise in all aquatic habitats by minimizing vessel speed, using quieter equipment or technologies, or deploying bubble curtains or other noise screens during underwater work.
    - Implement a marine observer program during construction and operation to avoid and minimize boat strikes to whales, sea turtles, seals, and dugongs.
- **Deployable Technologies**
  - Restrict aircraft operation at altitudes lower than 1,500 feet within 0.5 mile of known pupping or haulout areas during critical life stages, with the exception only for severe weather conditions.
  - Keep aircraft above altitudes higher than 1,500 feet within 0.5 mile of walruses and seals hauled out on land or ice, with the exception only for severe weather conditions.

### **11.7. LAND USE, AIRSPACE, AND RECREATION**

#### **11.7.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to land use, airspace, and recreation. The following BMPs and mitigation measures would apply to all project types:

- Give preference to development options that involve use of existing physical infrastructure, and/or that do not involve new aboveground structures (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.), especially near recreation lands.



- Give preference to development options that are compatible with existing zoning and applicable comprehensive plans.
- Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (i.e., cut and fill) or vegetation, and that are as far from surrounding residences as possible.
- Retain existing vegetation wherever possible to provide visual screening of new infrastructure.
- Select infrastructure designs that minimize contrast with the surrounding landscape and land uses.
- Avoid infrastructure locations on easements established for wildlife habitat and other conservation purposes, to the extent practicable and feasible, and ensure compliance with applicable conditions and restrictions for locations on conservation lands.
- Select infrastructure locations that are as far from recreation lands as practicable and feasible.
- Select infrastructure designs that minimize construction footprints.
- Give preference to infrastructure locations that are compatible with existing park or recreation planning documents.
- Avoid or minimize, as practicable and feasible, construction activities in areas covered by existing incompatible easements.

### **11.7.2. Project-Type Specific BMPs and Mitigation Measures**

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wireless Projects
  - New Wireless Communication Towers
    - Select the shortest possible structures necessary to meet the FirstNet system's needs, and only deploy towers less than 200 feet in height.
    - Place new infrastructure near existing similar infrastructure where possible, to minimize the total number of new aerial navigation hazards.
    - Avoid placing new infrastructure near airports or the areas regulated under the FAA's Part 77 regulations (*FAA 2016a*).
    - Avoid placing new infrastructure within Military Operations Areas or under Military Training Routes.
    - Work closely with the National Park Service (NPS) to address any concerns they might have if a tower needs to be placed in an area that might affect the nighttime sky at an NPS unit.

- Deployable Technologies
  - Limit the use of Deployable Airborne Communications Architecture to areas less likely to be used by commercial, military, or private aviation (to the degree feasible, and in consultation with the FAA and Department of Defense).

## **11.8. VISUAL RESOURCES**

### **11.8.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to visual resources. The following BMPs and mitigation measures would apply to all project types:

- Take the scenic character of the surrounding area into account in the proposed design to reasonably minimize or avoid visual impacts to the surrounding area when viewed from existing roadways or shorelines (design structures to complement the natural landscape; for example, use paint that blends with the surrounding landscape).
- Utilize non-reflecting coatings on towers, antennas, buildings, and associated structures where possible.
- Implement sensitive grading techniques that blend grading with the natural terrain.
- Treat all disturbed slopes for erosion control.
- Minimize the area of bare soil at any one time as much as possible by constructing in stages.
- Revegetate disturbed areas as progressively and quickly as practicable to restore vegetative cover.
- Reduce or eliminate the need for lighting on poles or structures, or to restrict the duration and directionality of needed lighting.
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.), and specifically avoid the construction of new aerial fiber optic plant and/or new wireless communication towers within, or in locations within sight of, federal or other lands where visual resources are regulated (e.g., units of the National Park System, or areas where local zoning regulations emphasize protection of views or aesthetic conditions), or where residents and visitors have come to expect high visual quality and the absence of human-built structures.
- Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (i.e., cut and fill) or vegetation, and that are as far from surrounding residences as possible.
- Select infrastructure designs that minimize construction footprints.
- Retain existing vegetation wherever possible to provide visual screening of new infrastructure.

- Select infrastructure designs that minimize contrast with the surrounding landscape.
- Comply with all relevant and applicable federal regulations and guidance regarding visual and aesthetic conditions and impacts.

### **11.8.2. Project-Type Specific BMPs and Mitigation Measures**

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wireless Projects
  - New Wireless Communication Towers
    - Work closely with the NPS to address any concerns they might have if a tower needs to be placed in an area that might affect the nighttime sky at an NPS unit.
- Deployable Technologies
  - Select parking locations for deployable technologies that are screened from view by topography or vegetation, that are as far away from as many observers as possible, and that are not in or near areas considered scenic, such as shorelines, ridgelines, or scenic roads.
  - Select deployable designs that minimize the use of nighttime lighting, that include shielded or directional nighttime lighting, and/or that use the minimum nighttime lighting required for safe operations.

## **11.9. SOCIOECONOMICS**

### **11.9.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to socioeconomics. The following BMPs and mitigation measures would apply to all project types:

- Avoid development of new wireless communication towers in or near residential areas to reduce the potential that such activities could have adverse impacts on residential property values. Acceptable distances could vary, depending on the nature of the aesthetic impacts, the nature of other objectionable effects that influence property values, and other factors such as residential density, local concern over aesthetics, desire for improved wireless communications, local media response, and more. According to a recent literature review, measurable adverse impacts of wireless communication towers on property values are generally not observable beyond 300 meters (984 feet), and often are not observable beyond 100 meters (328 feet) (*Bond et al. 2013*).

- Avoid development or enlargement of storage, staging, and launch/landing areas for deployable technologies in or near residential areas to reduce the potential that such activities could have adverse impacts on residential property values. Acceptable distances could vary depending on the size of the facility, types of activities occurring there, the nature of the aesthetic impacts or other aspects that influence property values, and other factors such as residential density, local concern over aesthetics, desire for improved wireless communications, local media response, and more.
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.).
- Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (i.e., cut and fill) or vegetation and that are as far from surrounding residences as possible.
- Retain existing vegetation wherever possible to provide visual screening of new infrastructure.
- Select infrastructure designs that minimize contrast with the surrounding landscape.
- Give preference to hiring workers who are local residents, where practicable. In addition to reducing influx and associated social cohesion effects; this BMP would have the following effects on socioeconomic resources:
  - Reducing demand for public services, since employees would already be residents (i.e., existing public service users).
  - Increasing local employment and economic activity through wages and spending.
- Share deployment plans with public service providers, especially first responders, as early in the process as possible, and throughout the deployment process. This will provide advance notice to public service providers, and would particularly allow first responders to be better prepared for emergencies that could arise during deployment.
- Consult with subsistence users (including Indigenous Peoples and other individuals or groups for whom subsistence is a way of life) to understand the species and habitats used for subsistence activities, as well as the seasonal cycle of subsistence activity.
- Select infrastructure locations that minimize or avoid disturbance of subsistence species habitat.

### **11.9.2. Project-Type Specific BMPs and Mitigation Measures**

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

## **11.10. ENVIRONMENTAL JUSTICE**

### **11.10.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential environmental justice impacts. The following BMPs and mitigation measures would apply to all project types:

- Identify specific communities (i.e., neighborhoods or populations that may be contained within individual block groups), where possible, that are at risk of experiencing environmental justice impacts (this is important in Alaska given the size of block groups, particularly in rural areas). Conduct targeted outreach to these communities, tailored to the specific racial, ethnic, financial, and/or cultural background, as early in the development process as possible to explain the nature and extent of specific potential impacts, and to gain feedback on those impacts.
- Consult with subsistence users (including Indigenous Peoples and other individuals or groups for whom subsistence is a way of life) to understand the species and habitats used for subsistence activities, as well as the seasonal cycle of subsistence activity.
- Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.).
- Select infrastructure locations, where possible, that are not within or near environmental justice communities, particularly new build options.
- Follow all BMPs identified throughout this chapter that reduce adverse impacts of construction activities, such as generation of noise, dust, and traffic.
- Avoid siting deployment activities and facilities requiring construction in proximity to environmental justice communities to reduce the potential that such activities would be seen as disproportionately affecting environmental justice communities. In general, proximity means within a distance at which noise and dust would be considered objectionable or where effects on traffic volume or patterns would be considered detrimental to local residents or businesses.
- Avoid development of new wireless communication towers in proximity to environmental justice communities because of their potential impacts on property values and to reduce the potential that such activities would be seen as disproportionately affecting environmental justice communities. Proximity could be defined variably depending on the nature of the aesthetic impacts, nature of other objectionable effects that influence property values, and other factors such as local concern over aesthetics, desire for improved wireless communications, local media response, and more. According to a recent literature review, measurable adverse impacts on property values are generally not observable beyond 300 meters (984 feet), and often are not observable beyond 100 meters (328 feet) (*Bond et al. 2013*).

### **11.10.2. Project-Type Specific BMPs and Mitigation Measures**

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

## **11.11. CULTURAL RESOURCES**

### **11.11.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to cultural resources. The following BMPs and mitigation measures would apply to all project types:

- Comply with the requirements of Section 106 of the National Historic Preservation Act.
- Follow all applicable federal and state requirements if inadvertent discoveries of human remains are made during deployment or operations.
- Ensure usage of an appropriate indirect effects Area of Potential Effects as part of pre-siting or pre-deployment surveys to sufficiently account for potential indirect effects to cultural resources.
- Establish procedures for pre-deployment monitoring if a project has the potential to adversely indirectly affect historic properties to collect baseline data, monitor potential indirect effects during deployment, and determine if effects have occurred post-deployment. Develop BMPs and mitigation measures as part of a Memorandum of Agreement or Programmatic Agreement to address any potential effects, if they were to occur.
- Use low-impact construction alternatives, when feasible. For instance, ripping could be used as an alternative to blasting near structures or archaeological sites identified as at risk of effects from vibration. Other techniques such as bored piling could be used to minimize the vibration generated, where possible.
- Restrict the timing of deployment activities so as not to disturb the use of historic properties, as applicable. Stop work at certain times when traditional and/or religious properties are in use, such as during significant events (e.g., religious festivals or ceremonies).
- Design projects to mitigate potentially negative visual and auditory impacts of facilities. The following visual and noise abatement techniques should be considered: noise-reducing barriers, low-profile constructions, proper siting to maximize the use of topography and vegetation, screening, blending with topographic forms and existing vegetation patterns, and use of environmental coloration or advanced camouflage techniques to limit visual effects.
- Consult with site users through a community liaison team to understand site usage and how the project could affect user access.
- Arrange alternative access using stakeholder input if access to an important cultural heritage site is restricted or blocked. Notify the public of the blockage and alternate means of access.

- Follow all applicable federal requirements for agency and tribal consultation on the identification of and assessment of effects to cultural resources.
- Avoid deployment in areas with known historic properties and deploy equipment and facilities in alternate locations if practical.

### **11.11.2. Project-Type Specific BMPs and Mitigation Measures**

There are no project-specific BMPs and mitigation measures for cultural resources beyond those listed above for all project types.

## **11.12. AIR QUALITY**

### **11.12.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to air quality. The following BMPs and mitigation measures would apply to all project types:

- Follow all applicable federal, state/territory, and local requirements for obtaining air pollution control permits for applicable emission sources.
- Use engines certified to the lowest emission standards and engines that burn alternative fuels (e.g., natural gas, biofuels), and/or install emission control devices (when practicable) for equipment with internal combustion engines.
- Use vehicles with hybrid or electric technology, when possible, to reduce or eliminate criteria pollutant emissions from fuel combustion.
- Use renewable energy, as practicable or feasible, for backup power at buildout locations (cell tower sites, for example).
- Control dust from construction or other land-disturbing activities by spraying water on roads/construction areas, limiting the area of uncovered soil to the minimum needed for each activity, siting staging areas to minimize fugitive dust, using a soil stabilizer (chemical dust suppressor), mulching areas or using a temporary gravel cover, limiting the number and speed of vehicles on the site, and covering trucks hauling dirt.
- Post and enforce speed limits on dirt/gravel roads to reduce airborne fugitive dust.
- Limit idling time of construction vehicle and equipment and conduct proper vehicle maintenance.
- Minimize the time of operation of drones or aircraft below the mixing height (i.e., typically estimated at 3,000 feet aboveground level).
- Use electric or alternate fueled ground support equipment for drones or other aircraft.

- Avoid placement of air emission sources within Class I Areas to the extent possible.<sup>19</sup>
- Ensure all activities are in compliance with general conformity requirements in nonattainment and maintenance areas.
- Ensure all activities conform to the State or Territory Implementation Plan.
- Follow all applicable federal, state/territory, and local air quality requirements, including standards for nuisance (where possible) and fossil fuel-powered generators.
- Ensure all diesel engines are compliant with USEPA emission standards for the corresponding engine class.
- Ensure all equipment is appropriately sized for the Proposed Action.
- Consider using hydrogen-fueled generators where practicable to reduce nitrous oxides emissions.
- Obtain permits, where required, to install and operate fossil fuel-powered generators.<sup>20</sup>
- Implement a dust control plan for construction activities and any travel over unpaved roads.
- Use only ultra-low sulfur fuel (where commercially available) for both on-road and off-road diesel engines.
- Ensure all fuel-burning equipment including, but not limited to, heavy construction equipment and power generator, is maintained in accordance with manufacturer's specifications.

### **11.12.2. Project-Type Specific BMPs and Mitigation Measures**

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

## **11.13. NOISE AND VIBRATIONS**

### **11.13.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential noise and vibration impacts. The following BMPs and mitigation measures would apply to all project types:

- Use noise mufflers on heavy equipment to limit noise and vibration exposure on noise and vibration-sensitive receptors during construction and grading activities near populated areas and other noise sensitive receptors, including parks or other protected areas; limit the use of such equipment to operation during daytime hours only.

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<sup>19</sup> Class I areas are national parks and wilderness areas in attainment or unclassifiable areas that exceed 5,000 acres in size and were in existence on August 7, 1977.

<sup>20</sup> Permits for stationary sources (diesel generators) should be obtained in advance of future deployment.



- Avoid, as practicable, deployment in areas with highly sensitive receptors and construct facilities in alternate locations for those projects involving heavy equipment for deployment. Such sensitive areas include foraging or breeding areas for disturbance-sensitive congregatory species such as some species of bats, colonial waterbirds, and seabirds, particularly those species that are listed as threatened or endangered, as well as wilderness areas (where recreational activities such as hiking, bird watching, etc. occur).
- Follow all applicable federal, state/territory, county/borough, and local requirements for construction and operation noise and vibration control to avoid or minimize increased noise and vibration.
- Follow all state/territory and federal guidelines for limiting aircraft noise and vibration on populated areas and over national parks.
- Include mitigation measures during the design and implementation phases of the project for equipment that is expected to generate significant noise or vibration (e.g., use of noise barriers such as walls, shrubbery).
- Ensure, as practicable, all heavy equipment, power generators, and boats are maintained in accordance with manufacturer's specifications.
- Limit construction activities to daytime hours (7 a.m. to 7 p.m.) to the extent possible when increased noise levels are more tolerable and avoid construction on Sundays and legal holidays.
- Implement BMPs and mitigation measures as directed by the local jurisdiction such as avoiding unnecessary revving of engines, switching off equipment when not in use, changing location of stationary construction equipment, minimizing drop height of materials, replacing conventional audible reversing alarms with more quiet alternative reversing warning systems, siting equipment away from noise sensitive areas (if practicable), notifying adjacent residents in advance of construction work, installing temporary acoustic barriers around stationary construction noise sources, and other controls as needed to reduce increased noise levels.

### **11.13.2. Project-Type Specific BMPs and Mitigation Measures**

The following project-specific BMPs and mitigation measures apply in addition to those listed above for all project types:

- Wired Projects
  - New Build – Aerial Fiber Optic Plant
    - Do not permit underwater blasting and pile driving activities in any waterbody.
  - New Build – Submarine Fiber Optic Plant
    - Do not permit underwater blasting and pile driving activities in any waterbody.

## **11.14. CLIMATE CHANGE**

### **11.14.1. BMPs and Mitigation Measures for All Project Types**

To minimize the GHG emissions of the Proposed Action, FirstNet and/or their partners would require, as practicable or feasible, implementation of the following BMPs and mitigation measures:

- Ensure that equipment used is the most energy efficient, or use state-of-the-art equipment to increase energy efficiency.
- Use more fuel-efficient diesel-power generation units or low-emission units such as gasoline- or hydrogen-fueled power generators.
- Ensure that construction vehicles are running only when required for construction and reduce or limit unnecessary idling.
- Ensure all operators and drivers have received adequate training to efficiently use equipment.
- Conduct regular maintenance and inspection on equipment to ensure that it is running at the maximum energy efficiency.
- Use renewable energy, as practicable or feasible, for backup power at buildout locations (cell tower sites, for example).
- Minimize disturbed land area and soil disturbance by co-locating where it is feasible.
- Revegetate disturbed land areas after construction where it is feasible.
- Use access roads previously used during deployment activities for maintenance and operational activities.

To minimize climate change effects on the Proposed Action, FirstNet and/or their partners would require, as practicable or feasible, implementation of the following BMPs and mitigation measures to provide for adaptation to climate change effects:

- Ensure design of aboveground structures and equipment has included allowances for maximum temperature and precipitation changes.
- Continuously monitor and reinforce structures build on permafrost.
- Assess sea-level rise prior to installation of infrastructure near coastal areas.
- To allow for extreme weather events and flooding, monitor risk-prone areas and reinforce structures or relocate structures such as deployables outside of high-risk areas as needed.
- Work jointly with public authorities in the implementation of monitoring plans and action plans related to potential impacts that could affect the Proposed Action.

### **11.14.2. Project-Type Specific BMPs and Mitigation Measures**

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

## **11.15. HUMAN HEALTH AND SAFETY**

### **11.15.1. BMPs and Mitigation Measures for All Project Types**

FirstNet and/or their partners would require, as practicable or feasible, the BMPs and mitigation measures listed below to help avoid or minimize potential impacts to human health and safety. The following BMPs and mitigation measures would apply to all project types:

- Follow all applicable federal, state/territory, and local requirements for hazardous materials and hazardous waste management.
- Utilize trained and licensed heavy equipment operators, when available or required.
- Develop a site-specific Health and Safety Plan that identifies all potential physical and chemical hazards present at the site, including historic contamination.
- Develop and utilize Standard Operating Procedures for site preparation activities and include descriptions of work practice controls and administrative controls.
- Ensure workers wear proper safety equipment as appropriate to the potential hazards present, such as high visibility safety vests, hard hats, steel-toe boots, gloves, eye protection, and hearing protection.
- Provide daily safety meetings to review activities, potential hazards, and safety objectives.
- Avoid site preparation work in areas with high vehicle traffic volume, such as road ROWs.
- Avoid site preparation work in areas known to contain environmental contamination.
- Incorporate all BMPs and mitigation measures listed in Section 11.1, Infrastructure, on potential impacts to transportation system capacity and safety.
- Incorporate all BMPs and mitigation measures listed in Section 11.2, Soils, for potential impacts from soil erosion.
- Incorporate all BMPs and mitigation measures listed in Section 11.4, Water Resources, for potential impacts to water quality – sedimentation, pollutants, nutrients or water temperature, and changes to groundwater or aquifer characteristics.
- Incorporate all BMPs and mitigation measures listed in Section 11.12, Air Quality.
- Incorporate all BMPs and mitigation measures listed in Section 11.13, Noise and Vibrations.
- Prepare an SPCC Plan to prevent, contain, and report accidental spills.
- Conduct air and noise monitoring to ensure levels stay within health-protective levels for communities and workers and, as required, that workers are trained and comply with personal protective equipment requirements as established by the Occupational Safety and Health Administration (OSHA).
- Search for the location of known contaminated sites prior to site selection in the area where the Proposed Action site is being considered, for new or existing infrastructure projects.

- Ensure that appropriate measures are taken in compliance with applicable regulations (including Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act)<sup>21</sup> if construction occurs in an area where there is the potential for legacy contamination, to protect workers and the public from unacceptable levels of exposure to contaminants as a result of deployment activities.
- Establish an emergency response plan (including emergency preparedness and response activities, resources, and responsibilities) to attend to specific emergencies (e.g., accidental spills) that could arise during deployment.
- Ensure that reporting requirements are followed in the event that Emergency Planning and Community Right-to-Know Act reporting thresholds are reached for the shipping, handling or storage of gasoline or diesel used for equipment and generators.<sup>22</sup>
- Establish a grievance mechanism or other stakeholder engagement tool that is accessible and culturally appropriate for use by the community to express concerns regarding the Proposed Action.
- Implement community education and public awareness, as needed, about the Proposed Action's traffic, routes used, road signage, and safety which are particularly critical in high-risk areas.
- Use signage to clearly mark construction sites, and establish boundaries and barricades to keep people out of dangerous areas.
- Make sure an incident investigation procedure is in place that can be specifically used for any near misses or incidents involving workers and community members.
- Ensure all workers are appropriately trained in wildlife identification and hazard management to minimize the likelihood of wildlife attacks.
- Ensure all workers are appropriately trained in weather hazard management and equipped with all necessary personal protective equipment.
- Inform community members of dates and times of construction activities that are likely to generate noise at levels above 55 A-weighted decibels at the residences or workplaces of those individuals.
- Monitor land clearing and construction sites for areas of standing water, including ditches and holes in the ground, as well open receptacles (e.g., empty barrels) and fill or eliminate these hazards to prevent mosquito breeding.

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<sup>21</sup> The main objective of the Resource Conservation and Recovery Act of 1976 is to “protect human health and the environment from the potential hazards of waste disposal, to conserve energy and natural resources, to reduce the amount of waste generated, and to ensure that wastes are managed in an environmentally sound manner” (*USEPA 2015a*). The Comprehensive Environmental Response, Compensation, and Liability Act or Superfund law was designed to help clean up hazardous waste sites and releases of pollutants or contaminants that may negatively affect public health (*USEPA 2011*).

<sup>22</sup> The Emergency Planning and Community Right-to-Know Act of 1986 was designed to assist communities in planning for emergencies related to hazardous waste. The law also requires industry to inform federal, state, and local governments on the storage, use, and releases of hazardous chemicals: 75,000 gallons for gasoline; 100,000 gallons for diesel; and 10,000 pounds for all other hazardous chemicals (*USEPA 2015b*).

- Given that no filariasis-, chikungunya-, or dengue-specific OSHA recommendations are available, follow OSHA recommended Workplace Precautions against West Nile Virus, another mosquito-borne illness for which, like chikungunya and dengue, the only preventative measure is avoidance of bites by infected mosquitoes.
- Ensure that the appropriate medication is available for treatment of any filariasis infections that may arise in the workforce for projects located in areas where filariasis is known to occur.

### 11.15.2. Project-Type Specific BMPs and Mitigation Measures

There are no project-specific BMPs and mitigation measures beyond those listed above for all project types.

## 11.16. REFERENCES

### 11.16.1. Wildlife

- APLIC (Avian Power Line Interaction Committee). 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, D.C. and Sacramento, CA. Accessed: November 21, 2016. Retrieved from:  
[http://www.dodpif.org/downloads/APLIC\\_2006\\_SuggestedPractices.pdf](http://www.dodpif.org/downloads/APLIC_2006_SuggestedPractices.pdf)
- \_\_\_\_\_. 2012. *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*. Washington, D.C.: Edison Electric Institute and APLIC.
- APLIC and USFWS (Avian Power Line Interaction Committee and the U.S. Fish and Wildlife Service). 2005. *Avian Protection Plan Guidelines*. April 2005.
- FAA (Federal Aviation Administration). 2016a. *Obstruction Marking and Lighting, Advisory Circular 70/7460-1L, Change 1*. October 8, 2016. U.S. Department of Transportation. Accessed: October 8, 2016. Retrieved from:  
[https://www.faa.gov/regulations\\_policies/advisory\\_circulars/index.cfm/go/document.current/documentNumber/70\\_7460-1](https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.current/documentNumber/70_7460-1)
- \_\_\_\_\_. 2016b. Specification for Obstruction Lighting Equipment. Advisory Circular 150/5345-43H. September 28, 2016. Accessed: March 2017. Retrieved from:  
[https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/150-5345-43GH.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5345-43GH.pdf)
- FCC (Federal Communications Commission). 2017. *Opportunities to Reduce Bird Collisions with Communication Towers while Reducing Tower Lighting Costs*. Washington, D.C. January 6, 2017. Accessed: March 2017. Retrieved from:  
[http://wireless.fcc.gov/migratory-birds/Light\\_Changes\\_Information\\_Update\\_120415.pdf](http://wireless.fcc.gov/migratory-birds/Light_Changes_Information_Update_120415.pdf)
- Gehring, J., P. Kerlinger, and A.M. Manville, II. 2009. *Communication Towers, Lights and Birds: Successful Methods of Reducing the Frequency of Avian Collisions*. Ecological Applications, 19(2): 505-514.

- \_\_\_\_\_. 2011. *The Role of Tower Height and Guy Wires on Avian Collisions with Communication Towers*. The Wildlife Society. *Journal of Wildlife Management*, 75(4): 848-855.
- Manville, A.M., II. 2002. *Protocol for Monitoring the Impact of Cellular Telecommunication Towers on Migratory Birds Within the Coconino, Prescott, and Kaibab National Forests, Arizona*. Prepared for U.S. Forest Service. 9 pp.
- \_\_\_\_\_. 2004. *Prairie Grouse Leks and Wind Turbines: U.S. Fish and Wildlife Service Justification for a 5-mile Buffer from Leks: Additional Grassland Songbird Recommendations*. Peer-reviewed briefing paper. Arlington, VA: U.S. Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management. 17 pp.
- \_\_\_\_\_. 2007. *Comments of the U.S. Fish and Wildlife Service Submitted Electronically to the FCC on 47 CFR Parts 1 and 17, WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds."* February 2, 2007. 32 pp.
- \_\_\_\_\_. 2009. "Towers, Turbines, Power Lines, and Buildings—Steps Being Taken by the U.S. Fish and Wildlife Service to Avoid or Minimize Take of Migratory Birds at these Structures." In T.D. Rich, C. Arizmendi, D. Demarest, and C. Thompson (eds.). *Tundra to Tropics: Connecting Habitats and People*. McAllen, TX: Proceedings 4th International Partners in Flight Conference. Pp. 262-272.
- \_\_\_\_\_. 2011. *Comments of the U.S. Fish and Wildlife Service's Division of Migratory Bird Management Filed Electronically on WT Docket No. 08-61 and WT Docket No. 03-187, Regarding the Environmental Effects of the Federal Communication's Antenna Structure Registration Program*. January 14, 2011. 12 pp.
- Patterson, J.T., Jr. 2012. *Evaluation of New Obstruction Lighting Techniques to Reduce Avian Fatalities*. DOT/FAA/TC-TN12/9, Federal Aviation Administration, U.S. Department of Transportation. 28 pp, plus appendices.
- USFWS (U.S. Fish and Wildlife Service). 2000. *Service Guidance on the Siting, Construction, Operation, and Decommissioning of Communication Towers*. FWSIFHC/DHCIBFA. September 14, 2000. Accessed: July 2015. Retrieved from: [http://www.fws.gov/habitatconservation/com\\_tow\\_guidelines.pdf](http://www.fws.gov/habitatconservation/com_tow_guidelines.pdf) (updated January 2016)
- \_\_\_\_\_. 2008. *Birds of Conservation Concern 2008*. Arlington, VA: U.S. Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management. 85 pp. Accessed: July 2015. Retrieved from: <http://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf> (updated January 2016)
- \_\_\_\_\_. 2012a. *Service Interim Guidelines for Recommendations on Communications Tower Siting, Construction, Operation, and Decommissioning*. The Migratory Bird Program – Conserving America's Birds. Accessed: July 2015. Retrieved from: <http://www.fws.gov/policy/m0084.html> (updated January 2016)

- \_\_\_\_\_. 2012b. *U.S. Fish and Wildlife Service Land-based Wind Energy Guidelines*. March, 82 pp.
- \_\_\_\_\_. 2013a. *Eagle Conservation Plan Guidance, Module 1, Land-based Wind Energy, Version 2*. Division of Migratory Bird Management. April, 103 pp.
- \_\_\_\_\_. 2013b. *2013 U.S. Fish and Wildlife Service USFWS Revised Voluntary Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning -- Suggestions Based on Previous USFWS Recommendations to FCC Regarding WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds," Docket No. 08-61, FCC's Antenna Structure Registration Program, and Service 2012 Wind Energy Guidelines*. Prepared by Albert M. Manville. September 27, 2013.

### **11.16.2. Fisheries and Aquatic Habitats**

- Hanson, Jeanne, Mark Helvey, and Russ Strach (eds.). 2003. *Non-fishing Impacts to Essential Fish Habitat and Recommended Conservation Measures*. Version 1, August 2013. NOAA Fisheries. Accessed: July 13, 2015. Retrieved from:  
<http://www.fpir.noaa.gov/Library/HCD/EFH%20Non-fishing%20NW-SW%202003.pdf>
- NOAA (National Oceanic and Atmospheric Administration). 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SPO-69. October 2005. Revised Edition, June 2006.

### **11.16.3. Threatened and Endangered Species and Species of Conservation Concern**

- APLIC (Avian Power Line Interaction Committee). 2012. *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*. Washington, D.C.: Edison Electric Institute and APLIC.

### **11.16.4. Land Use, Airspace, and Recreation**

- FAA (Federal Aviation Administration). 2016. *Obstruction Marking and Lighting, Advisory Circular 70/7460-1L, Change 1*. October 8, 2016. U.S. Department of Transportation. Accessed: October 8, 2016. Retrieved from:  
[https://www.faa.gov/regulations\\_policies/advisory\\_circulars/index.cfm/go/document.current/documentNumber/70\\_7460-1](https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.current/documentNumber/70_7460-1)

### **11.16.5. Socioeconomics**

- Bond, Sandy, Sally Sims, and Peter Dent. 2013. *Towers, Turbines and Transmission Lines: Impacts on Property Values*. Chichester, West Sussex, U.K.: Wiley-Blackwell.

### **11.16.6. Environmental Justice**

Bond, Sandy, Sally Sims, and Peter Dent. 2013. *Towers, Turbines and Transmission Lines: Impacts on Property Values*. Chichester, West Sussex, U.K.: Wiley-Blackwell.

### **11.16.7. Human Health and Safety**

USEPA (U.S. Environmental Protection Agency). 2011. *CERCLA Overview*. EPA Superfund, Laws, Policy and Guidance.

\_\_\_\_\_. 2015a. *Resource Conservation and Recovery Act (RCRA)*. Accessed: July 2015. Retrieved from: <http://www.epa.gov/agriculture/agriculture-laws-and-regulations-apply-your-agricultural-operation-statute#RCRA> (updated January 2016)

\_\_\_\_\_. 2015b. *Summary of the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund)*. Accessed: July 2015. Retrieved from: <http://www2.epa.gov/laws-regulations/summary-comprehensive-environmental-response-compensation-and-liability-act>



# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

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Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
<[https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)>
- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |

|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |



|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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## 12. COMPARISON OF ALTERNATIVES

### 12.1. INTRODUCTION

This chapter presents, in summary form, impact ratings for the Preferred Alternative, as well as each of the remaining alternatives outlined in Section 2.2, Description of Alternatives.

Under the Preferred Alternative, FirstNet and/or their partners would construct a nationwide broadband LTE network using a combination of the wired, wireless, deployable, and satellite technologies. There is currently a wide range of technologies that FirstNet may use to implement and deploy the Nationwide Public Safety Broadband Network (NPSBN). Full descriptions of wired, wireless and deployable projects that FirstNet may consider are explained in Section 2.1.2, Proposed Action Infrastructure.

Under the Deployable Technologies Alternative, FirstNet and/or their partners would procure, deploy, and maintain a nationwide fleet of mobile communications systems, including ground-based and aerial deployable technologies, to provide temporary coverage in areas not covered by existing, usable infrastructure. There would be no collocation of equipment and no new construction associated with wired or wireless projects discussed above under the Preferred Alternative. Some limited construction could be associated with implementation such as land clearing or paving for parking or staging areas. Generally, these units would be deployed at times of an incident to the affected area for either planned or unplanned incidents or events. Equipment would be stationed in every state and territory, often at multiple locations in each state or territory, to facilitate suitable response. These mobile communication units would be temporarily installed and may use existing satellite, microwave, or radio systems for backhaul.

Under the No Action Alternative, the NPSBN would not be constructed; there would be no nationwide, coordinated system dedicated to public safety interoperable communications. The existing multiplicity of communications networks would remain in place, as would the current, known limitations and problems of existing communication networks during times of emergency or disaster. This alternative would require an act of Congress to revise the Act, which currently requires the NPSBN.

This Final Programmatic Environmental Impact Statement contains seven stand-alone chapters devoted to each of the seven states or territories in the Non-Contiguous U.S. region (see Chapters 3 through 9). Each of these chapters discusses fifteen separate resource areas, such as biological resources, land use, air quality, etc. and discusses the potential impacts of (or to) the Proposed Action in an Environmental Consequences section.

Through the programmatic approach, FirstNet has identified four categories of potential impacts at the programmatic level to these resources:

1. *Potentially significant*
2. *Less than significant with best management practices (BMPs) and mitigation measures incorporated*
3. *Less than significant*
4. *No impact*

Two exceptions exist to this categorization of potential impacts based on applicable, resource-specific regulations. For threatened and endangered species and species of conservation concern, categories of potential impacts are defined as: *may affect, likely to adversely affect; may affect, not likely to adversely affect; and no effect*. These impact categories are comparable to those defined in the *Endangered Species Consultation Handbook (USFWS and NMFS 1998)*. In Table 12.2-1, the following numeric values have been assigned for the purpose of equivalency:

1. *May affect, likely to adversely affect*<sup>1</sup>
2. *May affect, not likely to adversely affect*
4. *No effect*

For cultural resources, categories of potential impacts are defined as an *adverse effect; mitigated adverse effect; effect, but not adverse; and no effect*. These impact categories are comparable to those defined in *36 CFR § 800, Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS 1983)*, and the U.S. National Park Service's *National Register Bulletin: How to Apply the National Register Criteria for Evaluation (NPS 2002)*. In Table 12.2-1, the following numeric values have been assigned for the purpose of equivalency:

1. *Adverse effect*
2. *Mitigated adverse effect*
3. *Effect, but not adverse*
4. *No effect*

## 12.2. COMPARISON OF ALTERNATIVES

Table 12.2-1 below presents impact ratings at the programmatic level of the preferred and remaining alternatives in summary form. Numerical ratings represent whole number averages of ratings across states and territories, rounded conservatively to err on the side of greater potential impact significance.

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<sup>1</sup> For all impact ratings where a potential affect is found, full and effective implementation of mitigation is assumed.

Evaluation of potential impacts was determined by the nature of both the deployment and operation of the infrastructure associated with each project alternative considered, the Preferred Alternative and the Deployable Technologies Alternative. The specific infrastructure associated with the Deployable Technologies Alternative would be the same as the deployable technologies implemented as part of the Preferred Alternative but would likely be implemented in greater numbers, over a larger geographic extent, and used with greater frequency and duration. It would not include fixed infrastructure such as towers or buried or aerial fiber.

As a result, potential impacts associated with the two project alternatives are generally similar. For most resources, impact ratings are identical, although some differences exist for some resource areas. For example, the Preferred Alternative would have somewhat greater potential impacts than the Deployable Technologies Alternative to water resources, wildlife, and visual resources. Conversely, the Deployable Technologies Alternative would have somewhat greater potential impacts than the Preferred Alternative to air resources.

The No Action Alternative would have no impacts, since by definition no system would be deployed and existing conditions would not change. As required by the National Environmental Policy Act, this alternative is used as a baseline against which the potential impacts of the action alternatives are compared. However, the No Action Alternative would not achieve the Proposed Action's stated purpose or meet the project need as required by the Middle Class Tax Relief and Job Creation Act of 2012 (*Pub. L. No. 112-96, Title VI, 126 Stat. 156 codified at 47 USC § 1401 et seq.*), and as such it would require an act of Congress in order for the No Action Alternative to take place.

Although Table 12.2-1 below focuses primarily on potential adverse impacts at the programmatic level, it is important to note that the ultimate outcome of the NPSBN would provide first responders with the tools they need to do their jobs more effectively and minimize the loss of life in the event of any future natural or manmade emergencies or disasters. In addition, likely substantial beneficial impacts associated with the NPSBN could occur as a result of the creation of direct, indirect, and induced employment. This could occur through new jobs associated with Proposed Action (direct), its contractors and subcontractors (indirect), and other business that serve the Proposed Action employees, contractors, or subcontractors (induced). The Proposed Action could also positively affect economic conditions through equipment purchases and changes in tax revenue, wages, and spending.

**Table 12.2-1: Comparison of Alternatives by Resource Area and Type of Effect<sup>2</sup>**

| Resource Area/Type of Effect                                                                                                                                                                                     | Preferred Alternative |            | Deployable Technologies Alternative |            | No Action Alternative |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------|-------------------------------------|------------|-----------------------|
|                                                                                                                                                                                                                  | Deployment            | Operations | Deployment                          | Operations |                       |
| Infrastructure                                                                                                                                                                                                   |                       |            |                                     |            |                       |
| Transportation system capacity and safety                                                                                                                                                                        | 3                     | 3          | 3                                   | 3          | 4                     |
| Strain on capacity of local health, public safety, and emergency response services                                                                                                                               | 3                     | 3          | 3                                   | 3          | 4                     |
| Modifies existing public safety response telecommunication practices, physical infrastructure, or level of service in a manner that directly affects public safety communication capabilities and response times | 3                     | 3          | 3                                   | 3          | 4                     |
| Effects to commercial telecommunication systems, communications, or level of service                                                                                                                             | 3                     | 3          | 3                                   | 3          | 4                     |
| Effects to utilities, including electric power transmission facilities and water and sewer facilities                                                                                                            | 3                     | 3          | 3                                   | 3          | 4                     |
| Soils                                                                                                                                                                                                            |                       |            |                                     |            |                       |
| Soil erosion                                                                                                                                                                                                     | 3                     | 3          | 3                                   | 3          | 4                     |
| Topsoil mixing                                                                                                                                                                                                   | 3                     | 3          | 3                                   | 3          | 4                     |
| Soil compaction and rutting                                                                                                                                                                                      | 3                     | 3          | 3                                   | 3          | 4                     |
| Geology                                                                                                                                                                                                          |                       |            |                                     |            |                       |
| Potential Impacts of the Project                                                                                                                                                                                 |                       |            |                                     |            |                       |
| Surface geology, bedrock, topography, physiography, and geomorphology                                                                                                                                            | 3                     | 3          | 3                                   | 3          | 4                     |
| Mineral and fossil fuel resource impacts                                                                                                                                                                         | 3                     | 3          | 3                                   | 3          | 4                     |
| Paleontological resources impacts                                                                                                                                                                                | 3                     | 3          | 3                                   | 3          | 4                     |

<sup>2</sup> While the analysis indicates that certain locations could have higher or lower impact ratings, this table is evaluating the potential regional impacts (not state- or territory-specific) associated with the Proposed Action. Site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work.

| Resource Area/Type of Effect                                                                            | Preferred Alternative |            | Deployable Technologies Alternative |            | No Action Alternative |
|---------------------------------------------------------------------------------------------------------|-----------------------|------------|-------------------------------------|------------|-----------------------|
|                                                                                                         | Deployment            | Operations | Deployment                          | Operations |                       |
| Potential Impacts to the Project                                                                        |                       |            |                                     |            |                       |
| Seismic hazard                                                                                          | 3                     | 3          | 3                                   | 3          | 4                     |
| Volcanic activity                                                                                       | 3                     | 3          | 3                                   | 3          | 4                     |
| Landslide                                                                                               | 3                     | 3          | 3                                   | 3          | 4                     |
| Land subsidence                                                                                         | 3                     | 3          | 3                                   | 3          | 4                     |
| Water Resources                                                                                         |                       |            |                                     |            |                       |
| Water Quality (groundwater and surface water) - sedimentation, pollutants, water temperature            | 3                     | 3          | 3                                   | 3          | 4                     |
| Floodplain degradation <sup>a</sup>                                                                     | 3                     | 3          | 3                                   | 4          | 4                     |
| Drainage pattern alteration                                                                             | 3                     | 3          | 3                                   | 4          | 4                     |
| Flow alteration                                                                                         | 4                     | 4          | 4                                   | 4          | 4                     |
| Changes in groundwater or aquifer characteristics                                                       | 3                     | 3          | 3                                   | 4          | 4                     |
| Wetlands <sup>3</sup>                                                                                   |                       |            |                                     |            |                       |
| Direct wetland loss (fill or conversion to non-wetland), other direct and indirect effects <sup>b</sup> | 3                     | 3          | 3                                   | 3          | 4                     |
| Biological Resources                                                                                    |                       |            |                                     |            |                       |
| Vegetation                                                                                              |                       |            |                                     |            |                       |
| Vegetation and habitat loss, alteration, or fragmentation                                               | 3                     | 3          | 3                                   | 3          | 4                     |
| Invasive species effects                                                                                | 3                     | 3          | 3                                   | 3          | 4                     |
| Wildlife                                                                                                |                       |            |                                     |            |                       |
| Amphibians and reptiles                                                                                 | 3                     | 3          | 3                                   | 3          | 4                     |
| Terrestrial mammals                                                                                     | 3                     | 3          | 3                                   | 3          | 4                     |
| Marine mammals                                                                                          | 3                     | 3          | 3                                   | 3          | 4                     |
| Bats (radio frequency emissions)                                                                        | 3                     | 2          | 3                                   | 3          | 4                     |
| Birds (radio frequency emissions, tower collisions)                                                     | 3                     | 2          | 3                                   | 3          | 4                     |
| Terrestrial invertebrates                                                                               | 3                     | 3          | 3                                   | 3          | 4                     |

<sup>3</sup> Potential wetland impacts in American Samoa would be *less than significant with BMPs and mitigation measures incorporated* since wetlands comprise less than 1 percent of the area on American Samoa and are a rare habitat type.

| Resource Area/Type of Effect                                                                                                                   | Preferred Alternative |            | Deployable Technologies Alternative |            | No Action Alternative |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------|-------------------------------------|------------|-----------------------|
|                                                                                                                                                | Deployment            | Operations | Deployment                          | Operations |                       |
| Fisheries                                                                                                                                      |                       |            |                                     |            |                       |
| Direct injury/mortality                                                                                                                        | 3                     | 3          | 3                                   | 3          | 4                     |
| Vegetation and habitat loss                                                                                                                    | 3                     | 3          | 3                                   | 3          | 4                     |
| Indirect injury                                                                                                                                | 3                     | 3          | 3                                   | 3          | 4                     |
| Migration effects                                                                                                                              | 3                     | 3          | 3                                   | 3          | 4                     |
| Reproductive effects                                                                                                                           | 3                     | 3          | 3                                   | 3          | 4                     |
| Effects of invasive species                                                                                                                    | 3                     | 3          | 3                                   | 3          | 4                     |
| Threatened and Endangered Species and Species of Conservation Concern <sup>4</sup>                                                             |                       |            |                                     |            |                       |
| Marine mammals                                                                                                                                 | 2                     | 2          | 2                                   | 2          | 4                     |
| Terrestrial mammals                                                                                                                            | 2                     | 2          | 2                                   | 2          | 4                     |
| Birds                                                                                                                                          | 2                     | 2          | 2                                   | 2          | 4                     |
| Reptiles                                                                                                                                       | 2                     | 2          | 2                                   | 2          | 4                     |
| Fish                                                                                                                                           | 2                     | 2          | 2                                   | 2          | 4                     |
| Invertebrates                                                                                                                                  | 2                     | 2          | 2                                   | 2          | 4                     |
| Plants                                                                                                                                         | 2                     | 2          | 2                                   | 2          | 4                     |
| Land Use, Airspace, and Recreation                                                                                                             |                       |            |                                     |            |                       |
| Direct land use change (site of FirstNet facility installation or deployable base)                                                             | 3                     | 3          | 4                                   | 3          | 4                     |
| Indirect land use change (site of FirstNet facility installation or deployable base)                                                           | 3                     | 3          | 4                                   | 3          | 4                     |
| Use of airspace (at and near site of FirstNet facility installation or deployable base)                                                        | 3                     | 3          | 3                                   | 3          | 4                     |
| Loss of access to public or private recreation land                                                                                            | 3                     | 3          | 4                                   | 3          | 4                     |
| Loss of enjoyment of public or private recreation land (due to visual, noise, or other impacts that make recreational activity less desirable) | 3                     | 3          | 4                                   | 3          | 4                     |

<sup>4</sup> Categories of impacts are defined as: *may affect*, *likely to adversely affect*; *may affect, not likely to adversely affect*; and *no effect*. These impact categories are comparable to those defined in the *Endangered Species Consultation Handbook* (USFWS and NMFS 1998).



| Resource Area/Type of Effect                                                                                                                                               | Preferred Alternative |                  | Deployable Technologies Alternative |            | No Action Alternative |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------|-------------------------------------|------------|-----------------------|
|                                                                                                                                                                            | Deployment            | Operations       | Deployment                          | Operations |                       |
| Visual Resources                                                                                                                                                           |                       |                  |                                     |            |                       |
| Adverse change in aesthetic character                                                                                                                                      | 3                     | 3 <sup>(5)</sup> | 3                                   | 3          | 4                     |
| Nighttime lighting (overall)                                                                                                                                               | 3                     | 3                | 3                                   | 3          | 4                     |
| Nighttime lighting (isolated rural areas or if sited near a national park)                                                                                                 | 3                     | 2                | 3                                   | 3          | 4                     |
| Socioeconomics                                                                                                                                                             |                       |                  |                                     |            |                       |
| Potential impacts to real estate                                                                                                                                           | 3                     | 3                | 4                                   | 3          | 4                     |
| Potential economic benefits or adverse impacts related to changes in tax revenues, wages, or direct spending (could be beneficial or adverse)                              | 3                     | 3                | 3                                   | 3          | 4                     |
| Employment                                                                                                                                                                 | 3                     | 3                | 3                                   | 3          | 4                     |
| Increased pressure on existing public services                                                                                                                             | 3                     | 3                | 4                                   | 4          | 4                     |
| Diminished social cohesion/disruption related to influx                                                                                                                    | 3                     | 3                | 4                                   | 4          | 4                     |
| Reduced opportunities for subsistence practices                                                                                                                            | 3                     | 3                | 4                                   | 3          | 4                     |
| Environmental Justice                                                                                                                                                      |                       |                  |                                     |            |                       |
| Effects associated with other resource areas (e.g., cultural resources) that have environmental justice implications due to the affected parties (as defined by EO 12898). | 3 <sup>(6)</sup>      | 3                | 3                                   | 3          | 4                     |

<sup>5</sup> Additional BMPs and mitigation measures may be implemented for towers.

<sup>6</sup> Since environmental justice impacts occur at the site-specific level, site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work. BMPs and mitigation measures may be required to address potential impacts to environmental justice communities at the site-specific level.

| Resource Area/Type of Effect                                                         | Preferred Alternative |            | Deployable Technologies Alternative |            | No Action Alternative |
|--------------------------------------------------------------------------------------|-----------------------|------------|-------------------------------------|------------|-----------------------|
|                                                                                      | Deployment            | Operations | Deployment                          | Operations |                       |
| Cultural Resources <sup>7</sup>                                                      |                       |            |                                     |            |                       |
| Direct effects to historic properties <sup>c</sup>                                   | 3                     | 3          | 3                                   | 3          | 4                     |
| Indirect effects to historic properties (i.e. visual, noise, vibration, atmospheric) | 3                     | 3          | 3                                   | 3          | 4                     |
| Loss of access to historic properties                                                | 3                     | 3          | 3                                   | 3          | 4                     |
| Air Quality                                                                          |                       |            |                                     |            |                       |
| Increased air emissions                                                              | 3                     | 3          | 3                                   | 3          | 4                     |
| Noise and Vibrations                                                                 |                       |            |                                     |            |                       |
| Increased noise and vibration levels                                                 | 3                     | 3          | 3                                   | 3          | 4                     |
| Climate Change                                                                       |                       |            |                                     |            |                       |
| Contribution to climate change through GHG emissions                                 | 3                     | 3          | 3                                   | 3          | 4                     |
| Effect of climate change on Proposed Action-related impacts                          | 4                     | 1-2        | 4                                   | 4          | 4                     |
| Human Health and Safety                                                              |                       |            |                                     |            |                       |
| Potential exposure to hazardous materials                                            | 3                     | 3          | 3                                   | 4          | 4                     |
| Accidents and Injuries                                                               | 3                     | 3          | 3                                   | 3          | 4                     |
| Exposure to Noise                                                                    | 3                     | 3          | 3                                   | 3          | 4                     |
| Communicable Disease                                                                 | 3                     | 3          | 3                                   | 3          | 4                     |

EO = Executive Order; GHG = greenhouse gas

Note: Impact ratings and colors are as follows:

1. (Red) *Potentially significant*
- 1-2. (White) *Range of potentially significant to less than significant with BMPs and mitigations measures incorporated*
2. (Orange) *Less than significant with BMPs and mitigations measures incorporated*
3. (Yellow) *Less than significant*
4. (Green) *No impact*

Note: The impact ratings used for the evaluation of Threatened and Endangered Species and Species of Conservation Concern are as follows:

1. (Red) *May affect, likely to adversely affect*
2. (Orange) *May affect, not likely to adversely affect*
4. (Green) *No effect*

<sup>7</sup> Categories of impacts defined as an *adverse effect*; *mitigated adverse effect*; *effect, but not adverse*; and *no effect* are comparable to those defined in 36 CFR § 800, Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation (NPS 1983), and the U.S. National Park Service's *National Register Bulletin: How to Apply the National Register Criteria for Evaluation* (NPS 2002).

Note: Impact ratings for the evaluation of cultural resources are as follows:

1. (Red) *Adverse effect*
2. (Orange) *Mitigated adverse effect*
3. (Yellow) *Effect, but not adverse*
4. (Green) *No effect*

<sup>a</sup> Because public safety infrastructure is considered a critical facility, Proposed Action activities should avoid the 500-year floodplain wherever practicable per the Executive Orders on Floodplain Management (*EO 11988 and EO 13690*).

<sup>b</sup> Indirect effects are those resulting from direct effects, but they occur elsewhere in space and/or time.

<sup>c</sup> Per the National Historic Preservation Act, an historic property is defined as any district, archaeological site, building, structure, or object that is either listed or eligible for listing in the National Register of Historic Places (NRHP). Cultural resources present within an individual project's Area of Potential Effect are not historic properties if they do not meet the eligibility requirements for listing in the NRHP. Sites of religious and/or cultural significance refer to areas of concern to Indian tribes and other consulting parties that, in consultation with the respective party or parties, may or may not be eligible for listing in the NRHP. These sites may also be considered traditional cultural property (TCP). Therefore, by definition, these significance criteria only apply to cultural resources that are historic properties, significant sites of religious and/or cultural significance, or TCPs. For the purposes of brevity, the term "historic property" is used here to refer to either historic properties, significant sites of religious and/or cultural significance, or TCPs.

### 12.3. REFERENCES

- NPS (U.S. National Park Service). 1983. *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines [As Amended and Annotated]* Accessed: September 24, 2015. Retrieved from: [http://www.nps.gov/history/local-law/arch\\_stnds\\_0.htm](http://www.nps.gov/history/local-law/arch_stnds_0.htm)
- \_\_\_\_\_. 2002. *National Register Bulletin: How to Apply the National Register Criteria for Evaluation*. Accessed: September 24, 2015. Retrieved from: <http://www.nps.gov/nr/publications/bulletins/nrb15/>
- USFWS and NMFS (U.S. Fish and Wildlife Service and National Marine Fisheries Service). 1998. *Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act*. March 1998. Retrieved from: [https://www.fws.gov/ENDANGERED/esa-library/pdf/esa\\_section7\\_handbook.pdf](https://www.fws.gov/ENDANGERED/esa-library/pdf/esa_section7_handbook.pdf)

# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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#### **Cooperating Agencies**

Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

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Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
<[https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)>
- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |

|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |

|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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## 13. OTHER REQUIRED ANALYSES

In addition to the analyses discussed in the previous state/territory chapters, the National Environmental Policy Act (NEPA) requires an additional evaluation of the potential impacts from the Proposed Action related to unavoidable adverse impacts, any irreversible or irretrievable commitment of resources, and the relationship between local short-term and long-term productivity.

### 13.1. UNAVOIDABLE ADVERSE IMPACTS

The Council on Environmental Quality's (CEQ) NEPA implementing regulations (*40 CFR § 1502.16*) require that an Environmental Impact Statement (EIS) evaluate the unavoidable adverse impacts from implementation of the Proposed Action. For this Proposed Action, the analysis indicates that no significant or unavoidable adverse impacts are anticipated at the programmatic level. Once site-specific project information is known, the potential for adverse impacts would be analyzed, as appropriate, in NEPA documentation tiered from this Final Programmatic EIS (PEIS). Site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work.

### 13.2. IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

CEQ's NEPA implementing regulations (*40 CFR § 1502.16*) require that an EIS review the potential impacts to irreversible or irretrievable commitments of resources resulting from implementation of the Proposed Action. An irreversible commitment of resources refers to the loss of resource use in the future, whereas irretrievable refers to the loss of a natural resource for harvest,<sup>1</sup> production, or use. These resources are irretrievable in that they would be used for a single project instead of being used for multiple purposes. An irretrievable commitment of resources is the loss of resources that cannot be replaced, recovered, or reversed. An example of irreversible commitments of resources could be the loss of a protected species or a cultural resource that would be considered permanent losses. An example of irretrievable commitment of resources could include the use of local contractors during deployment construction activities, during which the contractors supporting FirstNet deployment would be unable to work on other projects, and may cause temporary increases in the cost of local labor, equipment, or materials.

The potential impacts at the programmatic level addressed in each Environmental Consequences section of the preceding chapters were determined based on the resource-specific impact significance criteria developed by FirstNet. As a result, the impact significance ratings<sup>2</sup> of the specific types of effects analyzed in this Final PEIS cannot be directly related to the generalized discussion of irreversible or irretrievable commitments of resources in this section. However, any potential impacts that could create perceptible resource commitments that would be

---

<sup>1</sup> Harvesting is the act or process to take or kill wildlife for food, sport, or population control; to gather crops for consumption.

<sup>2</sup> As discussed in the Environmental Consequences sections, types of effects were rated as *potentially significant, less than significant with BMPs and mitigation measures incorporated, less than significant*, and *no impact* at the programmatic level based on the characteristics of the potential effects. BMPs are best management practices.

irreversible or irretrievable are assumed to result in some level of impact to a particular resource. Potential resource commitments are shown on Table 13.2-1.

**Table 13.2-1: Summary of Irreversible and Irretrievable Commitment of Resources by Resource Area**

| Resource Area                | Irreversible Impacts | Irretrievable Impacts | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------|----------------------|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Infrastructure               | No                   | No                    | Short-term obstruction or temporary disruption to local infrastructure could occur during construction of deployment activities. There would be no long-term impacts to infrastructure.                                                                                                                                                                                                                                                                                                 |
| Soils                        | Yes                  | Yes                   | If an undisturbed land area is selected for deployment and operation activities, there could be an irreversible resources commitment. Irretrievable impacts could occur if, for example, deployment/construction activities affect a planting or harvesting schedule or crop yields.                                                                                                                                                                                                    |
| Geology                      | Yes                  | Yes                   | Removal or disturbance of paleontological resources (fossils) could potentially create irreversible and irretrievable impacts.                                                                                                                                                                                                                                                                                                                                                          |
| Water Resources and Wetlands | No                   | No                    | Deployment activities are not expected to cause irretrievable loss of existing waterbodies or wetlands, or exceed water quality standards.                                                                                                                                                                                                                                                                                                                                              |
| Biological Resources         | Yes                  | Yes                   | Removal or disturbance of habitat could potentially create minor irreversible and irretrievable impacts.                                                                                                                                                                                                                                                                                                                                                                                |
| Land Use and Recreation      | Yes                  | Yes                   | Land use required for the deployment activities could potentially be a minor irreversible impact. Deployment of buried fiber, for example, could result in minor irretrievable impacts due to temporary loss of land use for other purposes.                                                                                                                                                                                                                                            |
| Visual Resources             | Yes                  | Yes                   | Irreversible and irretrievable impacts associated with obstruction of scenic areas could occur from some angles, and new light sources associated with project activities could impact enjoyment of the night sky.                                                                                                                                                                                                                                                                      |
| Socioeconomic Resources      | No                   | Yes                   | There could be a temporary increase in use of local contractors during construction activities, representing increased employment and an irretrievable loss of workers for other projects during construction.                                                                                                                                                                                                                                                                          |
| Environmental Justice        | No                   | No                    | In general, Environmental Justice impacts across each state or territory would not include irreversible or irretrievable effects. Analyses of individual proposed projects should assess whether potential impacts to specific environmental justice communities include irreversible and/or irretrievable effects. Site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work. |
| Cultural Resources           | Yes                  | Yes                   | Removal or disturbance of previously unidentified cultural resources could potentially result in irretrievable and irreversible impacts.                                                                                                                                                                                                                                                                                                                                                |
| Air Quality                  | No                   | No                    | Project emissions are not expected to exceed federal or state air quality standards. Air quality would return to existing conditions after completion of deployment activities.                                                                                                                                                                                                                                                                                                         |
| Noise and Vibrations         | No                   | Yes                   | Potential short-term, temporary noise impacts may result during construction activities for deployment. There would be no long-term impacts from noise and vibrations.                                                                                                                                                                                                                                                                                                                  |



| Resource Area           | Irreversible Impacts | Irretrievable Impacts | Explanation                                                                                                                                                                                                                               |
|-------------------------|----------------------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Climate Change          | No                   | No                    | Greenhouse gas emissions are not expected to be significant at the programmatic level.                                                                                                                                                    |
| Human Health and Safety | No                   | Yes                   | Construction activities during deployment may present relatively minor human health and safety concerns. Any hazardous wastes would be disposed of properly. Conditions would return to normal after completion of deployment activities. |

Where any potential irreversible or irretrievable commitments of resources are identified, they would be addressed in project-specific environmental compliance documentation. Project- or site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work. BMPs and mitigation measures would be implemented where practicable and feasible to help reduce irreversible and irretrievable impacts.

### 13.3. RELATIONSHIP BETWEEN SHORT-TERM AND LONG-TERM PRODUCTIVITY

CEQ's NEPA implementing regulations (*40 CFR § 1502.16*) require that an EIS address the relationship between short-term use of the environment and the potential impacts of such use on the maintenance and enhancement of long-term productivity, particularly for beneficial uses. Such impacts can arise from choosing one action that could reduce the flexibility of pursuing other options in the future, or from selecting a specific parcel of land or other resource to a certain use that would not allow other uses to occur at the site. At the programmatic level, it is anticipated that implementation of the Proposed Action would not result in any impacts that would narrow the range of future beneficial uses of the environment because it would not pose any long-term risks to the health, safety, or the general welfare of public communities and would, in fact, provide significant public welfare benefits in terms of increased public safety and security. Deployment activities would follow, as practicable and feasible, the BMPs and mitigation measures outlined in this Final PEIS, as appropriate.

FirstNet does not intend to alter the current uses of the environment. Project- or site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work. During those analyses, each project element and activity would be evaluated, and the potential long-term effects on productivity of each environmental resource area would be evaluated relative to potential trade-offs.

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# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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#### **Cooperating Agencies**

Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

May 2017

Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
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- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |



|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |

|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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## 14. DRAFT PEIS PUBLIC COMMENTS

FirstNet has developed a series of five Programmatic Environmental Impact Statements (PEISs) for the Proposed Action, one for each of five geographic regions across the United States (U.S.). This Final PEIS helps fulfill some of FirstNet's responsibilities under the National Environmental Policy Act (NEPA) for the non-contiguous region, which includes the states of Alaska and Hawaii, as well as the Commonwealths of the Northern Mariana Islands and Puerto Rico and the territories of American Samoa, Guam, and the U.S. Virgin Islands. Under the Council on Environmental Quality guidance for public involvement in the NEPA process, agencies shall seek to involve the public in preparing environmental documents such as this PEIS (40 CFR § 1506.6). These efforts include providing notice to potentially interested parties, holding public meetings, soliciting comments, and making both the Draft and Final PEIS available to the public.

This chapter provides a full listing of public and agency comments received on the Draft PEIS for the non-contiguous region as well as FirstNet's responses to those comments (see Table 14-1). In addition, some of the comments received on the other four Draft PEISs for the contiguous U.S. were applicable to the non-contiguous region as well; those comments that were received during the preparation of this document are captured in Table 14-2.<sup>1</sup>

The Draft PEIS for the non-contiguous region was published on March 4, 2016, which initiated a 60-day public comment period (81 FR § 11511 [March 4, 2016]). Notices were also provided directly to cooperating agencies, state/territory Single Points of Contact, elected officials, American Indian tribes and Native Hawaiian Organizations, media organizations, and other interested parties.

Over the course of the comment period, agencies and members of the public were invited to submit comments to FirstNet via traditional mail, e-mail, and the regulations.gov website.<sup>2</sup> In addition, public meetings were held in each of the seven non-contiguous states and territories where participants had the opportunity to talk directly with FirstNet environmental staff and its contractors to learn about the Proposed Action and the preliminary findings of the Draft PEIS. Individuals in attendance could provide input on those findings both verbally and on comment cards. The public meetings were held as follows:

- Anchorage, Alaska, on March 15, 2016
- Juneau, Alaska, on March 17, 2016
- Honolulu, Hawaii, on March 21, 2016
- Tumon Bay, Guam, on April 5, 2016
- Saipan, Northern Mariana Islands, on April 7, 2016
- Tafuna, American Samoa, on April 11, 2016

<sup>1</sup> A summary of comments provided during the scoping period can be found in Appendix B, *First Responder Network Authority Nationwide Public Safety Broadband Network Programmatic Environmental Impact Statement Scoping Summary Report*.

<sup>2</sup> Docket ID: FIRSTNET-2016-0001 (<https://www.regulations.gov/docket?D=FIRSTNET-2016-0001>)

- Christiansted, St. Croix, U.S. Virgin Islands, on April 22, 2016
- San Juan, Puerto Rico, on April 26, 2016

Although the official comment period lasted 60 days, FirstNet also considered comments provided after the closing of that period. There were a total of 20 submissions received on the non-contiguous Draft PEIS, which included 5 comment cards and 5 verbal comments. From those 20 submissions, 171 comments were extracted as identified in Table 14-1 (166 comments from agencies or individuals who identified themselves with agency affiliation and 5 public comments). Agency comments were received from the U.S. Department of Agriculture Natural Resources Conservation Service, U.S. Department of the Interior, U.S. Department of Energy, U.S. Department of Homeland Security, U.S. Environmental Protection Agency, U.S. Coast Guard, American Samoa Department of Homeland Security, State of Hawaii Department of Land and Natural Resources, Puerto Rico Emergency Management Agency, Port Authority of Guam, Guam Department of Homeland Security, and U.S. Virgin Islands Bureau of Information Technology.

Content-related comments received on the non-contiguous region Draft PEIS ranged from simple word changes and reference updates to suggestions for additional analysis. Several comments were site-specific in nature, such as installation methods on the Arctic Coastal Plain in Alaska and the identification of eagle habitats within their known ranges. In addition, numerous commenters on the Draft PEIS indicated that the Final PEIS should describe the environmental review process to be followed after the Final PEIS is published and prior to construction and implementation of the Proposed Action. As indicated throughout this Final PEIS, site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis, but will be issuing a Supplemental Environmental Impact Statement with that information as soon as it is determined.

During the preparation of this document, comments were also received on the other four Draft PEISs for the contiguous U.S. Comments from 13 of these submissions were also applicable to the non-contiguous region (see Table 14-2). These comments included reference and guidance updates, such as the need to remove the 25,000 metric tons of carbon dioxide equivalent reference point from the greenhouse gas and climate change analysis; concerns regarding vibration impacts to natural and cultural resources; suggestions for mitigating potential impacts to migratory birds, such as conducting vegetation clearing outside of breeding periods; and ensuring a detailed review of the best management practices that could avoid or minimize potential impacts of RF emissions to wildlife and humans.

All comments from both Tables 14-1 and 14-2 were used to prepare this Final PEIS.

Table 14-1: Draft PEIS Comment Response Matrix

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)   | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
|---------------|----------------|------------------|------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------|
| FN-NC-0001    | 1              | 2/26/2016        | Michael Robotham | NRCS                   | Based on my preliminary review of the document, I do not see any issues with the finding of “less that significant” impact related to soil resources, including the protection of prime and important farmlands (FPPA), in all the jurisdictions covered by this assessment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thank you for your comment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | General                                                                            | NA                                               |
| FN-NC-0001    | 2              | 2/26/2016        | Michael Robotham | NRCS                   | <p>I am somewhat concerned about the decision to use STATSGO2 as the basis for the soils assessments instead of using the more detailed SSURGO data. This may be an issue of consistency since SSURGO is not available for significant portions of Alaska, but, this does result in the use of a less detailed and comprehensive data source in areas where more detailed and comprehensive data (SSURGO) is easily available (Hawaii, Guam, Am Samoa, CNMI, Puerto Rico and USVI) and, at a minimum, this decision should be document and justified in the introductory section.</p> <p>In my opinion, given the scope and effect of the proposed activities, the use of STATSGO2 vs the more detailed SSURGO data does not change the overall conclusions of the assessment at the broad scale. However, it should be explicitly stated (if it is not already and I just missed it) that specific decisions on the selection of alternative and, more specifically on the selection of sites for those alternatives will be based on best available soils information (SSURGO where it exists – STATSGO2 where it doesn’t). In addition, it should be clearly stated that all BMPs to ameliorate potential impacts (e.g. soil erosion during construction activities) will be based on best available soils data and information.</p> | FirstNet used the STATSGO2 database to obtain soils information at the programmatic level to ensure consistency across all the states and territories and the District of Columbia. This regional information provides a sufficient level of detail for a programmatic analysis. Where appropriate, the best available soils data and information, including the use of the SSURGO database, will be used during any subsequent site-specific assessments. This explanation has been provided in the Final PEIS. | General                                                                            | All Soils Affected Environment sections          |
| FN-NC-0001    | 3              | 2/26/2016        | Michael Robotham | NRCS                   | There also are some typos/inconsistencies which I assume will be caught in the editorial process including the following in Volume 3 (American Samoa): Soil Conservation Service. 1982. Soil Survey of the United States Virgin Islands. U.S. Department of Agriculture in cooperation with the Government of American Samoa.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | This error has been corrected in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | General                                                                            | Various                                          |
| FN-NC-0002    | 4              | 4/18/2016        | William Ostrum   | DOE                    | “(See NEPA 1502.20)” - This seems to be referencing the CEQ NEPA regulations, not NEPA. Suggest replacing “NEPA” with “CEQ” for similar references throughout.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The proper reference for this CEQ regulation is <i>40 CFR § 1502.20</i> . References have been corrected throughout the Final PEIS document as appropriate.                                                                                                                                                                                                                                                                                                                                                      | ES1.1, page 1                                                                      | ES1.1                                            |
| FN-NC-0002    | 5              | 4/18/2016        | William Ostrum   | DOE                    | “Partner organization(s)” - this is the first time this term is used. Suggest providing some explanation of the role of these organizations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The following explanation has been included in the Final PEIS: “FirstNet’s partner organization(s) would assist in providing resources as necessary to deploy and operate the NPSBN.” This text has been added as a footnote in the Executive Summary and in the text body of Section 2.1.                                                                                                                                                                                                                       | ES3, page 6; 2.1, page 2-1                                                         | ES3                                              |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s) | Sender Organization(s) | Comment Text                                                                                                                                                                   | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS                                                                       |
|---------------|----------------|------------------|----------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| FN-NC-0002    | 6              | 4/18/2016        | William Ostrum | DOE                    | Recommend including the title of the preferred alternative in the header.                                                                                                      | The Final PEIS has been updated to make clean distinctions between the Proposed Action and the Preferred Alternative. The Proposed Action is the nationwide broadband network and the Preferred Alternative refers to the specific way the network would be implemented using a combination of technologies.                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ES3.1, page 7                                                                      | Throughout document                                                                                                    |
| FN-NC-0002    | 7              | 4/18/2016        | William Ostrum | DOE                    | Add a brief explanation of the source of the BMPs in general (e.g., BMPs have been developed based on independent research by FirstNet and consultation with other agencies.)  | A footnote has been added to the Executive Summary and the main body text in the Final PEIS stating: “BMPs and mitigation measures have been developed based on consultation with other agencies as well as independent research by FirstNet and their environmental contractors.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ES4, page 10                                                                       | ES4; Chapter 11, BMPS and Mitigation Measures                                                                          |
| FN-NC-0002    | 8              | 4/18/2016        | William Ostrum | DOE                    | Bullet 8 - Also coordinate with federal, state, and local government agencies as appropriate.                                                                                  | Bullet 8 referenced in Table ES4-1 has been updated in the Final PEIS to read: “Coordinate with federal, state/territory, and local government agencies as appropriate, as well as with public safety officials, emergency and medical facilities, and existing telecommunications providers to the extent practicable to facilitate awareness of deployment activities and accompanying schedule.”                                                                                                                                                                                                                                                                                                                                                             | Table ES4-1, page 12                                                               | Table ES4-1; Chapter 11, BMPS and Mitigation Measures                                                                  |
| FN-NC-0002    | 9              | 4/18/2016        | William Ostrum | DOE                    | Explain “notification and redundancy.”                                                                                                                                         | A footnote has been added to this text of the Final PEIS stating the following: “In this context, notification refers to the ability of health care providers to be alerted in the event of a disaster. Redundancy refers to the duplication of equipment or processes to help maintain continuity of operations.” This has also been explained in the Infrastructure sections of each state/territory-specific chapters.                                                                                                                                                                                                                                                                                                                                       | ES4.1.6, page 15                                                                   | Infrastructure Affected Environment sections and Environmental Consequences sections; Chapter 1, Introduction; ES4.1.6 |
| FN-NC-0002    | 10             | 4/18/2016        | William Ostrum | DOE                    | Global - unclear when “less than significant with BMPs and mitigation measures” should be used. It seems like impacts could be significant without BMPs in most cases.         | Section ES4 explains that the methodology used to determine the various impact levels in the programmatic analysis is provided for each resource within each state or territory section. The methodology includes developing and applying specific programmatic criteria to determine impact levels. The descriptions of potential impacts to various resources presented in the Executive Summary are summarized. Specific impacts will be evaluated at the site-specific level in subsequent environmental reviews. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. | ES4.2, page 16                                                                     | ES4                                                                                                                    |
| FN-NC-0002    | 11             | 4/18/2016        | William Ostrum | DOE                    | Since prime farmlands are discussed for each other area, add “Alaska has no prime farmlands.”                                                                                  | The Executive Summary of the Final PEIS has been updated to indicate that prime farmland soils are not present in Alaska since soil temperatures do not meet the required threshold established by Congress.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ES4.2.1, page 19                                                                   | ES4.2.1                                                                                                                |
| FN-NC-0002    | 12             | 4/18/2016        | William Ostrum | DOE                    | “It is recommended that...” Recommend removing this phrase throughout the impacts discussion. It is better to say that “FirstNet will, as appropriate and practical, avoid...” | The text in the Final PEIS has been revised to state “As practicable or feasible, FirstNet and/or their partners would work to avoid...”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ES4.3.2, page 25                                                                   | Throughout document                                                                                                    |



| Submission ID | Comment Number | Date(s) Received | Sender Name(s) | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                   | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS              |
|---------------|----------------|------------------|----------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------|
| FN-NC-0002    | 13             | 4/18/2016        | William Ostrum | DOE                    | Global - The phrase “in general” could be seen to imply that there are specific effects that could be considered significant. Recommend removing.                                                                                                                                                              | At the programmatic level and using the impact criteria developed for the PEIS, these effects would be considered less than significant. The phrase “in general” has been removed for clarity.                                                                                                                                                                                                                                                                                                                                                                                                                                 | ES4.4.2, page 33                                                                   | Throughout the Executive Summary                              |
| FN-NC-0002    | 14             | 4/18/2016        | William Ostrum | DOE                    | “Consider spanning...” -recommend removing “Consider.”                                                                                                                                                                                                                                                         | This sentence has been updated in the Final PEIS to read: “Where practicable, span a wetland by locating telecommunication poles on either side of the wetland instead of disturbing the interior.”                                                                                                                                                                                                                                                                                                                                                                                                                            | Table ES4-5, page 36                                                               | Table ES4-5; Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0002    | 15             | 4/18/2016        | William Ostrum | DOE                    | In final sentence, insert “impacts” between “and” and “further.” The BMPs wouldn’t reduce deployment (the first half of the sentence) but would reduce impacts.                                                                                                                                                | This text has been updated in the Final PEIS to read: “To the extent practicable or feasible, FirstNet and/or their partners would work to avoid or minimize deployment in wetland areas. Where deployment in wetlands cannot be avoided, mitigation measures, as defined through permitting and/or consultation with the appropriate resource agency, would be implemented to help avoid or reduce potential impacts. Implementation of BMPs, as practicable or feasible, could further reduce the potential for impacts.”                                                                                                    | ES4.5.1, page 39                                                                   | ES4.5.1; ES4.5.2; ES4.5.3; ES4.5.4; ES4.5.5; ES4.5.6; ES4.5.7 |
| FN-NC-0002    | 16             | 4/18/2016        | William Ostrum | DOE                    | Remove “likely” from last sentence.                                                                                                                                                                                                                                                                            | The word “likely” has been removed from this section in the Final PEIS. The sentence now reads: “To the extent practicable or feasible, FirstNet and/or their partners would work to avoid or minimize deployment in wetland areas. Where deployment in wetlands cannot be avoided, mitigation measures, as defined through permitting and/or consultation with the appropriate resource agency, would be implemented to help avoid or reduce potential impacts. Implementation of BMPs, as practicable or feasible, could further reduce the potential for impacts.”                                                          | ES4.5.2, page 39                                                                   | ES4.5.2                                                       |
| FN-NC-0002    | 17             | 4/18/2016        | William Ostrum | DOE                    | Text claims that “activities that involve collocation or shared use of existing facilities or do not require new ground disturbance...would have no effect on biological resources.” Things like lighting and noise could still have an effect. Suggest rewriting to say it is a less than significant effect. | The text in ES4.6 has been updated to better explain the potential development scenarios that could/could not result in potential impacts to biological resources. As described in the Biological Resources sections within each state/territory-specific chapter, collocation or shared use of existing facilities could result in the addition of power units, structural hardening, and physical security measures such as lighting. These activities could impact biological resources, and the text of ES4.6 has been updated to make these distinctions clear, consistent with the text in the state/territory chapters. | ES4.6, page 41                                                                     | ES4.6                                                         |
| FN-NC-0002    | 18             | 4/18/2016        | William Ostrum | DOE                    | Last sentence before bullets - unclear why it claims impacts to “biological resources (including wildlife...” are assessed separately. Isn’t that the focus of this section?                                                                                                                                   | Within the Biological Resources sections (as well as other resource sections) of each state/territory-specific chapter, potential impacts as a result of deployment are assessed separately from operations impacts. This text in ES4.6 has been revised as needed to more clearly convey this point.                                                                                                                                                                                                                                                                                                                          | ES4.6, page 41                                                                     | ES4.6                                                         |

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| FN-NC-0002    | 19             | 4/18/2016        | William Ostrum | DOE                    | Include statement that FirstNet “has and will continue to coordinate with appropriate state, local, federal, and tribal agencies.” p 1-7 says FirstNet has already initiated contact with USFWS, but doesn’t mention NOAA/NMFS. Suggest including NOAA if applicable. | Specific planned and on-going consultation efforts are discussed in Section ES1.3 as well as in Chapter 1, Introduction (Section 1.5). Appendix A, <i>Invited Cooperating Agencies</i> , lists those agencies that were invited to become cooperating agencies including NOAA and NMFS. NOAA and NMFS declined to be cooperating agencies for the Programmatic EIS. Within Table ES4-6, there is a BMP/Mitigation Measure related to consultation with USFWS and NMFS.                                                                                                                                                                                                                                                        | ES1.2, page 1                                                                      | NA                                                |
| FN-NC-0002    | 20             | 4/18/2016        | William Ostrum | DOE                    | Remove extra “s” in third to last bullet.                                                                                                                                                                                                                             | The extra “s” has been removed in the third to last bullet.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Table ES4-6, page 44                                                               | Table ES4-6                                       |
| FN-NC-0002    | 21             | 4/18/2016        | William Ostrum | DOE                    | “May affect, but is not likely to adversely affect” is the conclusion of a Biological assessment. Has one been completed for this project? If not recommend using different language.                                                                                 | As indicated in footnote b of Table ES4-6, the impact ratings used for Threatened and Endangered Species and Species of Conservation Concern are based on those in the Endangered Species Consultation Handbook (USFWS and NMFS 1998) in order to facilitate impact evaluation under Section 7 of the Endangered Species Act. A Programmatic Biological Assessment has not been completed for the project. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined; however, consultation under Section 7 of the ESA will occur as required. | ES4.6.1, page 51                                                                   | NA                                                |
| FN-NC-0002    | 22             | 4/18/2016        | William Ostrum | DOE                    | Appendix D contains a species list, but it uses older references from secondary sources. Replace with USFWS and NMFS species lists.                                                                                                                                   | As explained in Section 3.1.6.6, Table 1 of Appendix D, <i>Threatened and Endangered Species</i> , is a list of Forest Service and BLM sensitive species only. Table 3.1.6.6-1 lists the federal and state-listed species in Alaska using USFWS and NMFS species lists.                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ES4.6.1, page 51                                                                   | NA                                                |
| FN-NC-0002    | 23             | 4/18/2016        | William Ostrum | DOE                    | Recommend removing reference to aurora borealis. It seems out of place given the level of detail provided for dark skies in other locations.                                                                                                                          | Aurora borealis is a unique natural phenomenon found in Alaska more so than other places in the United States, and is therefore an important part of the existing environment. As such, it is appropriate to include it in this discussion.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ES4.8.1, page 62                                                                   | NA                                                |
| FN-NC-0002    | 24             | 4/18/2016        | William Ostrum | DOE                    | Recommend replacing reference (Puerto Rico Tourism Company 2015). Is there a government or academic source for this information?                                                                                                                                      | The reference has been updated using a government or academic source. This change has also made in Section 8.1.8 (others).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ES4.8.6, page 63                                                                   | ES4.8.6; 8.1.8.3; accompanying reference sections |
| FN-NC-0002    | 25             | 4/18/2016        | William Ostrum | DOE                    | Add reference for “studies have shown a minimal impact on property prices.”                                                                                                                                                                                           | This text has been updated in the Final PEIS to be consistent with the text of the state/territory-specific socioeconomic impacts sections. The Bond et al. 2013 reference that is included in the resource section has been added to the Executive Summary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ES4.9, page 64                                                                     | ES4.9                                             |

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| FN-NC-0002    | 26             | 4/18/2016        | William Ostrum | DOE                    | Also reference the previously discussed impacts and BMPs resulting less than significant effects on tourism which is important in many of these areas.                                      | This text has been updated in the Final PEIS to mention tourism.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ES4.9, page 64                                                                     | ES4.9                                                                |
| FN-NC-0002    | 27             | 4/18/2016        | William Ostrum | DOE                    | Bullet referring to “subsistence species habitat” may be more appropriate in EJ discussion than socioeconomics.                                                                             | Impacts and related BMPs associated with subsistence practices/resources are addressed in the socioeconomics sections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Table ES4-9, page 65                                                               | NA                                                                   |
| FN-NC-0002    | 28             | 4/18/2016        | William Ostrum | DOE                    | See previous comment regarding discussion of subsistence practices.                                                                                                                         | Impacts and related BMPs associated with subsistence practices/resources are addressed in both the socioeconomics and environmental justice sections.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ES4.9.1, page 65                                                                   | NA                                                                   |
| FN-NC-0002    | 29             | 4/18/2016        | William Ostrum | DOE                    | The individual state/territory summaries don’t mention low-income groups, just minority groups. This should be considered in the ratings and discussion.                                    | This section of the text has been modified to include the low-income information that is presented in the environmental justice sections of the state/territory-specific chapters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ES4.10, page 68                                                                    | ES4.10.1; ES4.10.2; ES4.10.3; ES4.10.4; ES4.10.5; ES4.10.6; ES4.10.7 |
| FN-NC-0002    | 30             | 4/18/2016        | William Ostrum | DOE                    | Add “, a racial minority for purposes of this analysis” to the first sentence.                                                                                                              | This text has been updated in the Final PEIS to indicate that the majority of American Samoa’s population is considered a racial minority.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ES4.10.3, page 71                                                                  | ES4.10.3                                                             |
| FN-NC-0002    | 31             | 4/18/2016        | William Ostrum | DOE                    | Does the rating (3) imply that is effect is expected but that it won’t be an adverse effect? Unclear how “physical damage to and/or destruction of historic properties” can be not adverse. | As explained in the text, the evaluation of potential impacts to cultural resources uses a distinct set of impact categories. A rating of 3, “effect, but not adverse,” is comparable to a rating of “less than significant” at the programmatic level for other resource areas. As discussed in each Cultural Resources section of the Final PEIS, the criterion of “effect, but not adverse” applies for effects to a non-contributing portion of a single or many historic properties. Also, the first effect type in Table ES4-11 has been changed to “Direct effects to historic properties” to be consistent with the main text of the cultural resources sections in the Final PEIS. | Table ES4-11, page 75                                                              | Table ES4-11                                                         |
| FN-NC-0002    | 32             | 4/18/2016        | William Ostrum | DOE                    | In the first sentence, replace “flat areas” with “easily accessible areas.”                                                                                                                 | This sentence has been updated in the various sections of Final PEIS to read: “...cultural resources can be found in coastal areas or inland environments, in relatively flat or easily accessible areas, or in more remote locations, such as those that could be used for ceremonial purposes.”                                                                                                                                                                                                                                                                                                                                                                                           | ES4.11.1, page 77                                                                  | 5.1.11.3; 6.1.11.3; 7.1.11.3; ES4.11.1; ES4.11.2                     |
| FN-NC-0002    | 33             | 4/18/2016        | William Ostrum | DOE                    | Should the second bullet also include Class 1 areas?                                                                                                                                        | The second bullet in Table ES4-12 has been updated to include Class I areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Table ES4-12, page 80                                                              | Table ES4-12; Chapter 11, BMPS and Mitigation Measures               |

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| FN-NC-0002    | 34             | 4/18/2016        | William Ostrum | DOE                    | According to the CEQ guidance, the analysis should use “GHG emissions as a proxy for assessing...proposed climate change impacts.” This is a little different than just “GHG emissions” as stated in the text.                                                                                                                                                                            | The Final PEIS has been updated (both in the Executive Summary and in the main body text) to state that GHG emissions are used as a proxy for assessing climate change impacts from the Proposed Action.                                                                                                       | ES4.14, page 86                                                                    | All Climate Change sections; Affected Environment sections and Environmental Consequences sections |
| FN-NC-0002    | 35             | 4/18/2016        | William Ostrum | DOE                    | When discussing the Revised guidance, use “recommends” not “requires.”                                                                                                                                                                                                                                                                                                                    | The word “requires” has been replaced with “recommends” in this text of the Final PEIS.                                                                                                                                                                                                                        | ES4.14, page 86                                                                    | All Climate Change sections; Environmental Consequences sections; ES4.14                           |
| FN-NC-0002    | 36             | 4/18/2016        | William Ostrum | DOE                    | Replace “any project type” with “the FirstNet program” in the last sentence.                                                                                                                                                                                                                                                                                                              | This section has been modified in the Final PEIS to reflect the final CEQ guidance on GHG emissions.                                                                                                                                                                                                           | ES4.14, page 86                                                                    | ES4.14                                                                                             |
| FN-NC-0002    | 37             | 4/18/2016        | William Ostrum | DOE                    | 25,000 metric tons is a “reference point” not a “threshold” in the Revised guidance. Make text change in ES4.14 and the accompanying table.                                                                                                                                                                                                                                               | Section ES4.14, Table ES4-14, and elsewhere in the document that referenced the 25,000 metric ton reference point originally included in the CEQ draft guidance on GHG emissions has been updated to reflect the final guidance and no longer cites the reference point in accordance with the final guidance. | ES4.14, page 86                                                                    | All Climate Change sections; Environmental Consequences sections; ES4.14, Table ES4-14             |
| FN-NC-0002    | 38             | 4/18/2016        | William Ostrum | DOE                    | Add “-” between “El Nino” and “like.”                                                                                                                                                                                                                                                                                                                                                     | A hyphen has been added between “El Nino” and “like” in this section of the Final PEIS.                                                                                                                                                                                                                        | ES4.14.5, page 90                                                                  | ES4.14.5                                                                                           |
| FN-NC-0002    | 39             | 4/18/2016        | William Ostrum | DOE                    | “Increasing mean sea levels would likely increase the frequency of extreme events such as hurricanes.” Sea level rise isn’t usually associated with hurricane frequency. It could be associated with inundation frequency caused by hurricanes. Alternately, the previous sentence is talking about ocean temperature, which may be linked to hurricane frequency. Clarify this sentence. | This section has been re-written in the Final PEIS to make the requested clarifications regarding the correlation between sea level rise and extreme events.                                                                                                                                                   | ES4.14.5, page 90                                                                  | ES4.14.5                                                                                           |
| FN-NC-0002    | 40             | 4/18/2016        | William Ostrum | DOE                    | Recommend highlighting impacts that differ from the preferred alternative.                                                                                                                                                                                                                                                                                                                | Chapter 12, Comparison of Alternatives, provides a side-by-side comparison of impact ratings associated with the preferred alternative and each of the other alternatives. Section ES5.3 summarizes key differences.                                                                                           | Table ES5-1, page 100                                                              | ES5.3                                                                                              |
| FN-NC-0002    | 41             | 4/18/2016        | William Ostrum | DOE                    | If possible, provide links to remaining references.                                                                                                                                                                                                                                                                                                                                       | Not all references cited are available via web links. Links have been provided where available.                                                                                                                                                                                                                | General                                                                            | All Reference sections                                                                             |
| FN-NC-0002    | 42             | 4/18/2016        | William Ostrum | DOE                    | Unclear what “physical layer” means. Can the document just use “physical”?                                                                                                                                                                                                                                                                                                                | This text has been updated in the Final PEIS to just use the word “physical”.                                                                                                                                                                                                                                  | 1.4, page 1-5                                                                      | 1.4; all Geology Environmental Consequences sections                                               |

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| FN-NC-0002    | 43             | 4/18/2016        | William Ostrum | DOE                    | Insert period after “(Hurricane Sandy Rebuilding Taskforce).”                                                                                                                                                                                                    | A period has been added after the second Hurricane Sandy Rebuilding Taskforce reference.                                                                                                                                                                                                | 1.4, page 1-7                                                                      | 1.4                                                               |
| FN-NC-0002    | 44             | 4/18/2016        | William Ostrum | DOE                    | Recommend removing “under NEPA.” This isn’t a comprehensive list of the “primary objectives” of PEISs under NEPA. See 40 CFR § 1502.1 for primary purpose of an EIS.                                                                                             | The discussion in this section has been revised to summarize CEQ guidance for public participation under <i>40 CFR § 1506.6</i> . The discussion of PEIS objectives has been moved to Section 1.2.                                                                                      | 1.7, page 1-8                                                                      | 1.7                                                               |
| FN-NC-0002    | 45             | 4/18/2016        | William Ostrum | DOE                    | Insert “further” between “warranted” and “analysis.”                                                                                                                                                                                                             | At the time of scoping, an initial formal/published analysis had not yet been performed related to identifying alternatives to the Proposed Action. Therefore, the scoping phase would not have identified areas for further analysis, but rather for initial analysis. No change made. | 1.7.1, page 1-9                                                                    | NA                                                                |
| FN-NC-0002    | 46             | 4/18/2016        | William Ostrum | DOE                    | Add a brief statement on how scoping comments were incorporated into the PEIS (e.g., are all of these impacts now discussed in the PEIS).                                                                                                                        | A statement has been added to this text in the Final PEIS to indicate that scoping comments were taken into consideration during the analysis and drafting phase of the Draft PEIS.                                                                                                     | 1.7.2, page 1-10                                                                   | 1.7.2                                                             |
| FN-NC-0002    | 47             | 4/18/2016        | William Ostrum | DOE                    | Recommend including the full ESA definition of take: harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.                                                                                     | The text has been revised to include the full definition of take rather than a summary.                                                                                                                                                                                                 | 1.8.3, page 1-11                                                                   | 1.8.3; 1.8.6; all Biology Affected Environment sections; Glossary |
| FN-NC-0002    | 48             | 4/18/2016        | William Ostrum | DOE                    | Federal agencies must use the best *available* scientific and commercial data. This is an important distinction.                                                                                                                                                 | For clarity, the word “available” has been moved from after the words “commercial data” to before the word “scientific”. The sentence now reads: “...use the best available scientific and commercial data when making an effect determination...”                                      | 1.8.3, page 1-12                                                                   | 1.8.3                                                             |
| FN-NC-0002    | 49             | 4/18/2016        | William Ostrum | DOE                    | May want to change title to Executive Order 11988 (as amended by 13690) - Floodplain Management” and combine with EO 13690. I don’t think it’s appropriate to consider these separately - see comment below on new guidelines.                                   | Sections 1.8.10 and 1.8.14 have been combined in the Final PEIS to explain EOs 11988 and 13690 in the same section. Appendix C, <i>Environmental Laws and Regulations</i> , has also been updated per this comment.                                                                     | 1.8.10, page 1-14                                                                  | 1.8.10; 1.8.14                                                    |
| FN-NC-0002    | 50             | 4/18/2016        | William Ostrum | DOE                    | The guidelines are unclear in first sentence after the bullets. Also, the guidelines were updated in 2015 to reflect EO 13690. Suggest moving the first two sentences of this paragraph to the end and adding “for implementing this EO” after “The guidelines.” | See response to comment 51. The text has been updated in the Final PEIS and the suggested sentence structure change has been made.                                                                                                                                                      | 1.8.10, page 1-14                                                                  | 1.8.10; 1.8.14                                                    |
| FN-NC-0002    | 51             | 4/18/2016        | William Ostrum | DOE                    | Add some discussion of how actions associated with the network will be “federal actions” or “federally funded actions” under EO 13693.                                                                                                                           | A summary description of EO 13693 has been added to Chapter 1, Introduction.                                                                                                                                                                                                            | 1.8.10, page 1-15                                                                  | New Section 1.8.14                                                |

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| FN-NC-0002    | 52             | 4/18/2016        | William Ostrum | DOE                    | Add links to remaining references.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Not all references cited are available via web links. Links have been provided where available.                                                                                                                                                                          | 1.10, page 1-17                                                                    | 1.1                                                            |
| FN-NC-0002    | 53             | 4/18/2016        | William Ostrum | DOE                    | Recommend removing quotes around “include the alternative of no action.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The quotes have been removed in the Final PEIS.                                                                                                                                                                                                                          | 2, page 2-1                                                                        | Chapter 2, Description of the Proposed Action and Alternatives |
| FN-NC-0002    | 54             | 4/18/2016        | William Ostrum | DOE                    | Remove “utility corridor” in the first sentence. It’s mentioned in the next sentence as something that could be included in ROW.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | The Final PEIS has been updated to read: “...plowing or trenching cable alongside the road usually within a utility corridor or within public road right-of-way (ROW), where possible. Utility ROWs could also include other easements and may be public or private.     | 2.1.2.1, page 2-2                                                                  | 2.1.2.1                                                        |
| FN-NC-0002    | 55             | 4/18/2016        | William Ostrum | DOE                    | Under “Cell on Wheels” replace “to” with “and” - “15 feet *and* 40 feet.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The sentence has been revised in the Final PEIS to read “...typically between 15 feet and 40 feet...”                                                                                                                                                                    | 2.1.2.3, page 2-4                                                                  | 2.1.2.3                                                        |
| FN-NC-0002    | 56             | 4/18/2016        | William Ostrum | DOE                    | Remove comma in “the No Action Alternative, forward for analysis.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The comma has been removed in the Final PEIS.                                                                                                                                                                                                                            | 2.2, page 2-5                                                                      | 2.2                                                            |
| FN-NC-0002    | 57             | 4/18/2016        | William Ostrum | DOE                    | Legislative mandate can’t be the only reason it’s dismissed. The combination of the reasons listed here is why it can be dismissed. Suggest rewording last two sentences - e.g., “This alternative has been dismissed from further consideration because new construction of the entire...Furthermore, it is counter to FirstNet’s legislative mandate to leverage existing infrastructure.”<br><br>40 most commonly asked questions concerning NEPA 2b - “A potential conflict with local or federal law does not necessarily render an alternative unreasonable, although such conflicts must be considered.” | The New Construction Only Alternative would present a clear violation of federal law, which is sufficient to dismiss this alternative from further consideration. As stated in this section, other factors further support eliminating this alternative. No change made. | 2.3.1, page 2-7                                                                    | NA                                                             |
| FN-NC-0002    | 58             | 4/18/2016        | William Ostrum | DOE                    | See previous comment on dismissing alternatives due to legislative mandate.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | The New Satellite Alternative would present a clear violation of federal law, which is sufficient to dismiss this alternative from further consideration. As stated in this section, other factors further support eliminating this alternative. No change made.         | 2.3.2, page 2-7                                                                    | NA                                                             |
| FN-NC-0002    | 59             | 4/18/2016        | William Ostrum | DOE                    | Insert “during the scoping period” after “comments received.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The suggested text has been added to the Final PEIS.                                                                                                                                                                                                                     | 2.4.1, page 2-7                                                                    | 2.4.1                                                          |



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| FN-NC-0002    | 60             | 4/18/2016        | William Ostrum | DOE                    | In last paragraph before bullets, insert an m-dash between “space” and “others.”                                                                                                                                                      | An em dash has been added as suggested in the Final PEIS.                                                                                                                                                                                                                                             | 2.4.1, page 2-8                                                                    | 2.4.1                                            |
| FN-NC-0002    | 61             | 4/18/2016        | William Ostrum | DOE                    | At the end of the first bullet, insert “in the microwave spectrum.                                                                                                                                                                    | The text has been updated in the Final PEIS to reflect the type of non-ionizing radiation that would be emitted, which is within the microwave spectrum. The text now also states that portions of 700 MHz band are already being used for both commercial wireless and public safety communications. | 2.4.1, page 2-8                                                                    | 2.4.1                                            |
| FN-NC-0002    | 62             | 4/18/2016        | William Ostrum | DOE                    | Highlight the frequency ranges where FirstNet would operate.                                                                                                                                                                          | Table 2.4.1-1 has been updated in the Final PEIS to indicate the frequency where FirstNet would operate.                                                                                                                                                                                              | Table 2.4.1-1, page 2-10                                                           | Table 2.4.1-1                                    |
| FN-NC-0002    | 63             | 4/18/2016        | William Ostrum | DOE                    | If possible, provide the exposure range of “typical ground-level exposures.”                                                                                                                                                          | Text related to “typical ground-level exposures” has been included in the Final PEIS.                                                                                                                                                                                                                 | 2-4-2, page 2-11                                                                   | 2.4.2                                            |
| FN-NC-0002    | 64             | 4/18/2016        | William Ostrum | DOE                    | In the paragraph after the bullets, verify that this is really a positive correlation. A negative correlation makes more sense.                                                                                                       | The text has been updated in the Final PEIS to explain that the correlation is negative between distance from transmitters and risk of cancer.                                                                                                                                                        | 2.4.2.2, page 2-17                                                                 | 2.4.2.2                                          |
| FN-NC-0002    | 65             | 4/18/2016        | William Ostrum | DOE                    | Remove “conversely” from the last sentence.                                                                                                                                                                                           | The word conversely has been removed in the Final PEIS.                                                                                                                                                                                                                                               | 2.4.2.3, page 2-18                                                                 | 2.4.2.3                                          |
| FN-NC-0002    | 66             | 4/18/2016        | William Ostrum | DOE                    | Remove second sentence of first paragraph. Federal regulatory levels aren’t set based on how they are used in NEPA.                                                                                                                   | The first paragraph in Section 2.4.3 has been revised in the Final PEIS to clarify the relationship between the lack of exposure levels for non-human species and the treatment of that impact in a NEPA analysis.                                                                                    | 2.4.3, page 2-18                                                                   | 2.4.3                                            |
| FN-NC-0002    | 67             | 4/18/2016        | William Ostrum | DOE                    | In the second paragraph, second sentence, replace the “and” between “project” and “make” with a comma.                                                                                                                                | The sentence has been restructured in the Final PEIS to improve flow by adding commas.                                                                                                                                                                                                                | 2.4.3, page 2-18                                                                   | 2.4.3                                            |
| FN-NC-0002    | 68             | 4/18/2016        | William Ostrum | DOE                    | In the second paragraph, second sentence, Depending on the specifics, environmental effects don’t necessarily have “parity.” It may be more accurate to say they have to be considered along with engineering and economic decisions. | The sentence has been modified in the Final PEIS to indicate that environmental effects would be considered along with engineering and economic decisions.                                                                                                                                            | 2.4.3, page 2-18                                                                   | 2.4.3                                            |

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| FN-NC-0002    | 69             | 4/18/2016        | William Ostrum | DOE                    | In the third paragraph, first sentence, suggest deleting “equally-if not-more.”                                                                                                                                     | It is FirstNet’s opinion that there is greater complexity associated with evaluating impacts to non-human species.                                                                                                                                           | 2.4.3, page 2-18                                                                   | NA                                                                          |
| FN-NC-0002    | 70             | 4/18/2016        | William Ostrum | DOE                    | Footnote 11: Clarify if this is referring to general effects on migratory bird species or effects specific to bird migration.                                                                                       | Footnote 11 has been updated in the Final PEIS to indicate that the research and environmental community have focused on migratory bird species.                                                                                                             | 2.4.3.1, page 2-19                                                                 | 2.4.3.1                                                                     |
| FN-NC-0002    | 71             | 4/18/2016        | William Ostrum | DOE                    | In the next to last paragraph, the first sentence (there are no available studies...) seems to contradict the previous paragraph, unless that study referred to high-level RF emissions. Clarify in text.           | This sentence has been removed in the Final PEIS.                                                                                                                                                                                                            | 2.4.3.1, page 2-20                                                                 | 2.4.3.1                                                                     |
| FN-NC-0002    | 72             | 4/18/2016        | William Ostrum | DOE                    | In the last paragraph, explain or remove “predatory journals.”                                                                                                                                                      | A footnote has been added to the text to explain the term “predatory open access journals.”                                                                                                                                                                  | 2.4.3.1, page 2-20                                                                 | 2.4.3.1                                                                     |
| FN-NC-0002    | 73             | 4/18/2016        | William Ostrum | DOE                    | In reference Dolk 1997, add a space after the PMID number.                                                                                                                                                          | A space has been added after the after the PMID number.                                                                                                                                                                                                      | References, page 2-22                                                              | Chapter 2, Description of the Proposed Action and Alternatives (References) |
| FN-NC-0002    | 74             | 4/18/2016        | William Ostrum | DOE                    | Is 2011 the most recent data available? Suggest updating if possible. Likewise with the energy information below.                                                                                                   | The most recent data from the USGS Mineral Commodity Summary and EIA have been used in the Final PEIS.                                                                                                                                                       | 3.1.3.3, page 3.1.3-2                                                              | 3.1.3.3; all Geology Environmental Consequences sections                    |
| FN-NC-0002    | 75             | 4/18/2016        | William Ostrum | DOE                    | In the last paragraph (The University of Alaska Museum...), next to last sentence, is this referring to something different than the “location” in the previous sentence. If not, recommend deleting this sentence. | The second to the last sentence has been modified in the Final PEIS to avoid redundancy. The sentence now reads: “Specifically, the database has a spatial query function that may be used to generate maps showing locations of fossil specimens...”        | 3.1.3.3, page 3.1.3-4                                                              | 3.1.3.3                                                                     |
| FN-NC-0002    | 76             | 4/18/2016        | William Ostrum | DOE                    | At the end of the next to last paragraph, insert “mainland” before “United States.”                                                                                                                                 | The sentence has been revised in the Final PEIS by adding “mainland”. The sentence reads: “...caused destruction along the west coast of the United States mainland, Hawaii, and Canada...”                                                                  | 3.1.3.4, page 3.1.3-5                                                              | 3.1.3.4                                                                     |
| FN-NC-0002    | 77             | 4/18/2016        | William Ostrum | DOE                    | Regarding the USGS landslide hazard map, is there no source of landslide hazard data for Alaska? If that’s the case, it should be stated clearly rather than just mentioning one source that excludes Alaska.       | This text has been updated in the Final PEIS to indicate that a state-wide landslide hazard dataset does not exist for Alaska. In addition, an example USGS map showing seismic landslide hazards in Anchorage has been referenced for that geographic area. | 3.1.3.4, page 3.1.3-8                                                              | 3.1.3.4                                                                     |



| Submission ID | Comment Number | Date(s) Received | Sender Name(s) | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                       | Response                                                                                                                                                                                                                                                                                                                                               | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS           |
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| FN-NC-0002    | 78             | 4/18/2016        | William Ostrum | DOE                    | 1st paragraph - Federally funded actions in the 500 year floodplain do fall under EO 13690. It provides a number of options for determining the floodplain for federally funded actions, one of which is the 500-year floodplain. This would likely include FirstNet’s activities. | This text in the Final PEIS has been updated and no longer states that the 500-year floodplain is not generally regulated.                                                                                                                                                                                                                             | 3.1.4.3, page 3.1.4-7                                                              | All Water Resources Affected Environment sections          |
| FN-NC-0002    | 79             | 4/18/2016        | William Ostrum | DOE                    | In the last paragraph, delete “among other species” from “Although not threatened or endangered in Alaska, among other species, ...”                                                                                                                                               | This text has been revised in the Final PEIS for clarity, now reading “Although not threatened or endangered in Alaska, moose and salmon (among other species) are important...”                                                                                                                                                                       | 3.1.5.4, page 3.1.5-10                                                             | 3.1.5.4                                                    |
| FN-NC-0002    | 80             | 4/18/2016        | William Ostrum | DOE                    | In the Terrestrial Invertebrates section, the last two sentences in this section are a little awkward and don’t flow correctly. Would rewrite as: “Many plants of the tundra are reliant on flies and bumblebees for pollination. For example,...”                                 | These sentences have been revised for improved flow in the Final PEIS.                                                                                                                                                                                                                                                                                 | 3.1.6.4, page 3.1.6-17                                                             | 3.1.6.4                                                    |
| FN-NC-0002    | 81             | 4/18/2016        | William Ostrum | DOE                    | In the final sentence in the bison section, clarify if “Bison herds” refers to the number of bison or the number of herds.                                                                                                                                                         | This sentence has been updated in the Final PEIS to specify that “bison herds” refers to the number of bison within the herds discussed.                                                                                                                                                                                                               | 3.1.6.4, page 3.1.6-21                                                             | 3.1.6.4                                                    |
| FN-NC-0002    | 82             | 4/18/2016        | William Ostrum | DOE                    | In the “Non-game (furbearers)” section, clarify how sealing records are relevant.                                                                                                                                                                                                  | This sentence has been simplified in the Final PEIS to indicate the ADFG estimates 2,500 to 3,500 trappers in the state.                                                                                                                                                                                                                               | 3.1.6.4, page 3.1.6-22                                                             | 3.1.6.4                                                    |
| FN-NC-0002    | 83             | 4/18/2016        | William Ostrum | DOE                    | Recommend removing footnote 1. The concept is covered in the following sentence.                                                                                                                                                                                                   | Footnote 1 has been left in the Final PEIS and the redundant sentence has been removed.                                                                                                                                                                                                                                                                | 3.1.6.5, page 3.1.6-33                                                             | 3.1.6.5                                                    |
| FN-NC-0002    | 84             | 4/18/2016        | William Ostrum | DOE                    | Since FirstNet is a federal agency, this discussion of HCPs and Section 10 permits may not be necessary.                                                                                                                                                                           | Footnote 5 indicates that an incidental take permit is issued under Section 10 of the ESA to private parties undertaking otherwise lawful projects that might result in the <i>take</i> of an endangered or threatened species. This information remains in the Final PEIS for completeness. No change made.                                           | 3.1.6.6, page 3.1.6-43                                                             | NA                                                         |
| FN-NC-0002    | 85             | 4/18/2016        | William Ostrum | DOE                    | Under Federally and State-listed and Candidate Species - Does FirstNet plan to treat the candidate species as if they are listed for purposes of this project? If so, state that here.                                                                                             | The response to this question has been addressed in the Environmental Consequences section (3.2.6.6). The text of the Final PEIS has been updated to clarify that while FirstNet does not plan to treat candidate species as listed species, they would be managed in accordance with applicable laws as well as the BMPs presented in the Final PEIS. | 3.1.6.6, page 3.1.6-45                                                             | 3.2.6.6                                                    |
| FN-NC-0002    | 86             | 4/18/2016        | William Ostrum | DOE                    | In the first full sentence, note that the reference point is metric tons of CO2-e, not just CO2, and that CO2 is recommended as a “proxy” for a project’s effect on climate change.                                                                                                | The text of the Final PEIS has been updated to reflect CO2-e and that CO2 is recommended as a proxy.                                                                                                                                                                                                                                                   | Page 3.1.14-4                                                                      | All Climate Change sections; Affected Environment sections |

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| FN-NC-0002    | 87             | 4/18/2016        | William Ostrum | DOE                    | In the last sentence in the smoking paragraph, replace “compared with” with “than.”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The sentence has been updated in the Final PEIS to read: “In 2013, Alaska had a higher percentage of current smokers (an estimated 22.6 percent, according to the Center for Disease Control’s Behavioral Risk Factor Survey) than the U.S. (19.0 percent, CDC 2013a).”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Page 3.1.15-4                                                                      | 3.1.15; 4.1.15; 5.1.15; 6.1.15; 7.1.15; 8.1.15; 9.1.15    |
| FN-NC-0003    | 88             | 4/21/2016        | Susan Hathaway | DHS                    | Thank you for this advanced read of the FirstNet PEIS. The additional time that you allowed us has greatly benefitted our review and ability to reach out to our components who have extensive and detailed experience in the field.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Thank you for your comment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | NA                                                                                 | NA                                                        |
| FN-NC-0003    | 89             | 4/21/2016        | Susan Hathaway | DHS                    | Impact Assessments- The impact assessment sections for all resource areas assume adverse impact with or without BMPs or no impacts. Please specify as such since in some cases increased public safety communication could be perceived as a beneficial positive effect. Particularly in light of the fact that your document makes statements such as “Over the years, numerous lives have been lost as a result of the lack of interoperability in public safety telecommunications in America.” The ultimate outcome of the program is beneficial to human health and safety.                                                                                                                                                                                                                                                                                                    | The Comparison of Alternatives chapter has been updated in the Final PEIS to include a subsection on likely substantial beneficial impacts, particularly related to infrastructure, health and safety, and socioeconomic resources. The Executive Summary also highlights the likely beneficial aspects of the Proposed Action.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Executive Summary, Chapter 12 Comparison of Alternatives                           | Executive Summary; Chapter 12, Comparison of Alternatives |
| FN-NC-0003    | 90             | 4/21/2016        | Susan Hathaway | DHS                    | FirstNet also makes the assumption that you will mitigate all significant adverse impacts to a level of not significant but without capturing the details of how or what criteria would be used. FirstNet may be able to provide regional examples or show that you have queried or communicated with agencies that have dealt with site specific tower colocations or mobile units and so on. Though this is programmatic because of the nature of the regional PEIS this information could be gleaned on such a level. In cases that you truly do not know it is difficult for the reader to agree that everything will be mitigated or minimized when you have no specificity to every scenario with corresponding BMP for a situation that is unknown similar to how you stated it in the cumulative effects section. FirstNet would need to wait for a site specific analysis. | The Final PEIS indicates that at the regional, programmatic level, potentially significant impacts are not expected based on the specific impact significance rating criteria developed for each individual resource (which uses a rating system based on magnitude/intensity, geographic extent, and duration/frequency). <sup>3</sup> However, significant impacts could potentially occur at the site-specific level. Site-specific BMPs may be needed in addition to those outlined in the PEIS, and those would be determined during site-specific environmental assessments in coordination with local environmental agencies. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. The text in the Final PEIS has been revised to indicate that impact determinations are at the programmatic level per the impact significance criteria. | General                                                                            | All Environmental Consequences Introduction sections; ES4 |

<sup>3</sup> Impacts of climate change on the Preferred Alternative could range from potentially significant to less than significant with BMPs and mitigation measures incorporated at the programmatic level.

| Submission ID | Comment Number | Date(s) Received | Sender Name(s) | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0003    | 91             | 4/21/2016        | Susan Hathaway | DHS                    | <b>Protocols for working with agencies to make siting and collocation decisions:</b> While we recognize that planning and decisions regarding siting and collocations will need to be made on a case by case/site by site basis, the EIS does not address the general protocol or role for the cooperating agencies to participate in the FirstNet program. This includes describing, in general, how the program expects their applicants and other agencies to work with FirstNet to ensure that environmental reviews and consultations are conducted for site-level projects. This is a concern because CBP has had at least one Commerce Department grant (a Broadband Technology Opportunity Program- BTOP grant) to a state agency (NM) come across our desks. In that case, they wish to collocate on a BPFTI tower located at the Santa Teresa Land Port of Entry. However, the Commerce grantee is doing all Environmental compliance on their own without anyone signing off at Commerce from what we were able to discover back when the project came to us in Summer 2015. As a result, CBP has been compelled to enter into discussions with Commerce with respect to taking on the consultation burden with some of the resource agencies to cover our NEPA obligations (per Chris Shaw at CBP OCC). Furthermore, CBP needs to ensure that the collocation would not interfere with existing CBP conditions on construction and use of that tower site. To date, that project remains unapproved by CBP and we have not heard back about what role Commerce will be taking or received any of the requested documentation that would allow us to proceed. (Please recall that we mentioned this project issue to you in January 2016.) Without protocols for us to review and comment upon, we can anticipate these same issues of who is responsible for what and how to ensure that FirstNet actions comply with any pre-existing environmental conditions on a DHS or DHS component tower or facility will persist. | The Introduction chapter (Chapter 1) has been updated in the Final PEIS to outline cooperating agency roles, how the program will be coordinated, and a description of the environmental review process going forward, including continued agency and public outreach efforts. For those FirstNet projects that have the potential to affect federal property or facilities, FirstNet or their partner(s), as appropriate, will conduct outreach to the relevant federal agency to help ensure compliance requirements are addressed. | Chapter 1                                                                          | Chapter 1, Introduction                          |

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| FN-NC-0003    | 92             | 4/21/2016        | Susan Hathaway | DHS                    | <b>Significance determinations:</b> As written, the document assumes that in all cases every approach for each type of activity will have minimal (mitigated or unmitigated) impacts. It is a concern that this PEIS may actually need to address more remote areas where impacts may approach significance depending on the site-specific case. For instance, what if some FirstNet resources potentially need to consider sites in or adjacent to pristine, protected areas? Or what if a best option in one area could potentially have adverse effects to historic properties? It seems that there should be some discussion of those possibilities. CBP’s towers are not 100% minimal to no impact. If we were to be approached by FirstNet about collocating on a site with restrictions, we would assume that our restrictions would stand for their activities or that they would end up with adverse impacts. So for a CBP helicopter access only site intended to avoid damage to historic properties, a FirstNet access road could not be minimal to no impact. Other towers located in coastal areas have strict requirements about access and maintenance which may elevate collocation on these towers to the level of significance. The document’s failure to better acknowledge the potential circumstances where impacts could arguably approach significance limits its potential usefulness to agencies that would cooperate with the FirstNet program in collocation and co-siting situations in areas with sensitive environmental resources. | The Final PEIS explains that at the programmatic level and based on the impact significance ratings developed, there would be no potentially significant impacts as a result of the Proposed Action as a whole. <sup>4</sup> However, the same impact significance criteria used at the programmatic level may not apply to site-specific build-out activities/actions. The Final PEIS acknowledges that site-specific impacts do have the potential to be more significant on a localized basis and may require site-specific assessments and mitigation. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. The text of the document has been updated to provide examples of circumstances where certain impacts may approach significance. In doing so, the Final PEIS makes clear distinctions between the purpose and usefulness of the PEIS and subsequent analyses (such as Environmental Assessments). For example, while potential impacts from specific FirstNet projects taking place in a wetland may not rise to the level of significance at the programmatic level, such impacts could be considered potentially significant at the site-specific level. | General                                                                            | Throughout Final PEIS, to include all Environmental Consequences Introduction sections |
| FN-NC-0003    | 93             | 4/21/2016        | Susan Hathaway | DHS                    | References/citations that refer to A. Manville most likely belong under US FWS and not his name, similar to what you have done with US DOE, USDA and FCC. Please check this and correct as necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Where government source documents list a specific author(s), the author name is used in the in-text citation and references section. The Manville references refer to a congressional staff briefing presentation (2007), a journal article in the Proceedings of the Fourth International Partners in Flight Conference (2009), and talking points released to the public from a communication tower webinar (2014). Dr. Manville is no longer with the USFWS. No change made.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Section 2-5; page 2-24                                                             | NA                                                                                     |
| FN-NC-0003    | 94             | 4/21/2016        | Susan Hathaway | DHS                    | Acronyms are used as references section that don’t the citation that you are referring to. So, despite the fact that you have divided the reference sections to each chapter it may actually be easier to combine all the references. This affects the references and other sections - For example- Under Acronyms you only specify APLIC as the Avian Power Line Interaction Committee and fail to define Alaska Public Lands Information Centers – which is in the references sections therefore it might be easier to combine all references and citations then provide the two uses- e.g. APLIC as APLIC[1] and APLIC[2].                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | The Final PEIS has been updated to ensure there are no conflicts between acronyms used in the text and reference citation acronyms. Where there is a conflict, the citation will use the full name. Where identical acronyms are used in the text, “1” and “2” designations are provided. The Final PEIS text has been updated to use “Alaska Public Lands Information Centers” in the references and citations and not “APLIC”.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TOC - Acronyms 3.3 and References                                                  | 3.3; 3.1.3                                                                             |

<sup>4</sup> Impacts of climate change on the Preferred Alternative could range from potentially significant to less than significant with BMPs and mitigation measures incorporated at the programmatic level.

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| FN-NC-0003    | 95             | 4/21/2016        | Susan Hathaway | DHS                    | <p>Incorrect citation – Please see <a href="https://www.whitehouse.gov/omb/fedreg_1997standards">https://www.whitehouse.gov/omb/fedreg_1997standards</a></p> <p>Change the citation for this simply to include the US Census Bureau or OMB definition – I think this section got confused with a prior section and you intended to reference OMB 1997 not CEQ 1997. CEQ 1997 does not expressly make these definitions. Nonetheless, the reader doesn’t need the basis for the definition they just need the proper definition Suggest “Since publication of the Environmental Justice: Guidance under the National Environmental Policy Act (CEQ 1997), The U.S. Census Bureau has changed how it defines race and ethnicity. Ethnicity (Hispanic or not Hispanic) is now counted defined separate differently from race (US Census, Definitions of Subject Characteristics, 2010; OMB 1997). As a result, this Draft Programmatic Environmental Impact Statement (PEIS) considers both race and ethnicity separately for the purpose of evaluating minority status.” Get the census definition and present it.</p>                                                                          | The suggested edits have been made in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Section 3.1.10.2, page 3.1.10-2                                                    | All Environmental Justice Affected Environment sections |
| FN-NC-0003    | 96             | 4/21/2016        | Susan Hathaway | DHS                    | <p><b>BMPs:</b> As a cooperating agency who at some time may have to work with FirstNet on deployment of technologies on our structures (or otherwise), DHS and its components should do a thorough and detailed review of the FirstNet BMPs to make sure that they do not conflict with existing DHS and component BMPs and MOUs which are specifically designed to prevent constraints to DHS and component technologies and missions. For example: There is a BMP for building new FirstNet towers that says: “Select the shortest possible structures necessary to meet the FirstNet system’s needs, and only deploy towers less than 200 feet in height.” It is fine as a goal, but (1) is it efficacious in every situation and (2) might it limit opportunities for collocations in certain circumstances (i.e. If one over 200’ tower may be able to service a remote area as opposed to using multiple less than 200’ towers to cover the same area, it should be an option for consideration)? Due to the volume of BMPs in the document and the apparent conflicting nature of some of the proposed BMPs, this will require a significant amount of time and agency resources.</p> | Unlike mitigation measures, BMPs are not required in every case and will be applied as practicable and feasible. FirstNet will continue to coordinate with DHS as a cooperating agency. Application of BMPs will be determined on a case-by-case basis. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. Additionally, some of FirstNet’s BMPs were developed through consultation with resource managing agencies. | Chapter 11 BMPs and Mitigation Measures                                            | Chapter 11, BMPS and Mitigation Measures                |
| FN-NC-0003    | 97             | 4/21/2016        | Susan Hathaway | DHS                    | DHS appreciates the thorough discussion and analysis of RF given the public concerns on the matter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Thank you for your comment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Section 2.4                                                                        | NA                                                      |

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| FN-NC-0003    | 98             | 4/21/2016        | Susan Hathaway | DHS                    | How would the installation of the system be documented and reference the PEIS criteria that apply? For instance, is there some kind of numbering scale (numbering or color coding) that could be associated with the potential impacts? That way, when the tiered analysis is being completed for the site-specific project, the appropriate reference could be made in the PEIS to address the type.     | The Draft and Final PEIS use four categories of potential impacts to rank the types of effects that may be anticipated at the programmatic level: 1) Potentially significant; 2) Less than significant with BMPs and mitigation measures incorporated; 3) Less than significant; and 4) No impact. As explained in the response to comment 92 above, the same impact significance criteria used at the programmatic level may not apply to all site-specific actions, and site-specific environmental analysis may be performed that describe potential impacts and mitigation measures at the local level. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. To the extent practicable, however, site-specific analyses will refer to and tier off of the appropriate discussions in the Final PEIS and will incorporate the applicable impact ratings and BMPs/mitigation measures from the Final PEIS. However, since the geographic extent, magnitude/intensity, and duration/frequency of some impacts may be different at the local level than at the programmatic level, site-specific impact rankings and additional BMPs/mitigation measures may be developed during these subsequent analyses. | Potential Impacts                                                                  | Throughout Final PEIS, to include all Environmental Consequences Introduction sections |
| FN-NC-0003    | 99             | 4/21/2016        | Susan Hathaway | DHS                    | The cumulative impacts section specifically states that a cumulative impact results from the additive effect of all projects in the same geographical area; however, no linkage is then made as to why you have singled-out examples of Broadband projects. Please provide rationale or re-word what you have so that reader can make sense of providing only one subset of potential cumulative impacts. | As explained in the Final PEIS, at the programmatic level it is not practical to include a list of all possible infrastructure projects in the cumulative impacts section. Instead, the cumulative impacts section describes projects similar to the Proposed Action with common impacts that would likely have additive effects. The text points out that specific project sites have not yet been identified by FirstNet, and that there is currently a wide range of potential technologies that could be implemented.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Table 10-1                                                                         | NA                                                                                     |



| Submission ID | Comment Number | Date(s) Received | Sender Name(s) | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS                                       |
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| FN-NC-0003    | 100            | 4/21/2016        | Susan Hathaway | DHS                    | <p>Given DHS above comments on impacts and BMPs it is difficult to see the analysis behind such broad statements as – “The potential impacts associated with the Proposed Action would result from the collocation on existing infrastructure; construction of new infrastructure and/or accessory components; use of existing fiber facilities; installation of new conduit; deployment of satellite phones and/or satellite technology; installation of microwave facilities; and utilization of deployable technologies. As described in Chapters 3 through 9, the effects as a result of the Proposed Action would not result in significant potential impacts.”</p> <p>And</p> <p>“Impacts would occur as a result of other ongoing telecommunications infrastructure development, including those projects described above; however, when combined with the potential impacts associated with the Proposed Action, significant impacts to the natural or human environment are not expected.”</p> <p>Cumulative impacts would include projects that FirstNet has no control over so these statements seem over-generalized and lack a reasonable written logic train to guide the reader to come to such a conclusion. DHS is familiar with situations along the border and in remote locations where this seems difficult to be certain and even more difficult to ensure/enforce.</p> | See the responses to comments 92 and 99. The FEIS recognizes that impacts could occur as a result of other ongoing telecommunications infrastructure development. However, when combined with the potential impacts associated with the Proposed Action, incremental significant impacts to the natural or human environment are not expected to be significant at the programmatic level.                                                                                                                      | Section 10 Cumulative, page 10-3                                                   | Throughout Final PEIS, to include all Environmental Consequences Introduction sections |
| FN-NC-0004    | 101            | 3/14/2016        | Anonymous      | Not specified          | The document refers to State Civil Defense which is a division of the State of Hawaii Dept. of Defense. The name was changed to Hawaii Emergency Management Agency (HI-EMA) in 2014; HI-EMA is now the accepted name for that entity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The Final PEIS includes the correct reference to HI-EMA.                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Section 4                                                                          | Hawaii Introduction; 4.1.1.2; 4.1.1.4                                                  |
| FN-NC-0005    | 102            | 4/26/2016        | Mihai Leta     | USCG                   | Please notify me if any FirstNet representatives visit CNMI in the future. I can provide visitors with information regarding potential tower sites.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | FirstNet has provided notification of this request to the User Advocacy Team.                                                                                                                                                                                                                                                                                                                                                                                                                                   | NA                                                                                 | NA                                                                                     |
| FN-NC-0006    | 103            | 3/21/2016        | John C.        | -                      | Will this network include coordination with transit agencies such as HART or HI DOT?                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | At this stage in the project, coordination between FirstNet and state and local transportation agencies has not occurred. However, as individual state/territory plans are developed, opportunities for coordination will occur. The Introduction chapter (Chapter 1) has been updated in the Final PEIS to outline cooperating agency roles, how the program will be coordinated, and a description of the environmental review process going forward, including continued agency and public outreach efforts. | NA                                                                                 | Chapter 1, Introduction                                                                |
| FN-NC-0007    | 104            | 4/5/2016         | Mike Gawel     | NPS                    | Land needed for facilities can be bought and owned on Guam. But in Saipan and all the Commonwealth of the Northern Mariana Islands, land cannot be alienated and can only be owned by traditional residents. But land can be leased for use in these islands.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The land use sections within the applicable state/territory chapters acknowledge this landownership issue.                                                                                                                                                                                                                                                                                                                                                                                                      | General                                                                            | NA                                                                                     |

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| FN-NC-0008    | 105            | 4/11/2016        | Carl Prendergast  | ASDHS                  | I am concerned that FirstNet will have negative impacts to existing local broadband companies like ASTLA (American Samoa Telecommunications Authority) or BlueSky Communications. The surplus bandwidth from FirstNet could cause loss of local jobs since these two companies employ many local people.                                                                                                        | The Final PEIS addresses this comment related to competition and potential job loss or dislocations in the socioeconomics impact sections within each state/territory chapter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | General                                                                            | All Socioeconomics Environmental Consequences sections                                                        |
| FN-NC-0009    | 106            | 4/22/2016        | Kenneth Duinkerck | -                      | FirstNet should use renewable energy for backup power in the Virgin Islands (cell towers, for example).                                                                                                                                                                                                                                                                                                         | The Final PEIS addresses the potential use of renewable energy in the Climate Change sections of each state/territory chapter, as well as in the BMPs and Mitigation Measures chapter (Chapter 11). A BMP in Chapter 11 states that FirstNet and/or their partners would use, as practicable or feasible, engines certified to the lowest emission standards and engines that burn alternative fuels (e.g., natural gas, biofuels). A BMP also states that FirstNet and/or their partners would use vehicles with hybrid or electric technology, as practicable or feasible, to reduce or eliminate criteria pollutant emissions from fuel combustion. | General                                                                            | All Climate Change sections;<br>Environmental Consequences sections; Chapter 11, BMPS and Mitigation Measures |
| FN-NC-0010    | 107            | 4/26/2016        | Ruth E. Silva     | PREMA                  | It’s important to take into consideration that there are three important species that are very loved by the island: the Puerto Rican parrot, manatees, and the coqui.                                                                                                                                                                                                                                           | The Final PEIS addresses potential impacts to wildlife and threatened and endangered species in Puerto Rico in sections 8.2.6.4, 8.2.6.6, and 8.1.6.4. Each of these species is specifically included in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                               | General                                                                            | NA                                                                                                            |
| FN-NC-0011    | 108            | 3/21/2016        | Victoria Garcia   | HI-DOD                 | (verbal comment) FirstNet should focus more effort on coordinating with other agencies in Hawaii, including Native Hawaiian Organizations, to educate them about the project in general, as well as to inform them about the environmental review process and potential environmental impacts. She suggested that FirstNet could better integrate the environmental review process into overall outreach plans. | Thank you for your comment. A Supplemental Programmatic Environmental Impact Statement will be developed that outlines the site-specific process. As discussed in the Final PEIS, FirstNet has initiated consultation with Native Hawaiian Organizations.                                                                                                                                                                                                                                                                                                                                                                                              | NA                                                                                 | NA                                                                                                            |
| FN-NC-0012    | 109            | 4/5/2016         | Leigh Pereda      | Guam DHS               | (verbal comment) FirstNet should make sure that the report is double-checked for typos. A typo was found in the Executive Summary where the text incorrectly referred to the people from Guam as Native Hawaiians.                                                                                                                                                                                              | The Final PEIS has been checked for typos and inconsistencies through a rigorous review and editing process.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | General                                                                            | Various                                                                                                       |
| FN-NC-0013    | 110            | 4/5/2016         | Chris Roberto     | Port Authority of Guam | (verbal comment) Regarding infrastructure resiliency in Guam, the FirstNet project should be structurally resilient and should take into account the potential for insect damage (such as from termites).                                                                                                                                                                                                       | The Description of the Proposed Action and Alternatives chapter (Chapter 2) addresses resiliency issues related to the NPSBN. The Infrastructure section within each state/territory chapter discusses infrastructure resiliency as well. Resiliency is discussed as a broad category of natural and man-made disasters and does not go into specifics at the programmatic level.                                                                                                                                                                                                                                                                      | Section 6.1.1;<br>Section 6.2.1                                                    | NA                                                                                                            |
| FN-NC-0014    | 111            | 4/11/2016        | Unknown           | Unknown                | (verbal comment) The PEIS should take into account emissions associated with generator use both during construction and during operation, for example, if back-up generators would be used to supply power to cell tower sites.                                                                                                                                                                                 | The PEIS discusses potential impacts related to air emissions and generator use in the air quality section within each state/territory-specific chapter. Additionally, BMPs and Mitigation measures are included in Chapter 11 to help avoid or minimize potential impacts to air quality. For example, FirstNet will use, as practicable or feasible, engines certified to the lowest emission standards and engines that burn alternative fuels (e.g., natural gas, biofuels).                                                                                                                                                                       | General                                                                            | Chapter 11, BMPS and Mitigation Measures                                                                      |



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| FN-NC-0015    | 112            | 4/11/2016        | Unknown              | Unknown                                              | (verbal comment) Not all historic places are included in the National Register of Historic Places, and that this should be taken into account during the planning and development stages of the project                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The cultural resources sections within each state/territory-specific chapter address historic places. The Final PEIS indicates that cultural resources surveys might need to be conducted to identify specific cultural resources of an individual project; however, through previous surveys and a general understanding of the cultural context, archaeological sites and historic resources are more typically found in certain locations given their size, type, and function.                                                                                                  | General                                                                            | All Cultural Environmental Consequences sections |
| FN-NC-0016    | 113            | 4/22/2016        | Reuben D. Molloy     | U.S. Virgin Islands Bureau of Information Technology | <p>(verbal comment) Some of the challenges in St. Croix related to the telecommunications infrastructure for first responders include:</p> <ul style="list-style-type: none"><li>• Coverage - 20% of St. Croix is a “dead-spot.” Even the radios of first responders are not useable in these areas.</li><li>• Congestion on the network is a major issue – too many users with not enough bandwidth.</li><li>• Redundancy – there are redundant 911 call centers in St. Thomas and St. Croix, but the LMR radios in the two locations are not interoperable so they cannot communicate after a call is made.</li><li>• Training – not all users of the system and radios are properly trained.</li></ul> <p>Also, cell tower “fall-zones” are an issue of concern on St. Croix. A moratorium for building tall towers near existing structures has been recently lifted, but the new regulations make constructing tall towers difficult. Collapsible towers should be explored. The importance of resilient infrastructure to withstand hurricanes is stressed.</p> | Technical information related to the deployment has been communicated to the relevant FirstNet personnel.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | General                                                                            | NA                                               |
| FN-NC-0017    | 114            | 4/25/2016        | Mary Josie Blanchard | US DOI                                               | <p>First paragraph, last sentence: The reference to sparse feeding opportunities is an incorrect categorization of habitats in Alaska. Birds migrate to breed in Arctic and sub-Arctic habitats in part because of the abundance of food resources (especially invertebrates) during the short summer season at these latitudes. However, habitat fragmentation is a source of impact to birds through the direct loss of habitat important to critical life stages, including nesting, brood rearing, and refueling (after and before long migratory flights and/or reproduction, which has high energy demands). Activities during construction can also result in indirect impacts to birds (through disturbance) during sensitive life stages. Recommend correcting as appropriate.</p> <p>Second paragraph: Activities onshore can in some circumstances disturb or displace Alaskan marine mammals as well (e.g. near terrestrial haulout locations, near polar bear dens).</p>                                                                                 | <p>The Final PEIS has been updated and no longer indicates relatively sparse feeding opportunities for birds. The final sentence of section 4.6.1 now reads: “Habitat fragmentation could also potentially affect birds through the loss of nesting, brood rearing, and feeding after and before long migratory flights and/or reproduction.”</p> <p>A sentence has been added to the second paragraph of section ES4.6.1 that reads: “Marine mammals could also be affected by project activities onshore if done near terrestrial haulout locations or near polar bear dens.”</p> | Executive Summary ES4.6.1, page ES-51                                              | ES4.6.1                                          |

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| FN-NC-0017    | 115            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Alaska presents unique challenges to certain ground-disturbing activities proposed under the Project’s preferred alternative, due to the presence of permafrost-rich soils across much of the landscape. On the Arctic Coastal Plain (ACP) especially, trenching in frozen saturated soils characteristic of this region of continuous permafrost often results in thermokarsting. This can in turn lead to trench subsidence. Subsidence of linear features has been known to drain adjacent wetlands, altering local hydrology and habitat and creating long-term maintenance issues. For example, subsidence and subsequent flooding of power cables buried in the tundra in a Prudhoe Bay oil field in the 1990s continued to be a problem well into the late 2000s, in spite of the routine placement of fill, which is expensive and not widely available in this region. We strongly recommend the Project consider alternatives to trenching for placement of fiber optic cable and other transmission lines on the ACP, include hanging wires on existing pipeline vertical support members, burial in existing roadways, and co-location with other transmission lines or other existing infrastructure (e.g., oil and gas pipelines). | Section 3.1.3 of the Draft PEIS indicated that thawing permafrost in Alaska can lead to land subsidence. The Final PEIS has been updated to elaborate on thermokarst and specifically calls out the Arctic Coastal Plain. Specific installation methods will be determined at the site-specific level or during project design phase.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | General                                                                            | 3.1.3; 3.2.3; 3.2.5 Chapter 11, BMPS and Mitigation Measures |
| FN-NC-0017    | 116            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Volume 6, Chapter 8 covers Puerto Rico and Volume 7, Chapter 9 covers the U.S. Virgin Islands. Alternatives include the use of existing or the construction of new wireless communication towers. Based on the information in the DPEIS, the use of towers to maintain a communications infrastructure in Puerto Rico and the U.S. Virgin Islands after a natural disaster such as a hurricane would be difficult. Hurricane force winds can knock down towers or misalign or dislocate antennae. Electrical power is usually cut to preserve the existing grid prior to a Hurricane or Tropical Storm, and power might not be re-established until downed lines are corrected. Under these circumstances, tower facilities would depend exclusively on their existing generators and fuel supplies. This makes tower communications after a tropical weather emergency difficult at best.                                                                                                                                                                                                                                                                                                                                                       | No change made. The Draft and Final PEIS indicate that the FirstNet network would be “hardened” from the physical, user access, and cyber security perspectives to be more resilient to impacts from natural and manmade disasters. Hardening refers to a variety of methods that may be used to make a structure more resistant to failure, whether through physical reinforcement of a structure, redundant sources of emergency power, or additional firewalls and cybersecurity. These efforts would be designed not only to ensure that the network has greater resistance to system failure than what is currently available, but also that it can recover more rapidly should failure occur at any point in the system. The goal would be to provide not only interoperability, but also improved operability in the event of a natural or manmade disaster. | General                                                                            | NA                                                           |
| FN-NC-0017    | 117            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Chapter 3 Alaska, page 3.1.6-11 to -13: The Endangered Species Act (ESA) should also be listed here.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | In both the Draft and Final PEIS, the Endangered Species Act (ESA) is discussed in Section 1.8, Overview or Relevant Federal Laws and Executive Orders, as well as in the “Specific Regulatory Considerations” sub-section within each state/territory-specific “Threatened and Endangered Species and Species of Conservation Concern” section. A footnote has been added to the “Specific Regulatory Considerations” subsection within each state/territory “Wildlife” section indicating this.                                                                                                                                                                                                                                                                                                                                                                   | Chapter 3 - Alaska 3.1.6.4 Wildlife, pages 3.1.6-11 to -13                         | All Wildlife Affected Environment sections                   |
| FN-NC-0017    | 118            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Third paragraph: Recommend clarifying that this is non-federal critical habitat, since there is also critical habitat as defined under the ESA. Be careful with the statement that critical habitat is managed by the State of Alaska.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | This sentence has been changed in the Final PEIS to say: “The ADFG Habitat Division manages land use activities within Alaska’s ‘Special Areas’ (state game refuges, state game sanctuaries, and non-federal critical habitat areas).”                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Chapter 3 - Alaska 3.1.6.4 Wildlife, page 3.1.6-11                                 | 3.1.6.4                                                      |

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| FN-NC-0017    | 119            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Bald and Golden Eagle Protection Act: Suggest acknowledging somewhere in this section that both Bald and Golden Eagles are federally managed through the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Also important to note, for projects taking place within eagles’ preferred habitat within their known ranges, the project proponent should contact the FWS to ensure compliance with BGEPA. Please add language that legal take must be authorized through a FWS permitting process. | This section of the Final PEIS has been updated to reflect that both Bald and Golden Eagles are also federally managed under the MBTA (in addition to the BGEPA). FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. Language has also been added indicating that legal take must be authorized through a USFWS permitting process. Site-specific reviews will be performed and consultation with USFWS where required will be conducted. | Chapter 3 - Alaska<br>3.1.6.4 Wildlife, page 3.1.6-12                              | All Wildlife Affected Environment sections       |
| FN-NC-0017    | 120            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | In the paragraph that continues from page 3.1.6-13, marine mammals should not be discussed. This text all falls under the header Terrestrial Habitats and Wildlife. Recommend making it clear in this paragraph that this section applies to species that are generally state-managed (according to the regions shown on Figure 3.1.6.4-1).                                                                                                                                                                                          | The mention of marine mammals in the introductory paragraph of this section has been removed in the Final PEIS. Text has been modified to indicate that the section discusses state-managed terrestrial habitats and wildlife.                                                                                                                                                                                                                                                                                                                                                                                                   | Chapter 3 - Alaska<br>3.1.6.4 Terrestrial Habitats and Wildlife, page 3.1.6-14     | 3.1.6.4                                          |
| FN-NC-0017    | 121            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Recommend making it clear in the introductory paragraph; this section applies to species that are generally federally-managed, through either NMFS or the FWS.<br><br>Beaufort and Chukchi Seas: There are Pacific walrus haulouts in the Chukchi Sea, in addition to those mentioned farther south.<br><br>Gulf of Alaska and Southeast: Please state the listed species that will be discussed in section 3.1.6.6, as you have for previous sections.                                                                              | The introductory paragraph of this section has been updated to indicate that the section applies to species that are generally federal-managed. In addition, the text notes that there are Pacific walrus haulouts in the Chukchi Sea. The text indicates that the North Pacific right whale is discussed in Section 3.1.6.6.                                                                                                                                                                                                                                                                                                    | Chapter 3 - Alaska<br>3.1.6.4 Habitats and Marine Mammals<br>3.1.6-22              | 3.1.6.4                                          |
| FN-NC-0017    | 122            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Pacific Walrus: The Pacific walrus is a candidate species under the ESA, so it should be discussed in Section 3.1.6.6. (Same comment applies to NMFS candidate species, such as the bearded seal). Walrus are known to stampede from terrestrial haulouts as well as ice floes; and this should be discussed, as it might be a more relevant concern to the FirstNet project, which has more of an onshore or nearshore footprint than an offshore component.                                                                        | The Pacific walrus and bearded seal discussion were left in Section 3.1.6.4 as the wildlife chapter goes into more detail regarding haulouts as they relate to specific species. A cross reference was added for Section 3.1.6.6 where these species are already included in a briefer discussion, within Table 3.1.6.6-1. Detail was also added to walrus discussion regarding stampeding.                                                                                                                                                                                                                                      | Chapter 3 - Alaska<br>3.1.6.4 Habitats and Marine Mammals, page 3.1.6-23           | 3.1.6.4                                          |
| FN-NC-0017    | 123            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Recommend using the FWS’s Birds of Conservation Concern list ( <a href="http://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf">http://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf</a> ) to help identify which birds in this category fall within which Bird Conservation Regions (BCR). Because the list is older than some of your references, those should not be replaced; however, this one should be added because it is the most recent, official list from the FWS.   | Information from the referenced 2008 USFWS Birds of Conservation Concern document has been added to the Final PEIS to supplement information provided in the Draft PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Chapter 3 - Alaska<br>3.1.6.4 Habitats and Birds, page 3.1.6-26                    | All Wildlife Affected Environment sections       |
| FN-NC-0017    | 124            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Aleutian and Bering Sea Islands: Short-tailed albatross could range into this BCR, as well as both listed eiders. Even if these are discussed in a later section, recommend including that fact here (where the BCRs are the focus). Same comment applies to other BCRs, as appropriate.                                                                                                                                                                                                                                             | A mention of the short-tailed albatross and eiders has been included in this section of the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Chapter 3 - Alaska<br>3.1.6.4 Habitats and Birds, page 3.1.6-26                    | 3.1.6.4                                          |

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| FN-NC-0017    | 125            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Arctic Plains and Mountains: Some seabirds are also found in this BCR, but they are missing from the discussion. Recommend including seabirds as part of this section.                                                                                                                                                                                                                                                                                                                                   | Seabirds have been added to this discussion of the Final PEIS.                                                                                                                                                                              | Chapter 3 - Alaska<br>3.1.6.4 Habitats and Birds, page 3.1.6-27                    | 3.1.6.4                                          |
| FN-NC-0017    | 126            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Northwest Pacific Rainforest: Missing raptors or other birds of prey in the discussion, including eagles. Recommend including these species.<br><br>In the first full sentence on page 28, place an “and/or” between wintering and migration habitat, so that it is clearer not all of the species listed do all of these things (e.g. Western Sandpipers are not breeding in the Copper and Stikine River Deltas).                                                                                      | Raptors, including the northern goshawk, bald eagle, and northern saw-whet owl were included in Section 3.1.6.4 of the Draft PEIS. No Change needed for the Final PEIS.<br><br>The suggested “and/or” edit has been made in the Final PEIS. | Chapter 3 - Alaska<br>3.1.6.4 Habitats and Birds, pages 3.1.6-27 to 28             | 3.1.6.4                                          |
| FN-NC-0017    | 127            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Northwestern Interior Forest: Missing raptors or other birds of prey in the discussion, including eagles. Recommend including these species.                                                                                                                                                                                                                                                                                                                                                             | Raptors and eagles have been added to this section of the Final PEIS.                                                                                                                                                                       | Chapter 3 - Alaska<br>3.1.6.4 Habitats and Birds, page 3.1.6-28                    | 3.1.6.4                                          |
| FN-NC-0017    | 128            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | The sentence referring to Figure 3.1.6.4-7 should be modified to reflect that federally- managed areas are also shown on this figure.                                                                                                                                                                                                                                                                                                                                                                    | This sentence has been updated in the Final PEIS as suggested to reflect that federally-managed areas are also shown on the figure.                                                                                                         | Chapter 3 - Alaska<br>3.1.6.4 Important Habitat Areas, page 3.1.6-29               | 3.1.6.4                                          |
| FN-NC-0017    | 129            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Recommend choosing representative IBAs from each of the types represented on Figure 3.1.6.4-8 (coastal, nearshore, marine, and colony) as examples for the discussion on this page. Currently, only IBAs important to nesting waterfowl are discussed.                                                                                                                                                                                                                                                   | This text in the Final PEIS has been updated to include a discussion of the various representative IBAs, not just nesting waterfowl.                                                                                                        | Chapter 3 - Alaska<br>3.1.6.4 Important Bird Areas, page 3.1.6-30                  | 3.1.6.4                                          |
| FN-NC-0017    | 130            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Species Overview: Refer to Table 3.1.6.6-1 here in the text.<br><br>Federal land State-listed and Candidate Species: It is incorrect to state that there are no federally listed Species of Concern. There are birds of conservation concern, as well as fish stocks/populations of conservation and management concern. If you are referring to a more specific definition of Species of Concern, then please provide a footnote for that definition under the introductory paragraph on page 3.1.6.43. | Table 3.1.6.6-1 was referenced in the Species Overview text of the Draft PEIS. No change made.<br><br>The sentence about Species of Concern has been removed from the text.                                                                 | Chapter 3 - Alaska<br>3.1.6.6 Threatened and Endangered Species, page 3.1.6-45     | 3.1.6.6                                          |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)       | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Response                                                                                                                                                                                                                                                                                                                                                                                                 | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS                      |
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| FN-NC-0017    | 131            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Short-tailed Albatross: Please fix the description under geographic range (some missing words make this hard to follow). Also, this species has been found as far north as the Chukchi Sea in recent years. Their range might be expanding.</p> <p>Eskimo Curlew: Species status can be changed to “probably extinct”.</p> <p>Eiders: Please include non-breeding habitats for both eiders under general habitat description.</p> <p>Yellow-billed Loon: Can be removed from this table. It was found not warranted for listing.</p> <p>Polar bear: This section needs some substantial edits. Polar bears are not migratory; they are found in Alaska year-round (including denning bears, which are increasingly using the terrestrial environment). Their habitat and geographic range both need to be updated to reflect their use of the terrestrial environment.</p> <p>Pacific Walrus: Please update this table to reflect walrus use of terrestrial haulouts.</p> | The applicable sections have been revised as appropriate.                                                                                                                                                                                                                                                                                                                                                | Chapter 3 - Alaska<br>3.1.6.6 Threatened and Endangered Species, Table 3.1.6.6-1   | 3.1.6.6                                                               |
| FN-NC-0017    | 132            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | The descriptions of Critical Habitat for Spectacled and Steller’s Eiders as described in the text on this page are not accurate. Please go back to the listing and correct.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | These descriptions have been modified in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                 | Chapter 3 - Alaska<br>3.1.6.6 Threatened and Endangered Species, page 3.1.6-57     | 3.1.6.6                                                               |
| FN-NC-0017    | 133            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | It is hard to see the terrestrial eider habitat delineated on this map. Please check for accuracy and consider renaming the yellow polygons CH for Steller’s AND spectacled eiders, and add the little sliver of spectacled eider-only CH south of Toksook Bay in another color. (See attached Figure 1: “Listed Critical Eider Habitat in YKD in FWS’s comment letter).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | This map in the Final PEIS has been updated to make the distinctions clear.                                                                                                                                                                                                                                                                                                                              | Chapter 3 - Alaska<br>3.1.6.6 Threatened and Endangered Species, Figure 3.1.6.6-1  | Figure 3.1.6.6-1                                                      |
| FN-NC-0017    | 134            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | In the sentence, “If a disturbance such as noise... excluded marine mammals from a preferred sea ice haulout,” please change this just to “haulout.” Walrus are using terrestrial haulouts more and more. Even if they are not preferred, these haulouts are important to their life history with loss of sea ice; additionally, walrus using terrestrial haulouts might be more likely than those using sea ice haulouts to be impacted by the FirstNet project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | In addition to sea ice haulouts, terrestrial haulouts were added to the document.                                                                                                                                                                                                                                                                                                                        | Chapter 3 - Alaska<br>3.1.6.6 Threatened and Endangered Species, page 3.1.6-59     | 3.1.6.6; 3.2.6.6                                                      |
| FN-NC-0017    | 135            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | It is not clear whether Section 3.2.6.4 applies to only non-listed species, or whether it includes listed species. Assuming the former, the information about Pacific Walrus (pages 3.2.6-17, 3.2.6-20, 3.2.6-22 through 23) should be removed from this section and placed in Section 3.2.6.6.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Section numbers have been added to the descriptions of the sections listed in Section 3.2.6.1 to make it clear where the various biological resources are covered within the larger section 3.2.6. The discussion of the Pacific Walrus was left in Section 3.2.6.4, where detailed species discussions are presented, and a cross reference to the threatened and endangered species section was added. | Chapter 3 - Alaska<br>3.2.6.4 Wildlife, page 3.2.6-16                              | All Biology<br>Environmental<br>Consequences<br>Introduction sections |

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| FN-NC-0017    | 136            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Direct Injury/Mortality: Collision events can occur to many species that do not necessarily fall in these categories, caused by weather events or poor visibility. Consider adding the bird family of alcids to the list of poor fliers and loons to the list of heavy birds. Note the mitigation measures and BMPs presented in Chapter 11 are general and not project-specific. The FWS would like the opportunity to collaborate early in the development of specific projects to help ensure impacts to migratory birds and ESA-listed species are avoided and minimized throughout the project siting, design, and operation stages.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Alcids and loons have been added as additional examples as suggested. Additionally, FirstNet intends to fully adhere to its compliance requirements under Section 7 of the ESA, and site-specific reviews will be performed and consultation where required will be conducted. | Chapter 3 - Alaska<br>3.2.6.4 Birds, page 3.2.6-18                                 | All Wildlife Environmental Consequences sections; Chapter 11, BMPS and Mitigation Measures |
| FN-NC-0017    | 137            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Vegetation and Habitat Loss Alteration, or Fragmentation: For a discussion about impacts from vegetation clearing, snow geese are not the best example to use. Snow geese are increasing in the western Arctic. In the eastern Arctic, they have displaced other birds through over grazing on grass and sedge tundra habitats. The statement that feeding habitats are limited is misleading. Not all feeding habitats are limited, although some (lagoons, mudflats) might be. Vegetation clearing in molting areas would be a concern because flightless birds do need access to high quality forage within their immediate vicinity. Brant molting and feeding at Teshekpuk Lake are a good example of this.</p> <p>In the last paragraph, recommend listing what factors would influence the degree to which habitat exclusion affects birds (e.g., life history and behavior of the species, stage of the annual cycle being affected, habitat type limited or not). Here, passerines are listed as one bird group for which construction activities might only have minor, short-term effects. Loons would be a good example of the other end of the spectrum (solitary nesters), as would seabirds (colony nesters). The shorebird example used here is also good.</p> | The examples provided in the Final PEIS have been updated as suggested. Additionally, the last paragraph of this section has been updated to describe the factors that would influence the degree to which habitat exclusion affects various bird groups.                      | Chapter 3 - Alaska<br>3.2.6.4 Birds, pages 3.2.6-20 to 21                          | 3.2.6.4                                                                                    |
| FN-NC-0017    | 138            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | The Alaska region of the FWS is in the process of updating recommendations for time periods to avoid vegetation clearing/land disturbing activities. The Project should refer to the most recent version of this document available prior to commencing construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | The text of this section has been updated to refer to the most recent versions of published materials related to avoidance periods for vegetation clearing.                                                                                                                    | Chapter 3 - Alaska<br>3.2.6.4 Birds, page 3.2.6-20                                 | 3.2.6.4                                                                                    |
| FN-NC-0017    | 139            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Indirect Injury/Mortality: What are the lowland and upland waders species referred to in the first paragraph under birds? This category of bird sometimes means shorebirds, or it might mean marsh birds (herons, egrets). Recommend clarification. FWS doesn't have any of the latter here, and the former were already listed in this sentence. Please also add some discussion here about increased predation on birds and/or their nests, with citations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | This text has been revised in the Final PEIS to provide necessary clarification. The text regarding increased predation has been removed.                                                                                                                                      | Chapter 3 - Alaska<br>3.2.6.4 Birds, page 3.2.6-23                                 | 3.2.6.4                                                                                    |



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| FN-NC-0017    | 140            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Effects to Migration or Migratory Patterns: Shorebirds migrating long distances are not just using Australian non-breeding areas. These birds are flying to Australia, Asia, and to North, Central, and South America non-breeding locations. Additionally, some seabirds are making these long-distance movements (terns may fly all the way to Antarctica), and so are some passerines (e.g. the Northern Wheatear, which winters in Africa).</p> <p>If one of the important, discrete stopover areas is impacted by construction permanently, there might be important consequences to a species or even a population. Temporary impacts could result in displacement from preferred stopover habitat, affecting quality and quantity of food resources, refueling rates, and possibly fitness of individual birds (with the potential to impact survival and therefore have population level consequences).</p> | <p>The examples provided in the Draft PEIS were not intended to be inclusive of all migrating birds. Text has been added in the Final PEIS to provide more information related to the range and distances of migrating bird groups. In addition, project BMPs (see Chapter 11, BMPS and Mitigation Measures) incorporate USFWS BMPs and mitigation measures, including the avoidance of sensitive areas such as known bird concentration areas and known migratory flyways.</p>                                                                                                                                                                                                                                                                   | Chapter 3 - Alaska<br>3.2.6.4 Birds, page 3.2.6-25                                 | All Wildlife Environmental Consequences sections; Chapter 11, BMPS and Mitigation Measures |
| FN-NC-0017    | 141            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Reproductive Effects: In addition to disturbance or displacement, young birds and eggs could be susceptible to direct impacts from construction activities (e.g. crushing of nests during construction of gravel pads). This could be mitigated by using appropriate construction timing windows (e.g. winter construction).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p>Direct impacts to nests during construction have been added under the Direct Injury/Mortality subsection. The use of construction timing windows can be an effective mitigation measure for avoiding and minimizing adverse reproductive effects. At the programmatic level the project covers a wide geographic range and currently lacks project-specific detail. As such, determining the feasibility and effectiveness of this BMP will be done as part of subsequent site-specific reviews. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined.</p> | Chapter 3 - Alaska<br>3.2.6.4 Birds, page 3.2.6-27                                 | All Wildlife Environmental Consequences sections; Chapter 11, BMPS and Mitigation Measures |
| FN-NC-0017    | 142            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Invasive Species Effects: Would any of the equipment or supplies for the proposed action be delivered via waterways? If so, there is potential to bring invasive species along on boat hulls and/or in ballast water. This would be one way of having large impacts to the marine ecosystem. Recommend clarification.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>No change made. The Draft and Final PEIS indicate that such invasive species effects to marine ecosystems are possible but not likely to be significant given the short duration of construction activities in limited near-shore locations. The project would not involve significant marine deployment activities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                       | Chapter 3 - Alaska<br>3.2.6.4 Marine Mammals, page 3.2.6-29                        | NA                                                                                         |
| FN-NC-0017    | 143            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Invasive Species Effects: In addition to seabirds, rats could impact any ground-nesting birds (waterfowl, cranes, shorebirds, tundra-nesting passerines). However there are laws against transporting rats in the State of Alaska, so activities for the Proposed Action should not increase risk to birds (as long as mitigation measures and BMPs are followed).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>No change made.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Chapter 3 - Alaska<br>3.2.6.4 Birds, page 3.2.6-29                                 | NA                                                                                         |

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| FN-NC-0017    | 144            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | If “deployment” (as described on 3.2.6-31) means construction, then is this section dealing with both temporary and permanent impacts? This is somewhat unclear, but the following comment assumes that is the case. Where potential impacts to birds are described, it is not correct to say that impacts to Alaska’s birds are anticipated to be less than significant. Impacts from infrastructure built under the Proposed Action could range from less than significant to significant at the population or species level, depending on placement, design, operation, and maintenance of the infrastructure. The FWS would like to be involved in site-specific placement, design, and operation as early as possible in the planning stages of individual projects, in order to help avoid and minimize impacts to birds. Also, as a side note, these international migrants should probably not be called “Alaska’s birds.” | The Final PEIS indicates that at the regional, programmatic level, potentially significant impacts are not expected based on the specific impact significance rating criteria developed for each individual resource (which uses a rating system based on magnitude/intensity, geographic extent, and duration/frequency). <sup>5</sup> However, significant impacts could potentially occur at the site-specific level, although with BMPs and mitigation measures this is expected to be rare. Site-specific BMPs may be needed in addition to those outlined in the PEIS, and those would be determined during site-specific environmental assessments in coordination with local environmental agencies. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. The text in the Final PEIS has been revised to indicate that impact determinations are at the programmatic level per the impact significance criteria. | Chapter 3 - Alaska<br>3.2.6.4 Birds, page 3.2.6-34                                    | All Wildlife Environmental Consequences sections                  |
| FN-NC-0017    | 145            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | There are no birds considered to be candidates for listing at this time in Alaska. Please correct here and throughout text in this section.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | The candidate bird species listing has been revised in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Chapter 3 - Alaska<br>3.2.6.6 Threatened and Endangered Species, Table 3.2.6.6-2      | 3.1.6.6; 3.2.6.6                                                  |
| FN-NC-0017    | 146            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Both direct injury or mortality and indirect effects from disturbance would be considered a take of listed species. Regardless of level of impact, this would be considered a violation of the ESA, unless authorized. Consider adding language stating such to this section.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Language has been added to this section in the Final PEIS to add clarification as suggested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Chapter 3 - Alaska<br>Threatened and Endangered Species, page 3.2.6-57                | All Threatened and Endangered Environmental Consequences sections |
| FN-NC-0017    | 147            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | First sentence in the first full paragraph of this page, please modify to say, “listed or candidate marine mammal species.”<br><br>Add polar bears to this discussion, as they are also a listed marine mammal.<br><br>In the sentence about walrus that starts with, “If a disturbance such as noise, human activity...,” please also add language stating this can happen on terrestrial haulouts (in addition to sea ice). Although terrestrial haulouts might not be “preferred,” they are becoming more and more important with reduced sea ice. Walrus displacement from haulouts could (extreme case) result in death through starvation or drowning, if the disturbance is chronic or severe enough to prevent walrus from returning, and if other, accessible haulouts are not available.                                                                                                                                 | Thank you for your comments. These changes have been made in the final PEIS as suggested.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Chapter 3 - Alaska<br>Threatened and Endangered Species/Marine Mammals, page 3.2.6-59 | 3.2.6.6                                                           |

<sup>5</sup> Impacts of climate change on the Preferred Alternative could range from potentially significant to less than significant with BMPs and mitigation measures incorporated at the programmatic level.



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| FN-NC-0017    | 148            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Recommend including timing windows as one way to avoid impacts to nests, eggs, and young birds. In the first paragraph, it is not accurate to say that injury or death from deployment of equipment is unlikely. Young birds and nests might be most susceptible to ground disturbing-activities (e.g. gravel pad construction during nesting season), but adult birds are susceptible to collision (as discussed in the next paragraph).</p> <p>Make the collision paragraph listed-species specific, as other species are discussed earlier in this document. It is not appropriate to talk about swans, cranes, eagles, hawks, osprey, or owls here. We also don’t have herons or egrets in Alaska. All of this language (excluding the discussion on herons and egrets) can be moved into the earlier section, where non-listed birds are discussed.</p> <p>It is not necessary to single the Eskimo Curlew out in this discussion. First, that species is likely extinct; but perhaps more pertinent to this discussion, it (just like any other bird) could be at risk of collision under certain conditions.</p> | Regarding timing windows, see response to Comment 141 above. The text has been modified in the Final PEIS to indicate that potential impacts to adult birds are unlikely from equipment deployment. Additional revisions have been made to the text to clarify the types of species potentially affected by collision impacts, such as large wing-span birds, heavy birds, and those that fly in flocks. Non-listed species are discussed in the Wildlife section. | Chapter 3 - Alaska Threatened and Endangered Species/Birds, page 3.2.6-60          | All Threatened and Endangered Environmental Consequences sections; Chapter 11, BMPS and Mitigation Measures |
| FN-NC-0017    | 149            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Under wired projects, please correct text to say “defending breeding sites or young” and “denning or pupping mammals or nesting birds” as mammals don’t nest.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The suggested edits have been made in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                              | Chapter 3 - Alaska Threatened and Endangered Species, page 3.2.6-65                | 3.2.6.6                                                                                                     |
| FN-NC-0017    | 150            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Under birds, please correct text to say the listed species have limited distribution in marine, coastal, and tundra habitats. Also, the correct number of listed birds is four (not five). Impacts to breeding birds are not the only possibility that should be listed here. There is collision risk if projects are not appropriately sited, designed, operated, and maintained. FWS would still consider the impact to be “may affect, not likely to adversely affect” IF the FWS is consulted early in the planning stages of a project, which will allow impacts to be avoided and minimized to the maximum extent.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Suggested edits have been made.                                                                                                                                                                                                                                                                                                                                                                                                                                    | Chapter 3 - Alaska Threatened and Endangered Species, Table 3.2.6.6-3              | All Threatened and Endangered Environmental Consequences sections                                           |
| FN-NC-0017    | 151            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Page 5-2 and Page 5.1.7-5 (Land Use) discusses lands owned by the federal government in the Pacific area, and mentions NPSA. Although the NPS manages these lands, this is accomplished through a lease agreement with the territorial Government (we have no ownership interests).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | This distinction has been made in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                  | Chapter 5 - American Samoa Affected Environment, page 5-2                          | 5.1.7.3                                                                                                     |
| FN-NC-0017    | 152            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Text indicates that no General Management Plan (GMP) is available. NPSA does have a GMP, which was approved in 1997; printed or electronic versions are available through Superintendent Scott Burch (see attached contact list at end of comments).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The Final PEIS has been revised to mention the GMP.                                                                                                                                                                                                                                                                                                                                                                                                                | Chapter 5 - American Samoa Affected Environment Visual Resources, page 5.1.8-3     | 5.1.8.3                                                                                                     |

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| FN-NC-0017    | 153            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Recommend including language prohibiting the use of straw or hay bales for erosion control as they can harbor invasive weed seeds, even if locally sourced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The relevant BMP in the Final PEIS has been updated to indicate that straw or hay bales used for erosion control will be designated as weed free.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Chapter 11<br>11.4.1<br>4th Bullet<br>Page 11-7                                    | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0017    | 154            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Project proponent should work with Alaska Department of Fish and Game to ensure culverts are properly sized to pass fish in any fish-bearing streams.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The relevant BMP in the Final FPEIS has been revised to indicate fish passage should be accommodated working with the appropriate state/territory natural resource agencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Chapter 11<br>11.4.1<br>7th Bullet<br>Page 11-8                                    | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0017    | 155            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | New Build - Aerial Fiber Optic Plant: “Install overhead transmission lines along existing road ROWs wherever possible to minimize vegetation clearing and other potential impacts to wetlands.” In certain locations (e.g., on the North Slope in high fog areas; in areas of critical eider habitat), it might be preferable to clear wetland vegetation outside of the breeding season for line burial as opposed to hanging new transmission wire/cables. For scenarios or deployment activities which require new work such as new Build Scenarios (Buried Fiber Optic Plant, Aerial Fiber Optic Plant, or Submarine Fiber Optic Plant); New Wireless Communication Towers; Deployable Technologies; and Deployable Aerial Communications Architecture, we cannot concur with your determination of not likely to adversely affect because of the many variables involved in the different options, habitats and species. New work should have ESA consultation on a case by case basis with the species of concern and appropriate BMPs. | <p>The text in this section has been modified to indicate that in certain circumstances it may be preferable and less impactful to implement line burial instead of installing lines overhead. Such determinations would be made at the site-specific level.</p> <p>Additionally, the Final PEIS indicates that at the regional, programmatic level, potentially significant impacts are not expected based on the specific impact significance rating criteria developed for each individual resource (which uses a rating system based on magnitude/intensity, geographic extent, and duration/frequency).<sup>6</sup> However, significant impacts could potentially occur at the site-specific level, although with BMPs and mitigation measures this is expected to be rare. Site-specific BMPs may be needed in addition to those outlined in the PEIS, and those would be determined during site-specific environmental assessments in coordination with local environmental agencies. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. The text in the Final PEIS has been revised to indicate that impact determinations are at the programmatic level per the impact significance criteria.</p> | Chapter 11<br>11.5.2<br>11-11                                                      | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0017    | 156            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Recommend including this additional information: Prior to selecting individual project locations in areas known to have habitat suitable for nesting Bald and Golden Eagles, work with the FWS to design and carry out surveys to locate active and inactive raptor nests. Early collaboration with the FWS will help to incorporate site-specific considerations, thereby minimizing the risk of unauthorized take of eagles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Site-specific BMPs may be needed in addition to those outlined in the PEIS, and those would be determined during site-specific environmental assessments in coordination with environmental agencies. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. Site-specific reviews will be performed and consultation where required will be conducted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Chapter 11<br>11.6.2.1<br>Item 4 and 5<br>Page 11-15                               | Chapter 11, BMPS and Mitigation Measures         |

<sup>6</sup> Impacts of climate change on the Preferred Alternative could range from potentially significant to less than significant with BMPs and mitigation measures incorporated at the programmatic level.

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)       | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0017    | 157            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | The Department believes that early consultation with appropriate agencies and stakeholders including, but not limited to, USFWS, NMFS, and state/territory wildlife and natural resources agencies, is critical since all the other BMPs are not detailed enough to properly make a not likely to adversely affect determination. The BMPs outlined in chapter 11.6.4 can be incorporated into the early consultation to reach a not likely to adversely affect determination, through informal consultation. | As mentioned above, the Final PEIS indicates that at the regional, programmatic level, potentially significant impacts are not expected based on the specific impact significance rating criteria developed for each individual resource (which uses a rating system based on magnitude/intensity, geographic extent, and duration/frequency). <sup>7</sup> However, significant impacts could potentially occur at the site-specific level, although with BMPs and mitigation measures this is expected to be rare. Site-specific BMPs may be needed in addition to those outlined in the PEIS, and those would be determined during site-specific environmental assessments in coordination with local environmental agencies. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. Where the possibility exists for a significant adverse impact at the project specific level, consultation with the appropriate agency may be required. | Chapter 11<br>11.6.4                                                               | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0017    | 158            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | Recommend including this additional information in the BMP section: Ground-disturbing work should take place outside the nesting season, so as to avoid direct and indirect impacts to breeding birds and their reproductive success. The FWS can provide project- specific timing window guidance for ground-clearing activities. As Region 7 is in the process of updating published timing windows, we recommend contacting the FWS for current guidance.                                                  | Please see the response to comment 141.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Chapter 11<br>General                                                              | Chapter 11, BMPS and Mitigation Measures         |

<sup>7</sup> Impacts of climate change on the Preferred Alternative could range from potentially significant to less than significant with BMPs and mitigation measures incorporated at the programmatic level.

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)       | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Response                    | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0017    | 159            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>NPS Pacific Area Parks &amp; Superintendents</p> <p>World War II Valor in the Pacific National Monument<br/>1845 Wasp Blvd.<br/>Bldg# 176 Honolulu HI 96818<br/>Jacqueline Ashwell, Superintendent<br/>Jacqueline_ashwell@nps.gov</p> <p>Honouliuli National Monument<br/>1845 Wasp Blvd.<br/>Bldg # 176<br/>Honolulu HI 96818<br/>Jacqueline Ashwell, Superintendent<br/>Jacqueline_ashwell@nps.gov</p> <p>Kalaupapa National Historical Park<br/>PO Box 2222<br/>Kalaupapa HI 96742<br/>Erika Stein Espaniola, Superintendent<br/>Erika_stein@nps.gov</p> <p>Haleakala National Park P.O. Box 369 Makawao, HI 96768<br/>Natalie Gates, Superintendent<br/>Natalie_gates@nps.gov</p> | Thank you for your comment. | Potentially Impacted NPS Resources                                                 | Chapter 16, Distribution List                    |
| FN-NC-0017    | 159 (cont.)    | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Ala Kahakai National Historic Trail<br/>73-4786 Kanalani Street, #14<br/>Kailua-Kona HI 96740<br/>Aric Arakaki, Superintendent<br/>Aric_arakaki@nps.gov</p> <p>Puukohola Heiau National Historic Site<br/>62-3601 Kawaihae Road<br/>Kawaihae HI 96743<br/>Daniel Kawaiaea, Superintendent<br/>Daniel_kawaiaea@nps.gov</p> <p>Kaloko-Honokohau National Historical Park<br/>73-4786 Kanalani St. Suite #14<br/>Kailua-Kona HI 96740<br/>Tammy Duchesne, Superintendent<br/>Tammy_duchesne@nps.gov</p> <p>Pu'u honua O Honaunau National Historical Park<br/>Tammy Duchesne, Superintendent<br/>Tammy_duchesne@nps.gov</p>                                                              | Thank you for your comment. | Potentially Impacted NPS Resources                                                 | Chapter 16, Distribution List                    |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)       | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0017    | 159 (cont.)    | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>Hawai'i Volcanoes National Park<br/>P.O. Box 52<br/>Hawai'i National Park, HI 96718-0052<br/>Cindy Orlando, Superintendent<br/>Cindy_orlando@nps.gov</p> <p>National Park of American Samoa<br/>Pago Pago, AS 96799<br/>Scott Burch, Superintendent<br/>Scott_burch@nps.gov</p> <p>War in the Pacific National Historic Park<br/>135 Murray Boulevard, Suite 100<br/>Hagatna, GU 96910<br/>James Richardson, Superintendent<br/>Jim_richardson@nps.gov</p> <p>American Memorial Park<br/>P.O. Box 5198-CHRB<br/>Saipan MP 96950<br/>James Richardson, Superintendent<br/>Jim_richardson@nps.gov</p>                                                                                                                                                                                                                                                                                                                                                                                 | Thank you for your comment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Potentially Impacted NPS Resources                                                 | Chapter 16, Distribution List                    |
| FN-NC-0017    | 160            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | The DPEIS is generally well-written, with thorough consideration of biological resources and includes a good discussion of potential impacts to these resources. Most activities discussed in the preferred alternative are identified to have “less than significant” impacts. Given the limited footprint associated with Project infrastructure, we generally agree with the assessment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thank you for your comment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | General                                                                            | NA                                               |
| FN-NC-0017    | 161            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>We believe the BMPs listed in Chapter 11 of the PEIS are sufficient to avoid and minimize risk to most species, in most areas. We recommend including the following, additional BMPs:</p> <ul style="list-style-type: none"><li>• Ground-disturbing work will take place outside the bird nesting season to avoid direct and indirect impacts to breeding birds and their reproductive success. The dates for the timing of the nesting seasons are currently being revised in Alaska, so we recommend you work directly with FWS staff in Region 7 to obtain avoidance periods.</li><li>• In areas known to have habitat suitable for nesting eagles (bald and golden), work with the FWS to design and implement surveys to locate active and inactive eagle nests prior to selecting individual Project locations. Early collaboration with the FWS will help to incorporate site-specific considerations, thereby minimizing the risk of unauthorized take of eagles.</li></ul> | Regarding the first suggested BMP, please see the response to comment 141. Site-specific BMPs may be needed in addition to those outlined in the PEIS, and those would be determined during site-specific environmental assessments in coordination with environmental agencies. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. Site-specific reviews will be performed and consultation where required will be conducted. | Chapter 11                                                                         | Chapter 11, BMPS and Mitigation Measures         |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)       | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0017    | 162            | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <p>On the Alaskan Coastal Plain (ACP) especially, aerial infrastructure might pose risks to birds during the breeding and migration seasons due to: (1) the density of birds migrating to the Arctic to breed; (2) frequent low lighting and poor weather conditions that lead to many low visibility days; and (3) a landscape that otherwise has few tall vertical structures. At risk are a wide variety of migratory bird species, including Alaska-breeding Steller’s (<i>Polysticta stelleri</i>) and spectacled eiders (<i>Somateria fischeri</i>), both of which are listed as threatened under the Endangered Species Act. For these coastal areas, the Department suggests the following additional BMPs should be implemented:</p> <ul style="list-style-type: none"><li>• Self-supporting towers will be used instead of guyed towers wherever possible.</li><li>• When guy wires are necessary, each wire will be marked for its full length, using daytime markers that stand out against the wire and the environment. Not all markers are designed for use in extreme conditions such as those encountered in the Arctic. The Project should work with the FWS to choose appropriate markers. Markers should be regularly maintained for the life of the project.</li><li>• On the ACP, monopole structures will be considered in place of lattice structures to discourage perching and nesting by ravens and raptors/birds of prey, unless use of a monopole structure would require addition of any guy wires. In these cases, projects should work with the FWS to incorporate anti-perching and anti-nesting devices into project design.</li></ul> | <p>The Draft and Final PEIS indicate that the use of non-guyed towers is preferable to guyed towers, and that when guy wires are used they will have daytime markers. FirstNet will consult with USFWS at the site-specific level as required, regarding the use of guyed towers. The text in the Final PEIS has been modified to indicate that, to the extent practicable and feasible, monopole structures may be considered in place of lattice structures on the ACP. If lattice towers are to be used on the ACP, FirstNet and/or their partners would work with the USFWS to incorporate anti-perching and anti-nesting devices into project design, as practicable and feasible.</p>                                                                                                         | Chapter 11                                                                         | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0017    | 162 (cont.)    | 4/25/2016        | Mary Josie Blanchard | US DOI                 | <ul style="list-style-type: none"><li>• Outdoor security or safety lights will be motion-triggered, downcast and/or down-shielded, and directed inward whenever possible to prevent “star” effects when viewed offsite. This recommendation applies to both permanent and temporary lighting used during construction and operation.</li><li>• Lights inside buildings will be motion-triggered. Blackout shades will be installed and used on outward-facing windows at night, when migratory birds are present (e.g., May through October on the ACP).</li><li>• The FWS has concerns about the risks overhead power lines pose to migratory birds on the ACP. Except in special cases, we generally discourage their use. If telecommunications facilities will require use of overhead wires, the FWS would like to provide input on design and placement to minimize potential impacts to migratory birds.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>Text has been added Chapter 11, BMPS and Mitigation Measures, of the Final PEIS related to the suggestions made in the first and third bullets. In certain circumstances it may be preferable and less impactful to implement line burial instead of installing lines overhead. Such determinations would be made at the site-specific level. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined.</p> <p>Although project-specific details have not yet been developed, buildings are not anticipated to be tall enough to pose a significant risk for bird collisions as a result of indoor lighting.</p> | Chapter 11                                                                         | Chapter 11, BMPS and Mitigation Measures         |



| Submission ID | Comment Number | Date(s) Received | Sender Name(s)       | Sender Organization(s)                                                                         | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0017    | 163            | 4/25/2016        | Mary Josie Blanchard | US DOI                                                                                         | For communication towers constructed in forested habitats without ESA compliance, the Department cannot concur with your no effect determination. The consultation process is a forward looking process that works to anticipate impacts and avoid or minimize them. This cannot be done for towers that were constructed without consultation. The Department recommends that towers show proof of existing ESA compliance prior to FirstNet using them.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The Federal Communications Commission (FCC) is responsible for addressing environmental and historic preservation requirements for existing towers. FirstNet will address ESA compliance requirements for any new towers and modifications made to existing towers for the Nationwide Public Safety Broadband Network (NPSBN) at the site-specific level. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. | General                                                                            | NA                                               |
| FN-NC-0118    | 164            | 7/27/2016        | Kealana Phillips     | State of Hawaii Department of Land and Natural Resources, State Historic Preservation Division | On behalf of the Maui Lana’I Island Burial Council, I would like to thank you for contacting the council regarding the First Responder Network Authority (FirstNet) release of the Draft Programmatic Environmental Impact Statement (PEIS) for the Nationwide Public Safety Broadband Network (NPSBN) in the non-contiguous region of the United States (Alaska, Hawai’i, American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and U.S. Virgin Islands). Unfortunately, with the sporadic meeting schedule of our schedule, we were not able to convene to discuss the PEIS prior to the 60-day comment period ending May 3. However, we would greatly appreciate it if we can remain informed as the project progresses so that we may provide comments in the future as we see fit. Should you have any questions or concerns, please feel free to contact me.                                                                                                                                       | FirstNet will continue to keep the State Historic Preservation Division informed as the project progresses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | General                                                                            | NA                                               |
| FN-NC-0019    | 165            | 5/3/2016         | Shari Wilson         | US EPA                                                                                         | <p>The draft PEIS analyzed three alternatives: 1) No Action; 2) Deployable Technologies Only and; 3) Mixed Technologies. FirstNet selected alternative three (Mixed Technologies) as the preferred alternative. This alternative incorporates a combination of methods including collocation of network equipment, construction of new communication towers, installation of new conduit and fiber technology and deployable technologies (portable satellite phones, cell-on-wheels, cell-on-light trucks and system-on-wheels).</p> <p>Based on our review, EPA finds no objection with the preferred alternative in the draft PEIS. EPA has rated the draft PEIS as LO (“Lack of Objections”). The “LO” rating signifies the draft PEIS did not identify an environmental impacts requiring substantive changes. A summary of EPA’s Rating System Criteria is located at <a href="http://www.epa.gov/compliance/nepa/comments/ratings.html">http://www.epa.gov/compliance/nepa/comments/ratings.html</a></p> | Thank you for your comment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | General                                                                            | NA                                               |
| FN-NC-0020    | 166            | 12/21/2016       | Jacinta Brown        | American Samoa Department of Homeland Security                                                 | Police Services – line 5 – There is one central police station and four sub-stations: Tafuna, Leone, Faga’itua and the Manu’a Islands Group, as well as the Department of Public Safety Uniform Crime Reporting Record Office, located in Fagatogo.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Thank you for your comment. This text has been updated in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Page 5.1.1-4                                                                       | 5.1.1.4                                          |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s) | Sender Organization(s)                         | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                 | Response                                                                  | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0020    | 167            | 12/21/2016       | Jacinta Brown  | American Samoa Department of Homeland Security | Second bullet: American Samoa TEMCO: should read American Samoa Department of Homeland Security (ASDHS), Territorial Emergency Management Coordinating Office (TEMCO) as the territorial emergency management mechanism is the lead office responsible for coordinating resource management, emergency response and recovery efforts.....                                                                    | Thank you for your comment. This text has been updated in the Final PEIS. | Page 5.1.1-6                                                                       | 5.1.1.5                                          |
| FN-NC-0020    | 168            | 12/21/2016       | Jacinta Brown  | American Samoa Department of Homeland Security | Third bullet: Emergency Alert System (EAS): The American Samoa EAS was developed by National Weather Services an ASDHS/TEMCO....                                                                                                                                                                                                                                                                             | Thank you for your comment. This text has been updated in the Final PEIS. | Page 5.1.1-6                                                                       | 5.1.1.5                                          |
| FN-NC-0020    | 169            | 12/21/2016       | Jacinta Brown  | American Samoa Department of Homeland Security | Fourth bullet: Federal Emergency Management Agency Integrated Public Alert and Warning System (IPAWS):....FEMA has partnered with the ASDHS/TEMCO and NOAA/NWS with the KKHJ-FM radio station in American Samoa as the EAS Primary Entry Point Station or LP1 and the radio station KULA-FM as the LP2.                                                                                                      | Thank you for your comment. This text has been updated in the Final PEIS. | Page 5.1.1-6                                                                       | 5.1.1.5                                          |
| FN-NC-0020    | 170            | 12/21/2016       | Jacinta Brown  | American Samoa Department of Homeland Security | Section on Fire Services: Fifth sentence in the para should read: There is one main fire station located in Fagatogo and four sub-stations which are co-located with the four police substations at Tafuna, Leone, Faga’itua and the Manu’a islands group. The Fire Bureau or Division of the Department of Public Safety is made up of ____ 48 ??? people, including firefighters and administrative staff. | Thank you for your comment. This text has been updated in the Final PEIS. | Page 5.1.1-5                                                                       | 5.1.1.4                                          |
| FN-NC-0020    | 171            | 12/21/2016       | Jacinta Brown  | American Samoa Department of Homeland Security | Section on Emergency Medical and Hospital Services: Emergency medical services are provided under the Lyndon B. Johnson (LBJ) Tropical Medical Center. The emergency medical staff is made of 34 people.....???                                                                                                                                                                                              | This text has been updated in the Final PEIS.                             | Page 5.1.1-5                                                                       | 5.1.1.4                                          |

ASDHS = American Samoa Department of Defense; DHS = U.S. Department of Homeland Security; DOE = U.S. Department of Energy; DOI = Department of the Interior; EPA = Environmental Protection Agency; ES = Executive Summary; HI-DOD = Hawaii Department of Defense; NA = not applicable; NPS = National Park Service; NPSBN = Nationwide Public Safety Broadband Network; NRCS = U.S. Department of Agriculture Natural Resources Conservation Service; PEIS = Programmatic Environmental Impact Statement; PREMA = Puerto Rico Emergency Management TOC = Table of Contents; USCG = U.S. Coast Guard



Table 14-2: Comments on Other Reports Applicable to this Final PEIS

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)    | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0021    | 172            | 10/11/2016       | Michaela E. Noble | US DOI                 | USFWS recommends conducting vegetation clearing and removal and tree cutting outside of the breeding period for migratory birds. The USFWS Field Offices can provide state-specific date ranges when clearing should be avoided.                                                                                                                                                                                                                                                                                                                                                                                                | Direct impacts to nests during construction have been added under the Direct Injury/Mortality subsection. The use of construction timing windows can be an effective mitigation measure for avoiding and minimizing adverse reproductive effects. At the programmatic level the project covers a wide geographic range and currently lacks project-specific detail. As such, determining the feasibility and effectiveness of this BMP will be done as part of subsequent site-specific reviews. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. | General                                                                            | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0021    | 173            | 10/11/2016       | Michaela E. Noble | US DOI                 | We recommend that structures containing the fewest perching options be used in areas where raptor and raven predation of sensitive resources is a concern. Where raptor electrocution is a concern, use of structures and components compatible with the guidance in the Avian Power Line Interaction Committee’s (APLIC) 2006 “Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006” electrocution manual should be implemented. Where collision is a hazard, we recommend the APLIC’s 2012 “Reducing Avian Collisions with Power Lines: The State of the Art in 2012” manual be implemented. | The suggested BMPs have been added to Chapter 11, BMPs and Mitigation Measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | General                                                                            | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0021    | 174            | 10/11/2016       | Michaela E. Noble | US DOI                 | The USFWS recommends that the suggested practices by the Avian Power Line Interaction Committee be followed to minimize impacts to migratory birds through collision and electrocution (see www.aplic.org for the 2006 electrocution and 2012 collision manuals) for all overhead lines.                                                                                                                                                                                                                                                                                                                                        | A reference to the APLIC practices is included in Chapter 11, BMPs and Mitigation Measures, to be implemented as practicable or feasible during deployment and operation activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | General                                                                            | Chapter 11, BMPS and Mitigation Measures         |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)    | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0021    | 175            | 10/11/2016       | Michaela E. Noble | US DOI                 | <p>Communication towers are currently estimated to kill between four and five million birds per year. A great deal of the mortality is the result of collisions with supporting guy wires. Additionally, the type of safety lighting on these towers appears to influence their attractiveness to birds. In order to minimize the potential for impacts to migratory birds, the USFWS urges consideration of the following siting and construction recommendations.</p> <p>1. If possible, new communication equipment should be co-located on an existing tower or similar structure (e.g. billboard, water tower, or building mount). Depending on tower load factors, from 6 to 10 providers may co-locate on an existing tower.</p> <p>2. Where co-location is not feasible and a new tower must be constructed, all efforts should be taken to construct towers no more than 199 feet above ground level (AGL), that do not require guys wires (e.g. use a lattice, monopole structure, etc.). Such towers should be unlighted if Federal Aviation Administration (FAA) regulations permit.</p> <p>3. If constructing multiple towers, providers should consider the cumulative effects of all of those towers to endangered, threatened, proposed, and candidate species and migratory birds as well as effects of each individual tower.</p> <p>4. If at all possible, new towers should be sited within existing antenna farms Avoid siting towers near (within 3 to 5 miles of) wetlands, other known bird concentration areas (e.g., state or Federal refuges, staging areas, rookeries), in known migratory or daily movement flyways, or in habitat of threatened or endangered species. Towers should not be sited in areas with a high incidence of fog, mist, or low ceilings.</p> <p>5. If taller (greater than 199 feet AGL) towers requiring lights for aviation safety must be constituted, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used. Unless required by the FAA, only white strobe lights should be used at night, preferably with the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. Current research indicates that solid or pulsating (beacon) red lights attract night-migrating birds at a much higher rate than white strobe lights.</p> | <p>Elements of many of these recommendations are included in Chapter 11, BMPs and Mitigation Measures. Most of these suggestions are also duplicates of the recommendations in USFWS 2013b which are cited in Chapter 11. Site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work, and the feasibility of implementing these recommendations could be determined during subsequent analysis and consultation. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined.</p> | General                                                                            | Chapter 11, BMPS and Mitigation Measures         |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)    | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Response                        | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0021    | 176            | 10/11/2016       | Michaela E. Noble | US DOI                 | <p>6. Towers designed using guy wires for support that are proposed to be located in known raptor or waterbird concentration areas or daily movement routes, or in major diurnal migratory bird movement routes or stopover sites, should have daytime visual markers (e.g., bird diverter devices) on the wires to prevent collisions by these diurnal moving species. For guidance on markers, the Avian Power Line Interaction Committee has published guidance (Reducing Avian Collisions with Power Lines: The State of the Art in 2012 and Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006). Copies can be obtained at <a href="http://www.aplic.org/">http://www.aplic.org/</a>.</p> <p>7. Towers and attendant facilities should be sited, designed, and constructed to avoid or minimize habitat loss within and adjacent to the tower footprint. Road access and fencing should be minimized to reduce or prevent habitat fragmentation and disturbance, and to reduce above-ground obstacles to birds in flight.</p> <p>8. If significant numbers of breeding, feeding, or roosting birds are known to occur within the tower construction area, relocation to an alternate site is recommended. If this is not possible, seasonal restrictions on construction may be advisable in order to avoid disturbance during periods of high bird activity.</p> <p>9. New towers should be designed structurally and electrically to accommodate the applicant/licensee’s antennas and comparable antennas for at least two additional users (minimum of 3 users for each tower structure), unless this design would require the addition of lights or guy wires to an otherwise unlighted and/or non-guyed tower.</p> <p>10.Security lighting for on-ground facilities and equipment should be down-shielded to keep light within the boundaries of the site.</p> <p>11.USFWS personnel and/or researchers from the Communication Tower Working Group or its designees should be allowed access to the site to evaluate bird use, conduct dead bird searches, and to conduct various research.</p> <p>12.Towers no longer in use or determined to be obsolete should be removed within 12 months of cessation of use.</p> | (Included with response above.) | General                                                                            | Chapter 11, BMPS and Mitigation Measures         |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)    | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Response                                                                                                                                                                                                                                                                                                                                                                   | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0021    | 177            | 10/11/2016       | Michaela E. Noble | US DOI                 | Although these measures will provide significant protection for migratory birds, implementation of these measures alone will not remove any liability should violations of the MBTA or the Eagle Act occur. The U.S. Fish and Wildlife Service Division of Law Enforcement and the U.S. Department of Justice have used enforcement and prosecutorial discretion in the past regarding individuals or companies who have made good faith efforts to avoid the take of migratory birds. We acknowledge that you intend to avoid construction during sensitive time periods and within specific spatial buffers for listed species. We recommend that nesting migratory birds also be avoided during the nesting season within species-specific buffers. As a part of the Project, we recommend monitoring of avian use of Project facilities as well as reporting avian mortality events. | (Included with response above.)                                                                                                                                                                                                                                                                                                                                            | General                                                                            | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0021    | 178            | 10/11/2016       | Michaela E. Noble | US DOI                 | The reproductive success of federally listed plants may be impacted by the Project, particularly through use of insecticides or pesticides as well as dust generated from construction and use of access roads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | The Draft and Final PEIS acknowledge this potential impact to listed plants.                                                                                                                                                                                                                                                                                               | General                                                                            | NA                                               |
| FN-NC-0021    | 179            | 10/11/2016       | Michaela E. Noble | US DOI                 | A spill prevention, control, and countermeasure plan (SPCCP) should be developed for the Project. This would apply to Water Resources, Wetlands, Fisheries and Aquatic Habitats, T&E Species, and Human Health and Safety.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The development of an SPCC Plan, as practicable or feasible, has been added to Chapter 11, BMPs and Mitigation Measures, to avoid, reduce, or minimize impacts to the resources mentioned.                                                                                                                                                                                 | General                                                                            | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0021    | 180            | 10/11/2016       | Michaela E. Noble | US DOI                 | Recommend adding a measure about control of fugitive dust generated by the Project’s use of unpaved roads and construction. Dust can settle on plants and block their ability to photosynthesize, and can disrupt pollination success.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Chapter 11, BMPS and Mitigation Measures, of the Draft PEIS included a BMP to implement a dust control plan for construction activities and any travel over unpaved roads. In the Final PEIS, a BMP has been added to this chapter in the Biological Resources section to avoid, reduce, or minimize dust impacts to those resources.                                      | Chapter 11                                                                         | Chapter 11, BMPS and Mitigation Measures         |
| FN-NC-0021    | 181            | 10/11/2016       | Michaela E. Noble | US DOI                 | Recommend adding a measure on controlling speed limits on access roads, particularly within areas where a federally listed animal may be struck by construction and/or maintenance vehicles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Chapter 11, BMPS and Mitigation Measures, of the Draft PEIS included a BMP to post and enforce speed limits on dirt/gravel roads as related to reducing airborne fugitive dust impacts. In the Final PEIS, a BMP has been added to this chapter in the Biological Resources section to avoid, reduce, or minimize potential collision impacts to Wildlife and T&E species. | Chapter 11                                                                         | Chapter 11, BMPS and Mitigation Measures         |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)    | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS |
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| FN-NC-0021    | 182            | 10/11/2016       | Michaela E. Noble | US DOI                 | Additionally, communication towers might have an impact on migratory birds due to non-ionizing electromagnetic radiation emitted by the tower. Please review the February 7, 2014, letter from the Department to Mr. Eli Veenendaal (National Telecommunications and Information Administrator) for additional information regarding electromagnetic radiation impacts from the Proposed Action (Enclosure 1).                                                                                                                                                                                                                 | <p>The full US DOI comment submission, including the February 7, 2014, letter to Mr. Veenendaal, can be found in Appendix H, <i>Radio Frequency Emissions Comments Received—All Regions</i>, of the Final PEIS. The letter references radiation studies conducted at communication towers and discusses the potential impacts to birds from non-ionizing electromagnetic radiation.</p> <p>The Wildlife sections of the Final PEIS have been updated to include additional information related to potential radio frequency exposure and its associated potential impacts to wildlife, specifically birds and bats. Potential radio frequency exposure impacts to humans are discussed in Section 2.4, Radio Frequency Emissions.</p> | General                                                                            | All Wildlife Environmental Consequences sections |
| FN-NC-0022    | 183            | 10/11/2016       | Brian Shepherd    | FirstNet Colorado      | The environmental regulations, guidelines, exclusions, etc. that apply to states that choose to ‘opt-in’ to the national plan (and the national partner) should apply to states that choose to develop an alternative Radio Access Network (RAN) through their statutory right. States and their partners that choose to opt-out should in no way be treated any differently than states that opt-in. The fundamental environmental impacts for each scenario are the same.                                                                                                                                                    | Thank you for your comments; however, the issues raised are beyond the scope of this Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | General                                                                            | NA                                               |
| FN-NC-0022    | 184            | 10/11/2016       | Brian Shepherd    | FirstNet Colorado      | Categorical exclusions: Any categorical exclusions requested by FirstNet and/or the national partner should set a precedent/template for any categorical exclusions required by an alternative plan state. As the national plan is developed, implemented, and categorical exclusions are granted, the parameters that enable those categorical exclusions should apply to any opt-out states. This will primarily impact the use of existing towers and/or structures for the RAN. A process and reasons for granting any exclusion for a specific tower or structures should be the same for any other towers or structures. | Thank you for your comments; however, the issues raised are beyond the scope of this Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | General                                                                            | NA                                               |
| FN-NC-0022    | 185            | 10/11/2016       | Brian Shepherd    | FirstNet Colorado      | Use of existing assets: We would encourage the PEIS to include a more detailed discussion of the impact of using existing towers and/or structures. Currently, the PEIS states that the use of existing assets ‘may’ have an environmental impact. It would be helpful to include in the final PEIS a set of specific parameters that would guide the decision on whether an existing asset will have an actual impact. We understand that the final impact would be a case-by-case review, but providing some examples of how specific uses of towers/structures may or may not create an impact would be helpful.            | The impacts of using existing assets would vary depending on the specific asset and its unique environment, therefore it is not possible to provide greater specificity on impacts at the programmatic level beyond the discussion of impacts of each project type on the various resource areas included in the Environmental Consequences sections of the document. The impacts of use of existing assets would be subject to further evaluation at the site-specific level. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined.              | General                                                                            | NA                                               |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)   | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS                                                                                       |
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| FN-NC-0023    | 186            | 10/21/2016       | Michael Robotham | NRCS                   | Another issue that has come up in our internal agency discussions is the need for FirstNet to be aware of land use easements that are held by NRCS (and I believe by other agencies – but we are focused on ours). NRCS holds some very large acreage easements, primarily focused on wildlife habitat. These are mainly located in the Western US, but easements have been purchased nationwide. Easement conditions often severely restrict potential management activities including, but not limited to, construction activities. Easements can be amended, but this is typically a very long process and, depending on the particular species of concern, proposed FirstNet activities may not be compatible with the goals of the particular easement. To address this issue, we suggest that language be included in the Draft PEIS recognizing that FirstNet is aware of this as a potential issue, and that all reasonable efforts will be taken to avoid construction activities in areas covered by existing easements.                                                                                                                                                   | Information related to NRCS easements has been included in the Final PEIS within the Land Use, Airspace, and Recreation sections of each state/territory chapter. In addition, a BMP has been added to Chapter 11, BMPs and Mitigation Measures, indicating that reasonable efforts would be taken to avoid or minimize construction activities in areas covered by existing incompatible easements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | General                                                                            | All Land Use Affected Environment sections; all Land Use Environmental Consequences sections; Chapter 11, BMPS and Mitigation Measures |
| FN-NC-0024    | 187            | 10/6/2016        | Nick Antonio     | Antonio Acoustics      | Construction vibration can have a direct effect on natural and cultural resources, including disturbance to humans, impacts on sensitive activities and processes, damage to property and structures, and effects on fauna in both land and marine habitats... I therefore suggest that the PEIS address vibration impacts from construction activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Thank you for your comment. Vibration impacts have been added to the noise and vibrations sections within each state/territory chapter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | General                                                                            | All Noise and Vibrations Affected Environment sections; all Noise and Vibrations Environmental Consequences sections                   |
| FN-NC-0024    | 188            | 10/6/2016        | Nick Antonio     | Antonio Acoustics      | The construction work proposed encompasses a wide variety of processes including (but not limited to) piling, trenching, concrete placement and road construction. Many of these processes are noisy. The exact location of these has not been established but some working is anticipated to be in urban and suburban areas. Therefore, some work will be close to noise sensitive receivers. It is not possible to carry out many construction work processes close to noise sensitive receivers without disturbance, sometimes even after mitigation. The PEIS identifies that noise from “the Proposed Action is expected to result in impacts that are not potentially significant regardless of whether BMPs and mitigation measures are incorporated.” Clearly this is wrongly categorized. As it is not possible to carry out noisy construction and work close to noise sensitive receivers without disturbance, Best Management Practices and mitigation measures should be incorporated. The Assessed Impact should therefore be either “Potentially Significant”, or “Less than significant with best management practices (BMPs) and mitigation measures incorporated.” | Thank you for your comment. See response to comment number 92. The Final PEIS explains that at the programmatic level and based on the impact significance ratings developed, there would be no potentially significant impacts as a result of the Proposed Action as a whole. <sup>8</sup> However, the same impact significance criteria used at the programmatic level may not apply to site-specific build-out activities/actions. The Final PEIS acknowledges that site-specific impacts do have the potential to be greater on a localized basis and may require site-specific assessments and mitigation. FirstNet has not yet determined the methodology that will be employed to address site-specific analysis but will be issuing a Supplemental Programmatic Environmental Impact Statement with that information as soon as it is determined. At the programmatic level, noise impacts are anticipated to be less than significant using the significance criteria established for the analyses. | General                                                                            | Throughout Final PEIS, to include all Noise and Vibrations Environmental Consequences sections                                         |

<sup>8</sup> Impacts of climate change on the Preferred Alternative could range from potentially significant to less than significant with BMPs and mitigation measures incorporated at the programmatic level.



| Submission ID | Comment Number | Date(s) Received | Sender Name(s)  | Sender Organization(s) | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS                             |
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| FN-NC-0025    | 189            | 11/15/2016       | Rob Tomiak      | US EPA                 | We recommend revising the GHG and climate change analysis to remove the 25,000 metric tons of CO2-e reference point and ensure overall consistency with the 2016 Final GHG Guidance.                                                                                                                                                                                                                                                                                                                                                                             | The climate change analyses in the Final PEIS no longer include the 25,000 metric ton reference point and have been revised in accordance with the 2016 Final Guidance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Climate Change Environmental Consequences sections                                 | All Climate Change Environmental Consequences sections; ES4.14, Table ES4-14 |
| FN-NC-0026    | 190            | 11/8/2016        | Richard Fristik | USDA-RUS               | Section 1.2 - Suggest deleting “of actions and associated levels” from this sentence: “Finally, and as discussed in the introduction of each of the Environmental Consequences sections, the programmatic approach allows FirstNet to identify and define four categories of actions and associated levels of potential impact as described below.”                                                                                                                                                                                                              | This phrase has been deleted from the sentence in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Section 1.2                                                                        | 1.2                                                                          |
| FN-NC-0026    | 191            | 11/8/2016        | Richard Fristik | USDA-RUS               | Sections 2.1.2 and 2.2 - realizing that this is a programmatic assessment, and as stated in Section 2.1, that the network “...must use existing infrastructure to the maximum extent economically desirable”, is it at all possible to at least generally describe the magnitude of parameters of the proposed project for this region in terms of miles of buried and aerial fiber, number of antennas/towers, etc.? If nothing else, this provides some point of reference for the impact assessment and may also inform the assessment of cumulative impacts. | Project design plans have not been developed and therefore this information is not available to be included in the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Sections 2.1 and 2.2                                                               | NA                                                                           |
| FN-NC-0026    | 192            | 11/8/2016        | Richard Fristik | USDA-RUS               | Section 2.4 - This seems oddly placed in this chapter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Radio frequency emission concerns were expressed by the public during the scoping and public comment periods. The discussion of emissions effects to human and non-human species is important to include in Chapter 2, Description of the Proposed Action and Alternatives, as it applies to all states and territories.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Section 2.4                                                                        | NA                                                                           |
| FN-NC-0026    | 193            | 11/8/2016        | Richard Fristik | USDA-RUS               | Concerned that the impact descriptions seem not to match established criteria of USFWS, e.g., for may affect, not likely to adversely affect, the effects are expected to be “discountable, insignificant, or completely beneficial” (FWS S. 7 Consultation Handbook)...                                                                                                                                                                                                                                                                                         | As explained in the Draft and Final PEIS, the impact levels (or effect determinations) used in the analysis of threatened and endangered species and species of conservation concern are based on those in the Endangered Species Consultation Handbook (USFWS and NMFS 1998). The text under the “Impact Assessment Methodology and Significant Criteria” heading in each of these sections describes the three impact levels (no effect; may affect, not likely to adversely affect; may affect, likely to adversely affect). Within these descriptions, the “may affect, not likely to adversely affect” determination indicates that these effects are beneficial, insignificant, or discountable. The text also describes the other two effect determinations. Following these descriptions, the impact significance rating criteria tables provide examples of various effect characteristics based on magnitude/intensity, geographic extent, and duration/frequency. | NA                                                                                 | NA                                                                           |
| FN-NC-0026    | 194            | 11/8/2016        | Richard Fristik | USDA-RUS               | ...references to CEQ 2014 guidance on climate change/GHG; CEQ issued final guidance Aug. 1, 2016. Not only do the references need to be changed, but text needs to be modified to reflect the final guidance, e.g., it no longer uses the 25,000 MT threshold.                                                                                                                                                                                                                                                                                                   | The Final PEIS uses the August 1, 2016 final guidance. The climate change analyses in the Final PEIS no longer include the 25,000 metric ton reference point and have been revised in accordance with the 2016 Final Guidance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | General                                                                            | All Climate Change Environmental Consequences sections; ES4.14, Table ES4-14 |

| Submission ID | Comment Number | Date(s) Received | Sender Name(s)                          | Sender Organization(s)                            | Comment Text                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS                                                                                                                                              |
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| FN-NC-0026    | 195            | 11/8/2016        | Richard Fristik                         | USDA-RUS                                          | BMPs/Mitigation... there is considerable overlap and redundancy in the BMPs and mitigation measures. Also, some appear to be neither BMP nor mitigation measure...                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Where appropriate and applicable, the suggestions made by RUS on the West Region BMPs and Mitigation Measures chapter were made in the non-contiguous region chapter.                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Chapter 11                                                                         | Chapter 11, BMPS and Mitigation Measures                                                                                                                                                      |
| FN-NC-0026    | 196            | 11/8/2016        | Richard Fristik                         | USDA-RUS                                          | Appendix A: The appendix possibly should be re-titled, and at a minimum the table annotated to indicate that these agencies were invited to be cooperating agencies (according to section 1.5.2), and then highlight or otherwise indicate those that accepted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | The title of Appendix A has been changed to <i>Invited Cooperating Agencies</i> in the Final PEIS to reflect the fact that the list represents the agencies that were invited to become cooperating agencies. The text of the appendix was also updated to indicate which agencies accepted the invitation.                                                                                                                                                                                                                                                                                                                   | Appendix A                                                                         | Appendix A, <i>Invited Cooperating Agencies</i>                                                                                                                                               |
| FN-NC-0027    | 197            | 1/20/2017        | Dr. Andrea A. Hunder and Jackie Rodgers | Osage Nation Tribal Historic Preservation Office  | First, it came to our attention that inadvertant discoveries and the Native American Graves Protection and Repatriation Act, also known as NAGPRA (Public Lawy 101-601; 25 U.S.C. 3001-3013) were not mentioned throughout the document. As the avoidance of disturbing burials is a top priority for the Osage Nation, this omission needs to be addressed. We suggest adding a BMP to follow all state and national laws and regulations if inadvertent discoveries of human remains are made during construction. Additionally, we suggest that state burial laws be included in the cultural resources sections' lists of state laws as well.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thank you for your comment. NAGPRA is addressed in Appendix C, <i>Environmental Laws and Regulations</i> , as well as in the applicable Cultural Resources Affected Environment and Environmental Consequences sections. Relevant burial laws are included in the "Specific Regulatory Considerations" under Section X.1.11. For clarity, the suggested BMP has been added to Chapter 11, BMPs and Mitigation Measures.                                                                                                                                                                                                       | General                                                                            | All Cultural Affected Environment sections; all Cultural Environmental Consequences sections; Chapter 11, BMPS and Mitigation Measures; Appendix C, <i>Environmental Laws and Regulations</i> |
| FN-NC-0027    | 198            | 1/20/2017        | Dr. Andrea A. Hunder and Jackie Rodgers | Osage Nation Tribal Historic Preservation Office  | One of the BMPs states "Follow all applicable federal requirements for consultation on the identification and assessment of effects to cultural resources." While it is important to consult with all invested parties on potential impacts to cultural resources, it is especially important to consult with Tribes before work begins. Tribes have special knowledge of their significant sites and often still utilize these sites in ceremonies or for other cultural purposes. Additionally, several peices of legislation and executive orders require tribal consultation including NAGPRA, the American Indian Religious Freedom Act (AIRFA) (16 U.S.C. 1996), the Archeological Resources Protection Act of 1979. (ARPA) (16 U.S.C. 470aa-mm), the National Historic Preservation Act (NHPA) (16 U.S.C. 470 et seq.), the National Environmental Policy Act (NEPA) Implementing Regulations (40 CFR Part 1500, and Executive Order 13175: Consultation and Coordination with Indian Tribal Governments (Nov. 6, 2000). This office recommends that tribal consultation be emphasized either within the wording of this BMP or in an additional BMP. | Thank you for your comment. When site-specific information is known, American Indian tribes will be notified of the deployment locations using FCC's Tower Construction Notification System (TCNS). At that time, the federally recognized tribes with an interest in a given geographic area will be able to review the project location(s) within that given geographic area and provide feedback, comments, or requests to FirstNet regarding the project(s) and its location in relation to cultural resources. Additionally for clarity, the suggested BMP has been revised in Chapter 11, BMPs and Mitigation Measures. | Chapter 11                                                                         | Chapter 11, BMPS and Mitigation Measures                                                                                                                                                      |
| FN-NC-0028    | NA             | 9/29/2016        | Dr. Albert M. Manville                  | Wildlife and Habitat Conservation Solutions, LLC; | Comments from this submittal express concerns about the potential impacts of radio frequency radiation to wildlife and humans. This submittal also expresses concerns related to birds colliding with communication towers. This full comment submission can be found in Appendix H of the Final PEIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The Wildlife sections of the Final PEIS have been updated to include additional information related to potential radio frequency exposure and its associated potential impacts to wildlife, specifically birds and bats. The Wildlife sections also address potential collision impacts. Potential radio frequency exposure impacts to humans are discussed in Section 2.4, Radio Frequency Emissions.                                                                                                                                                                                                                        | General                                                                            | All Wildlife Environmental Consequences sections                                                                                                                                              |



| Submission ID                 | Comment Number | Date(s) Received                              | Sender Name(s)                                                                      | Sender Organization(s) | Comment Text                                                                                                                                                                             | Response                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Chapter/Section/Page Number Reference in the Draft PEIS as Identified by Commenter | Section(s) where changes were made in Final PEIS                                                     |
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| FN-NC-0029 through FN-NC-0033 | NA             | 12/15/2016; 12/16/2016; 12/21/2016; 1/28/2017 | Catherine Kleiber; Rebecca Smith; Naveen Albert; Michelle Illiatovitch; Tara Schell | Various                | See Appendix H of the Final PEIS. Comments from these submissions express concerns about potential impacts to humans, wildlife, and vegetation as a result of radio frequency emissions. | The Wildlife sections of the Final PEIS have been updated to include additional information related to potential radio frequency exposure and its associated potential impacts to wildlife, specifically birds and bats. Potential radio frequency exposure impacts to humans are discussed in Section 2.4, Radio Frequency Emissions. The terrestrial vegetation sections have also been updated to acknowledge potential impacts from radio frequency emissions. | Various                                                                            | All Wildlife Environmental Consequences sections; All Vegetation Environmental Consequences sections |

DOI = Department of the Interior; EPA = Environmental Protection Agency; ES = Executive Summary; NA = not applicable; NPSBN = Nationwide Public Safety Broadband Network; NRCS = U.S. Department of Agriculture Natural Resources Conservation Service; PEIS = Programmatic Environmental Impact Statement; T&E = Threatened and Endangered; USDA-RUS = U.S. Department of Agriculture Rural Utilities Service

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# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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#### **Cooperating Agencies**

Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

May 2017

Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
<[https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)>
- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |



|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |

|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

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- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
<[https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)>
- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |



|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |

|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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U.S. Virgin Islands State Historic  
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### **Alaska**

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Akiak Native Community  
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Algaaciq Native Village, St. Mary's, AK  
Allakaket Village  
Angoon Community Association  
Anvik Village  
Arctic Village  
Asa'carsarmiut Tribe, Mountain Village, AK  
Atqasuk Village (Atkasook)  
Beaver Village, Beaver, AK  
Birch Creek Tribe, Fort Yukon, AK  
Central Council of the Tlingit & Haida Indian Tribes, Juneau, AK  
Chalkyitsik Village  
Cheesh-Na Tribe, Chistochina, AK  
Chevak Native Village  
Chickaloon Native Village  
Chignik Bay Tribal Council  
Chignik Lake Village  
Chilkat Indian Village (Klukwan), Haines, AK  
Chilkoot Indian Association, Haines, AK  
Chinik Eskimo Community, Golovin, AK  
Chuloonawick Native Village, Emmonak, AK  
Circle Native Community  
Craig Tribal Association  
Curyung Tribal Council, Dillingham, AK  
Douglas Indian Association, Juneau, AK  
Egegik Village  
Eklutna Native Village, Chugiak, AK  
Emmonak Village  
Evansville Village, Bettles Field, AK  
Galena Village (a.k.a. Loudon Village)  
Gulkana Village  
Healy Lake Village, Fairbanks, AK  
Holy Cross Village  
Hoonah Indian Association  
Hughes Village, Hughes, AK  
Huslia Village  
Hydaburg Cooperative Association

Igiugig Village  
Inupiat Community of the Arctic Slope, Barrow, AK  
Iqurmiut Traditional Council, Russian Mission, AK  
Ivanoff Bay Village, Anchorage, AK  
Kaguyak Village, Akhiok, AK  
Kaktovik Village (a.k.a. Barter Island)  
Kasigluk Traditional Elders Council  
Kenaitze Indian Tribe, Kenai, AK  
Ketchikan Indian Corporation  
King Island Native Community, Nome, AK  
King Salmon Tribe  
Klawock Cooperative Association  
Knik Tribe, Wasilla, AK  
Kokhanok Village  
Koyukuk Native Village  
Levelock Village  
Lime Village, McGrath, AK  
Manley Hot Springs Village  
Manokotak Village  
McGrath Native Village  
Mentasta Traditional Council  
Naknek Native Village  
Native Village of Afognak, Kodiak, AK  
Native Village of Akhiok  
Native Village of Akutan  
Native Village of Aleknagik  
Native Village of Ambler  
Native Village of Atka  
Native Village of Barrow, Inupiat Traditional Government  
Native Village of Belkofski, King Cove, AK  
Native Village of Brevig Mission  
Native Village of Buckland  
Native Village of Cantwell  
Native Village of Chenega (a.k.a. Chanega)  
Native Village of Chignik Lagoon  
Native Village of Chitina  
Native Village of Chuathbaluk (Russian Mission, Kuskokwim)  
Native Village of Council, Nome, AK



|                                                                    |                                                      |
|--------------------------------------------------------------------|------------------------------------------------------|
| Native Village of Deering                                          | Native Village of Nikolski                           |
| Native Village of Diomedé (a.k.a. Inalik)                          | Native Village of Noatak                             |
| Native Village of Eagle                                            | Native Village of Nuiqsut<br>(a.k.a. Nooiksut)       |
| Native Village of Eek                                              | Native Village of Nunam Iqua, Sheldon's<br>Point, AK |
| Native Village of Ekuk, Dillingham, AK                             | Native Village of Nunapitchuk                        |
| Native Village of Ekwok                                            | Native Village of Old Harbor                         |
| Native Village of Elim                                             | Native Village of Ouzinkie                           |
| Native Village of Eyak, Cordova, AK                                | Native Village of Paimiut,<br>Hooper Bay, AK         |
| Native Village of False Pass                                       | Native Village of Perryville                         |
| Native Village of Fort Yukon                                       | Native Village of Pilot Point                        |
| Native Village of Gakona                                           | Native Village of Pitka's Point, St.<br>Mary's, AK   |
| Native Village of Gambell                                          | Native Village of Point Hope                         |
| Native Village of Georgetown,<br>Anchorage, AK                     | Native Village of Point Lay                          |
| Native Village of Goodnews Bay                                     | Native Village of Port Graham                        |
| Native Village of Hamilton, Kotlik, AK                             | Native Village of Port Heiden                        |
| Native Village of Hooper Bay                                       | Native Village of Port Lions                         |
| Native Village of Kanatak, Wasilla, AK                             | Native Village of Ruby                               |
| Native Village of Karluk                                           | Native Village of Saint Michael                      |
| Native Village of Kiana                                            | Native Village of Savoonga                           |
| Native Village of Kipnuk                                           | Native Village of Scammon Bay                        |
| Native Village of Kivalina                                         | Native Village of Selawik                            |
| Native Village of Kluti Kaah, Copper<br>Center, AK                 | Native Village of Shaktoolik                         |
| Native Village of Kobuk                                            | Native Village of Shishmaref                         |
| Native Village of Kongiganak                                       | Native Village of Shungnak                           |
| Native Village of Kotzebue                                         | Native Village of Stevens, Stevens<br>Village, AK    |
| Native Village of Koyuk                                            | Native Village of Tanacross                          |
| Native Village of Kwigillingok                                     | Native Village of Tanana                             |
| Native Village of Kwinhagak,<br>Quinhagak, AK                      | Native Village of Tatitlek                           |
| Native Village of Larsen Bay                                       | Native Village of Tazlina, Glenallen, AK             |
| Native Village of Marshall<br>(a.k.a. Fortuna Ledge), Marshall, AK | Native Village of Teller                             |
| Native Village of Mary's Igloo,<br>Teller, AK                      | Native Village of Tetlin, Tok, AK                    |
| Native Village of Mekoryuk                                         | Native Village of Tuntutuliak                        |
| Native Village of Minto                                            | Native Village of Tununak                            |
| Native Village of Nanwalek<br>(a.k.a. English Bay)                 | Native Village of Tyonek                             |
| Native Village of Napaimute,<br>Anchorage, AK                      | Native Village of Unalakleet                         |
| Native Village of Napakiak                                         | Native Village of Unga, Sand Point, AK               |
| Native Village of Napaskiak                                        | Native Village of Venetie Tribal<br>Government       |
| Native Village of Nelson Lagoon                                    | Native Village of Wales                              |
| Native Village of Nightmute                                        | Native Village of White Mountain                     |
|                                                                    | Nenana Native Association                            |

|                                                                                                      |                                               |
|------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| New Koliganek Village Council                                                                        | Sitka Tribe of Alaska, Sitka, AK              |
| New Stuyahok Village                                                                                 | Skagway Village                               |
| Newhalen Village                                                                                     | South Naknek Village                          |
| Newtok Village                                                                                       | Stebbins Community Association                |
| Nikoli Village                                                                                       | Sun'aq Tribe of Kodiak                        |
| Ninilchik Village                                                                                    | Takotna Village                               |
| Nome Eskimo Community                                                                                | Tangirnaq Native Village                      |
| Nondalton Village                                                                                    | (a.k.a. Woody Island), Kodiak, AK             |
| Noorvik Native Community                                                                             | Telida Village, Nikolai, AK                   |
| Northway Village                                                                                     | Traditional Village of Togiak                 |
| Nulato Village                                                                                       | Tuluksak Native Community                     |
| Nunakauyarmiut Tribe, Toksook, AK                                                                    | Twin Hills Village                            |
| Organized Village of Grayling<br>(a.k.a. Holikachuk)                                                 | Ugashik Village, Anchorage, AK                |
| Organized Village of Kake                                                                            | Umkumiut Native Village,<br>Nightmute, AK     |
| Organized Village of Kasaan                                                                          | Village of Alakanuk                           |
| Organized Village of Kwethluk                                                                        | Village of Anaktuvuk Pass                     |
| Organized Village of Saxman,<br>Ketchikan, AK                                                        | Village of Aniak                              |
| Orutsararmiut Traditional Native<br>Council, Bethel, AK                                              | Village of Atmautluak                         |
| Oscarville Traditional Village,<br>Napaskiak, AK                                                     | Village of Bill Moore's Slough,<br>Kotlik, AK |
| Pauloff Harbor Village, Sand Point, AK                                                               | Village of Chefnak                            |
| Pedro Bay Village                                                                                    | Village of Clarks Point                       |
| Petersburg Indian Association                                                                        | Village of Crooked Creek                      |
| Pilot Station Traditional Village                                                                    | Village of Dot Lake                           |
| Platinum Traditional Village                                                                         | Village of Illiamna                           |
| Portage Creek Village (a.k.a.<br>Ohgsenakale), Anchorage, AK                                         | Village of Kalskag                            |
| Qagan Tayagungin Tribe of Sand Point<br>Village, Sand Point, AK                                      | Village of Kaltag                             |
| Qawalangin Tribe of Unalaska                                                                         | Village of Kotlik                             |
| Rampart Village, Rampart, AK                                                                         | Village of Lower Kalskag                      |
| Saint George Island (See Pribilof Islands<br>Aleut Communities of St. Paul and<br>St. George Island) | Village of Ohogamiut, Marshall, AK            |
| Saint Paul Island (See Pribilof Islands<br>Aleut Communities of St. Paul and<br>St. George Island)   | Village of Red Devil                          |
| Seldovia Village Tribe                                                                               | Village of Salamatoff, Kenai, AK              |
| Shageluk Native Village                                                                              | Village of Sleetmute                          |
|                                                                                                      | Village of Solomon, Nome, AK                  |
|                                                                                                      | Village of Stony River                        |
|                                                                                                      | Village of Venetie                            |
|                                                                                                      | Village of Wainwright                         |
|                                                                                                      | Wrangell Cooperative Association              |
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- Hawai'i Island Burial Council
- History and Culture Branch Chief
- Kaua'i/Ni'ihau Islands Burial  
Council
- Maui/Lana'i Islands Burial Council
- Molokai Island Burial Council
- Oahu Island Burial Council

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Superintendent, Puukohola Heiau  
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National Historical Park  
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Anchorage Public Library,  
Anchorage, AK  
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Big Lake Public Library, Big Lake, AK  
Chukchi Consortium Library,  
Kotzebue, AK  
Craig Public Library, Craig, AK  
Fairbanks North Star Borough Public  
Library, Fairbanks, AK  
Frances Kibble Kenny Lake Public  
Library, Copper Center, AK  
Innoko River Community/School and  
Tribal Library, Shageluk, AK  
Juneau Public Libraries - Downtown  
Branch Library, Juneau, AK  
Kenai Community Library, Kenai, AK  
Ketchikan Public Library, Ketchikan, AK  
Kettleson Memorial Library, Sitka, AK  
Klukwan Community/School Library,  
Haines, AK  
Koyuk Public Library, Koyuk, AK  
Mendenhall Valley Public Library,  
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Seldovia Public Library, Seldovia, AK  
Seward Community Library Museum,  
Seward, AK  
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Sutton Public Library/Community  
Resource Center, Sutton, AK  
Talkeetna Public Library, Talkeetna, AK  
Tanana Community/School Library,  
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Lanai Public Library, Lanai City, HI  
Lihue Public Library, Lihue, HI  
Molokai Public Library, Kaunakakai, HI  
Wailuku Public Library, Wailuku, HI

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Pago, AS

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Guam Public Library System, Hagatna,  
Guam

### **Northern Mariana Islands**

Joeten Kiyu Public Library, Saipan, MP

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Biblioteca Municipal Mariana Suarez de  
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Jane Stern Dorado Community Library,  
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Enid M. Baa Public Library,  
St. Thomas, VI  
Florence Williams Public Library,  
Christiansted, VI

## **MEDIA**

### **Alaska**

Alaska Journal of Commerce,  
Anchorage, AK  
Alaska Star, Eagle River, AK  
Anchorage Daily News, Anchorage, AK  
Anchorage Press, Anchorage, AK  
Bristol Bay Times, Anchorage, AK  
Capital City Weekly, Juneau, AK  
Chilkat Valley News, Haines, AK  
Clarion Dispatch, Kenai, AK  
Cordova Times, Cordova, AK  
Daily Sitka Sentinel, Sitka, AK  
Delta Discovery, Bethel, AK  
Delta Wind, Delta Junction, AK  
Fairbanks Daily News-Miner,  
Fairbanks, AK  
Frontiersman, Wasilla, AK  
Homer News, Homer, AK  
Homer Tribune, Homer, AK  
Ketchikan Daily News, Ketchikan, AK  
Kodiak Daily Mirror, Kodiak, AK  
Petersburg Pilot, Petersburg, AK  
Seldovia Gazette, Seldovia, AK  
The Arctic Sounder, Anchorage, AK  
The Nome Nugget, Nome, AK  
The Seward Phoenix LOG, Seward, AK  
The Skagway News, Skagway, AK  
Turnagain Times, Girdwood, AK  
Valdez Star, Valdez, AK  
Wrangell Sentinel, Wrangell, AK

### **Hawaii**

Hawaii Herald, Honolulu, HI  
Hawaii Reporter, Honolulu, HI  
Hawaii Star, Honolulu, HI

Hawaii Tribune-Herald, Hilo, HI  
Honolulu Civil Beat, Honolulu, HI  
Honolulu Star Advertiser, Honolulu, HI  
Lahaina News, Lahaina, Maui, HI  
MidWeek, Honolulu, HI  
North Hawaii News, Kamuela, HI  
North Shore News, Haleiwa, HI  
Pacific Business News, Honolulu, HI  
The Garden Island, Lihue, HI  
The Maui News, Wailuku, Maui, HI  
Voice of Kapolei, Kapolei, HI  
West Hawaii Today, Kailua-Kona, HI

### **American Samoa**

Samoa News, Pago Pago, AS

### **Guam**

Pacific Daily News, Hagatna, Guam  
The Guam Daily Post, Tamuning, Guam

### **Northern Mariana Islands**

Marianas Variety News & Views,  
Saipan, MP  
Saipan Tribune, Saipan, MP

### **Puerto Rico**

Caribbean Business, San Juan, PR  
The San Juan Daily Star, Caguas, PR

### **U.S. Virgin Islands**

Virgin Islands Daily News,  
St. Thomas, VI  
Virgin Islands Daily News, St. Croix, VI

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# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

May 2017

Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
<[https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)>
- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |

|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |



|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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## 17. INDEX

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## 17.2.CHAPTER 2: DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

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# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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#### **Cooperating Agencies**

Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

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Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
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- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |



|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |

|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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## 18. GLOSSARY

Terms are defined within the context of this Programmatic Environmental Impact Statement.

**aeolian:** An environment where wind is the major agent of sediment deposition.

**agroecosystems or agroforestry:** Land use management system in which trees or shrubs are grown around or among crops or pastureland.

**alluvial fan:** Sediment or debris in a fan shape deposited by streams and rivers.

**alluvial valleys:** Valleys formed by rivers.

**alluvium:** Sediment (clay, silt, sand, and/or gravel) deposited by flowing streams in a river valley.

**alvar:** A biological environment of naturally open areas of thin soil over limestone or marble bedrock, distinguished by a vegetation community that includes a number of rare plants.

**ammonia slip:** An industry term for ammonia passing through the Selective Catalytic Reduction system un-reacted. This occurs when ammonia is over-injected into a gas stream, temperatures are too low for ammonia to react, or the catalyst has degraded.

**anadromous fish:** Fish born in freshwater that migrate to the ocean to grow as adults, and then return to freshwater to spawn.<sup>1</sup>

**anchialine pools:** Enclosed, landlocked waterbodies or ponds with an underground connection to both fresh and salt water.<sup>2</sup>

**anthropogenic:** Changes caused by humans.

**aquatic:** Of or related to water.

**aquifer:** An underground layer of water-bearing permeable rock, rock fractures, or unconsolidated sediments from which groundwater can be extracted using a water well.

**arthropod:** Arthropods are invertebrate animals that have segmented bodies and jointed appendages, such as insects, spiders, and crustaceans.

**attainment area:** Any area that meets the national primary or secondary ambient air quality standard for the pollutant.

**avifauna:** The birds of a particular region, habitat, or geological period.

**backhaul capacity:** The ability of a network to transfer data from a radio base station or cell site to a larger core network. These connections are typically made via fiber optic cable and microwave technology.

**benthic:** Anything associated with or occurring on the bottom of a body of water.

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<sup>1</sup> NOAA (National Oceanic and Atmospheric Administration). 2006. *Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SpO-69. U.S. Department of Commerce. Accessed: August 8, 2015. Retrieved from: <https://www.st.nmfs.noaa.gov/st4/documents/FishGlossary.pdf>

<sup>2</sup> NOAA (National Oceanic and Atmospheric Administration). 2006. *Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SpO-69. U.S. Department of Commerce. Accessed: August 8, 2015. Retrieved from: <https://www.st.nmfs.noaa.gov/st4/documents/FishGlossary.pdf>

**binge drinking:** More than five drinks on one occasion for adult men and more than four drinks on one occasion for adult women.<sup>3</sup> See also heavy alcohol consumption.

**biology (soils):** The presence/absence of vegetation in soils that affects the soil's organic content quantity.

**biophysical settings:** Settings that represent the areas of vegetation that dominates a landscape without human disturbance.

**bioretention:** Bioretention is a structural storm water control measure that captures and temporarily stores storm water runoff using soils and vegetation in shallow basins or landscaped areas to provide enhanced removal of dissolved storm water pollutants, including nutrients, pesticides, organics, metals, and biological constituents.

**bivalve:** An aquatic mollusk with a hinged shell that encloses an invertebrate body.

**bog:** Wet, spongy ground with soil composed mainly of decayed vegetable matter.

**boreal forest:** Forest that consists primarily of spruces, pines, and larches.

**breeding area:** The area used by an organism to reproduce and to rear its offspring.

**bycatch:** Unintentional capture/injury/entanglement of unwanted species during commercial fishing (e.g., a shark captured in a seine net targeting salmon).

**calcareous:** Of or containing calcium carbonate, calcium, or limestone, or occurring on limestone.

**candidate species:** A species officially nominated for listing as threatened or endangered, according to the Endangered Species Act.

**carbon sink:** Carbon sinks occur when natural processes absorb more carbon dioxide than they release. Examples of natural processes that serve as carbon sinks include forests, soils, oceans, and vegetation.

**catadromous:** An organism that lives in fresh water and travels to the sea to spawn.

**cays:** Small, low-elevation, sandy islands on the surface of a coral reef.

**cetacean:** An order of marine mammals commonly known as whales, dolphins, and porpoises.

**Chamorro:** Indigenous people of the Mariana Islands, including Guam and the Northern Mariana Islands.

**chikungunya:** A mosquito-borne disease.

**cistern:** An artificial reservoir, usually underground used to store water.

**Class I Areas:** National parks and wilderness areas in attainment or unclassifiable areas that exceed 5,000 acres in size and were in existence on August 7, 1977.

**climate (soils):** Chemical changes in parent material occur slowly in low temperatures. Hot temperatures evaporate moisture, which facilitates chemical reactions within soils. The highest degree of reaction within soils occurs in temperate, moist climates.

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<sup>3</sup> Centers for Disease Control. 2016. *Excessive Alcohol Use: Preventing a Leading Risk for Death, Disease, and Injury*. Accessed: November 11, 2016. Retrieved from: <https://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2015/alcohol-aag.pdf>

**commercial fishery:** The whole process of catching and marketing fish and shellfish for sale.

**confined aquifers:** Layers of groundwater that are generally bound above and below with impermeable layers of rock or sediment. Unconfined aquifers are not bound by such layers.

**congregatory:** The behavior of gathering in groups.

**coral bleaching:** The stress response of corals releasing the photosynthetic plankton, known as Zooxanthellae, leading to coral bleaching.<sup>4</sup>

**county equivalent:** The U.S. Census Bureau terminology for a geographic area that functions as a unit of state government, even if it is not formally known as a county.

**covered haul system:** A covered haul system involves water “piped into the carrier vehicle, withdrawn by similar mechanism into the user’s cistern, and in most cases, piped again from cistern to faucet.”<sup>5</sup>

**critical habitat:** An area essential to the conservation of an endangered or threatened species that is designated by a governmental entity and that may require special management considerations or protection.

**crustaceans:** A group of freshwater and saltwater invertebrates with jointed legs and a hard shell of chitin (e.g., shrimps, crabs, lobsters, and crayfish).<sup>6</sup>

**decapods:** Types of crustaceans. Common crustacean examples include crayfish, crabs, and lobsters.

**deciduous:** Plants that shed certain structures such as leaves seasonally or at a given stage in development.

**degradation:** A reduced capacity of the environment to meet social or ecological objectives or needs.

**demersal:** Species that live and/or feed on or near the sea floor.

**dengue:** A mosquito-borne disease.

**depredating bird:** A bird that causes resource damage, economic loss, or a threat to health or human safety.

**dimension stone:** Natural rock material quarried for the purpose of obtaining blocks or slabs that meet specifications as to size and shape.

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<sup>4</sup> National Oceanic and Atmospheric Administration. 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/Spo-69. U.S. Department of Commerce. Accessed: August 8, 2015. Retrieved from: <https://www.st.nmfs.noaa.gov/st4/documents/FishGlossary.pdf>

<sup>5</sup> U.S. Environmental Protection Agency. 1998. *Applicability of the Safe Drinking Water Act to Water Haulers*. Accessed September 17, 2015. Retrieved from: <http://nepis.epa.gov/Exe/ZyNET.exe/P100NBCV.TXT?ZyActionD=ZyDocument&Client=EPA&Index=1995+Thru+1999&DocS=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C95thru99%5CTxt%5C00000036%5CP100NBCV.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=p%7Cf&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL> (updated January 2016)

<sup>6</sup> National Oceanic and Atmospheric Administration. 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SPO-69. October 2005. Revised Edition, June 2006.

**direct effect:** Effects that physically alter a historic property in some way.

**ecoregion:** An ecological area that is relatively homogeneous in climate, landform, soil, potential natural vegetation, hydrology, or other ecologically relevant variables.

**ecosystem:** A biological community of interacting organisms together with their physical environment.

**endangered species:** According to the Endangered Species Act, the term *endangered species* means any species in danger of extinction throughout all or a significant portion of its range. This does not include species of the Class Insecta determined by the Secretary of the Interior to constitute a pest whose protection under the provisions of the Endangered Species Act would present an overwhelming and overriding risk to humans.

**endemic:** Species that are only found in one area or region. Also, (of a disease or condition) regularly found among particular people or in a certain area.

**energetic (climate change):** Refers to strength and amplification in oscillations.

**ephemeral stream:** Ephemeral streams carry water only as a result of precipitation (any time of year).

**epiphytic:** Plants living on, or attached to, another plant.

**ermine:** A small carnivorous short-tailed weasel.

**erosion control blanket:** Biodegradable or synthetic sheet-like materials that are rolled out onto disturbed areas to protect soil from wind and water erosion.

**estuarine:** See estuary.

**estuarine emergent wetlands:** Coastal wetlands dominated by herbaceous vegetation where salt water from the sea mixes with rivers and streams.

**estuarine intertidal:** Coastal areas usually semi-enclosed by land but have open partially obstructed access to open ocean. Water is partially diluted by freshwater runoff.

**estuary:** Coastal areas where salt water from the sea mixes with rivers and streams, and may also be called bays, harbors, inlets, or lagoons.

**ethnographic:** The systematic study of people and cultures, generally designed to explore culture from the point of view of the subject of the study.

**eutrophication:** A process where waterbodies receive excess nutrients that stimulate excessive plant growth.

**evapotranspiration:** The sum of evaporation and plant transpiration from the Earth's land and ocean surface to the atmosphere

**exotic species:** A plant or animal species introduced from another geographic area that is not native to the area.

**expansive soils:** Soils that include clay materials that swell when they absorb water and shrink when dry, leaving voids in the soil.

**extant:** A species still in existence.

**extinction:** The state or process of a species' disappearance from part or all of its range.



**extirpated:** Cease to exist in the geographic area of study.

**fern allies:** Plants similar to true ferns but have different leaf structures, if they have leaves at all.

**forams (Foraminifera):** Single-celled organisms with shells.

**freshwater-lens systems:** Systems where freshwater floats on saltwater separated by a transition zone of brackish water found in areas where groundwater is not held up by impermeable barriers.

**frugivorous:** Animals that eat primarily fruit.

**furbearers:** Mammal species traditionally trapped or hunted for their fur, such as marten, lynx, wolverine, and beaver.

**geology:** An interdisciplinary science with a focus on the following aspects of earth sciences: geologic hazards and disasters, climate variability and change, energy and mineral resources, ecosystem and human health, and groundwater availability.

**germanium:** A mining byproduct associated with zinc production.

**gestation:** The period of development from conception to birth.

**glacial:** Relating to, or resulting from, the presence or effects of glaciers and ice sheets.

**Guamanians:** The native peoples of Guam.

**guts:** Narrow coastal water channels usually subject to strong tidal currents flowing back and forth.<sup>7</sup>

**habitat:** The natural environment where an organism lives, including its biological and physical surroundings.

**hard ground conditions:** A hard site exists where noise travels away from the source over a generally flat, hard surface such as water, concrete, hard-packed soil, or other ground surfaces having a low porosity. These are examples of reflective ground, where the ground does not provide any attenuation. The standard attenuation rate for hard site conditions is 6 A-weighted decibels (dBA) per doubling of distance for point source noise (e.g., power generators, most construction activities, etc.) and 3 dBA per doubling of distance for line sources (e.g., highway traffic, conveyor belt, etc.).<sup>8</sup>

**harvesting:** The act or process to take or kill wildlife for food, sport, or population control; to gather crops for consumption or sale.

**haulouts:** Areas of land or ice where seals and walrus come ashore to rest, molt, or breed.

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<sup>7</sup> University of Virgin Islands. 2009. *Waves of Change: A Resource for Environmental Issues in the U.S. Virgin Islands*. University of the Virgin Islands Center for Marine and Environmental Studies, Virgin Islands Marine Advisory Service. Accessed: May 2015. Retrieved from: [ftp://ftp.nodc.noaa.gov/pub/data.nodc/coris/library/NOAA/other/waves\\_change\\_envir\\_resource\\_usvi.pdf](ftp://ftp.nodc.noaa.gov/pub/data.nodc/coris/library/NOAA/other/waves_change_envir_resource_usvi.pdf)

<sup>8</sup> Washington State Department of Transportation. 2015. *Biological Assessment Preparation for Transportation Projects - Advanced Training Manual*. Version 02-2015. February 2015. Accessed: June 2015. Retrieved from: <http://www.wsdot.wa.gov/Environment/Biology/BA/BAGuidance.htm#manual>

**haze:** A condition caused when sunlight encounters tiny pollution particles in the air. Some light is absorbed by particles; other light is scattered away before it reaches an observer. More pollutants mean more absorption and scattering of light, which reduce the clarity and color of what we see. Some types of particles, such as sulfates, scatter more light, particularly during humid conditions.

**heavy alcohol consumption:** Drinking five or more drinks on the same occasion on each of five or more days in the past 30 days. See also binge drinking.

**heavy drinking:** More than two drinks per day for adult men and more than one drink per day for adult women.<sup>9</sup>

**herbaceous:** Plants that do not have woody stems.

**herbivorous:** Animals that eat primarily plants.

**hibernacula:** Habitats within which animals hibernate or otherwise seek refuge for extended periods.

**highly migratory:** Pelagic, or open-water, species that have a wide geographic distribution, both inside and outside countries' 200-mile zones, and that undertake migrations of significant but variable distances across oceans for feeding or reproduction.

**historic property:** An historic property is defined as any "prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register [of Historic Places] including artifacts, records, and material remains related to such a property or resource" (16 USC § 470(w)(5)).

**hookah:** A basic form of surface-supplied diving in which the air supply is via a single hose.

**hotspot (geology):** A location where plumes of hot rock rise from within the Earth toward the surface. Lower pressures toward the surface allow rock to melt, which can result in molten rock, volcanism, and lava flows.

**human environment:** The natural and the physical (e.g., structures) environment, and the association of people and their activities to those environments.

**human health and safety:** The existing environment for health and safety is defined by occupational and environmental hazards likely to be encountered during the construction, operation, and maintenance of towers, antennas, cables, utilities, and other equipment and infrastructure at existing and potential FirstNet telecommunication sites.

**hydrology:** The properties of water movement and distribution via precipitation, runoff, storage, and evaporation, especially in relation to land.

**ice floe:** A sheet of floating ice where walrus calves are typically born.

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<sup>9</sup> Centers for Disease Control. 2016. *Excessive Alcohol Use: Preventing a Leading Risk for Death, Disease, and Injury*. Accessed: November 11, 2016. Retrieved from: <https://www.cdc.gov/chronicdisease/resources/publications/aag/pdf/2015/alcohol-aag.pdf>

**Indian tribe:** The National Historic Preservation Act of 1966 defines an Indian tribe as “an Indian tribe, band, nation, or other organized group or community, including a Native village, Regional Corporation or Village Corporation, as those terms are defined in section 3 of the Alaska Native Claims Settlement Act (43 USC § 1602), which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians” (16 USC § 470(w)).

**indirect effect:** Effects that are further removed in time or space and diminish some aspect of the historic property, but may not physically alter it.

**inferred properties (soils):** Soil properties that are inferred from the combined data of soil science and other disciplines such as meteorology.

**infiltration basins:** Infiltration basins (also known as recharge basins) are considered a treatment BMP because they can remove pollutants from surface discharges by capturing the storm water runoff volume (typically, larger volumes than an infiltration trench) and infiltrating it directly to the soil rather than discharging it to an aboveground drainage system.

**informed siting of Proposed Action features:** Refers to the act of locating activities or features in areas that do not support listed species or their known habitats.

**infrastructure:** Consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure includes a broad array of facilities such as utility systems, streets and highways, railroads, airports, buildings and structures, ports, harbors, and other manmade facilities.

**injurious wildlife:** Any animal species or subspecies (except game birds or game mammals) known to be harmful to agriculture, aquaculture, indigenous wildlife or plants, or constituting a nuisance or health hazard, as listed in the *List of Species of Injurious Wildlife in Hawaii, Exhibit 5, Chapter 13-124*, State of Hawaii, Division of Forestry and Wildlife.

**insectivorous:** To feed on insects, worms, and other invertebrates.

**intermittent stream:** Streams that carry water for part of the year (generally winter and spring).

**invasive species:** Introduced species that out-compete native species for space and resources.<sup>10</sup>

**island arc:** A type of archipelago with an arc-shaped alignment. Island arcs are typically of volcanic origin.

**jurisdictional wetlands:** Jurisdictional wetlands are wetlands that are found to be “waters of the U.S.” per definitions presented in the Clean Water Act, and are thus under the jurisdiction of the U.S. Army Corps of Engineers.

**juvenile:** An organism that has not reached sexual maturity.

**karst:** Terrain with distinctive landforms and hydrology created from soluble rock dissolution and characterized by springs, caves, sinkholes, and unique hydrogeology.<sup>11</sup>

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<sup>10</sup> National Oceanic and Atmospheric Administration. 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SPO-69. October 2005. Revised Edition, June 2006.

<sup>11</sup> U.S. Geological Survey. Undated. *USGS Groundwater Information—What is Karst?* Accessed: August 28, 2015. Retrieved from: <http://water.usgs.gov/ogw/karst/pages/whatiskarst>

**Kona winds:** Kona winds are stormy, rain-bearing winds that blow over the Hawaiian Islands from the southwest or south-southwest in the opposite direction of trade winds. Kona winds occur when a low-pressure center is within 500 miles northwest of the islands. Although strong, Kona winds usually do not last for more than a day or so.

**lagomorphs:** Gnawing mammals that feed on plants and have fully furred feet and two pairs of incisors in the upper jaw.

**land subsidence:** The downward settling or sudden sinking of the Earth's surface.

**land use/land cover:** Refers to the use of land, as visible from the air (or satellites).

**landslide:** Refers to processes that lead to the downhill movement of earth materials due to gravity and other forces.

**lane miles:** Refers to the length of a roadway multiplied by the number of traffic lanes.<sup>12</sup>

**latte:** Large limestone or basalt pillars topped with a capstone.

**lava tubes:** Lava tubes are natural conduits through which lava travels beneath the surface of a lava flow.<sup>13</sup>

**leeward:** On the side sheltered from the wind (downwind).

**life cycle:** The continuous sequence of an organism's development.

**limestone:** A sedimentary rock consisting of calcium carbonate that can be deposited either by direct precipitation out of sea water or by biochemical processes such as coral reefs that secrete calcium carbonate as part of their structure.

**limiting distance:** Distances beyond which an adverse effect would not occur.

**listed wildlife:** Any animal listed as threatened or endangered by federal or state agencies.

**littoral:** Refers to shore or near-shore areas.

**maintenance area:** An area that was previously in nonattainment, but has met the national primary or secondary ambient air quality standards for the pollutant, and has been designated as in attainment.

**mammal:** A warm-blooded vertebrate that gives birth to, and nurses, live young; has highly evolved skeletal structures; is covered with hair at some stage of development; and has two pairs of limbs (except some aquatic mammals).

**manganese nodules:** Nodular concretions of manganese and iron oxides that occur on the ocean floor as a result of direct precipitation of minerals from seawater.

**manholes:** A small covered opening in a street or other surface that allows a person access, usually to utilities. Manholes may be used for telecommunications activities, especially in cities and urban areas, depending on the location of other utilities; in cities, utility lines are often co-located.

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<sup>12</sup> Rulebase Foundation. 2015. *Lane Miles Definition*. Accessed: September 2, 2015. Retrieved from: [https://definedterm.com/lane\\_miles](https://definedterm.com/lane_miles)

<sup>13</sup> U.S. Geological Survey. 2015e. *Volcano Hazards Program. Glossary–Lava Tube*. Accessed August 28, 2015. Retrieved from: [http://volcanoes.usgs.gov/vsc/glossary/lava\\_tube.html](http://volcanoes.usgs.gov/vsc/glossary/lava_tube.html)

**marine:** Of, or relating to, the sea.

**marine debris:** Any manmade object discarded, disposed of, or abandoned that enters the marine environment.

**marine intertidal:** Areas of open ocean associated with high energy coastline where the substrate is exposed and flooded by tides.<sup>14</sup>

**masonry cement:** A mix, typically of Portland cement, hydrated lime, and other materials used to improve the water retention and workability of cement in masonry work.

**maternity roosts:** Locations where bats congregate to birth and rear young. Maternity roosts are often located in trees, under manmade structures (e.g., bridges, rooftops, etc.), or in caves.

**mesic soil:** A medium-wet soil condition.

**metamorphic processes:** A process that involves profound physical and or chemical change in rocks due to heat and pressure.

**montane:** Mountainous areas.

**montane bogs:** bogs occurring in mountainous regions.

**moraine:** Unstratified and unsorted sediment deposits formed through direct action of, or contact with, glacier ice. Many different varieties are recognized depending on their position with respect to a glacier.

**muskeg:** North American swamp or bog consisting of a mixture of water and partly dead vegetation, frequently covered by a layer of sphagnum or other mosses.

**Native Hawaiian:** The National Historic Preservation Act of 1966 defines Native Hawaiian as “any individual who is a descendant of the aboriginal people who, prior to 1778, occupied and exercised sovereignty in the area that now constitutes the State of Hawaii” (16 USC § 470(w)(17)).

**Native Hawaiian Organization:** The National Historic Preservation Act of 1966 defines a Native Hawaiian organization as “any organization which serves and represents the interests of Native Hawaiians; has as a primary and stated purpose the provision of services to Native Hawaiians; and has demonstrated expertise in aspects of historic preservation that are significant to Native Hawaiians. The term includes, but is not limited to, the Office of Hawaiian Affairs of the State of Hawaii and Hui Malama I Na Kupuna O Hawai’i Nei, an organization incorporated under the laws of the State of Hawaii” (16 USC § 470 (w)(18)).

**noise:** A form of sound caused by pressure variations that the ear can detect; often defined as unwanted sound.

**nonattainment area:** Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

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<sup>14</sup> Cowardin, L.M., V. Carter, F.C. Golet, E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Fish and Wildlife Service Report No. FWS/OBS-79/31. Washington, D.C.

**nonpoint source pollution:** Any source of water pollution that does not meet the legal definition of “point source”, and includes runoff from rain or snowmelt that picks up natural and manmade pollutants, such as fertilizers, oils, salt, bacteria, and others that are eventually deposited into lakes, rivers, streams, wetlands, coastal water, and groundwater (33 USC § 1251 *et seq.*).

**noxious plant:** As defined in the Federal Noxious Weed Act of 1974, a noxious plant is any living stage (e.g., seeds and reproductive parts) of any parasitic or other plant of a kind, or subdivision of a kind, which is of foreign origin, is new to, or not widely prevalent in, the U.S., and can directly or indirectly injure crops, other useful plants, livestock, poultry, other interests of agriculture including irrigation, navigation, U.S. fish and wildlife resources, or public health.

**obligate:** Means “by necessity”; restricted to one particularly characteristic life mode.

**ocean convergence zone:** The relatively horizontal flow of ocean water toward a common destination from different directions. When ocean waters come together at a point or along a line (convergence line), the denser water coming from one direction sinks under the lighter water coming from the other direction. The ocean convergence lines include the polar, subtropical, tropical, and equatorial.

**orographic effect:** A change in atmospheric conditions caused by a change in elevation, primarily due to mountains.

**outwash:** The deposit of sand, silt, and gravel formed below a glacier by meltwater streams and rivers. An outwash plain is an extensive, relatively flat area of these glacial deposits.

**Pacific plate:** A tectonic plate located within portions of the Pacific Ocean.

**paleontological resources:** Fossils that are the physical remains of plants and animals that have mineralized into or left impressions in solid rock or sediment.

**palustrine emergent wetland:** All nontidal wetlands dominated by persistent herbaceous plants, mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand.

**palustrine wetlands:** Wetlands that include all nontidal wetlands dominated by trees, shrubs, persistent emergent, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 parts per thousand.

**parent material:** The original geologic source material from which a soil has formed; parent material influences soil properties, including color, texture, and ability to hold water.

**passerines:** An order of “perching” birds that have four toes, three facing forward and one backward, which allows the bird to easily cling to both horizontal and nearly vertical perches.

**pelagic:** Anything that inhabits the water column as opposed to being associated with the sea floor, generally occurring anywhere from the surface to 1,000 meters.<sup>15</sup>

**peneaeid shrimp:** A family of marine crustacean that includes some of the most commercially valuable species (e.g., tiger prawn).

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<sup>15</sup> NOAA (National Oceanic and Atmospheric Administration). 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/Spo-69. U.S. Department of Commerce. Accessed: August 8, 2015. Retrieved from: <https://www.st.nmfs.noaa.gov/st4/documents/FishGlossary.pdf>

**perched groundwater:** An aquifer that occurs above the regional water table, separated by an impermeable or relatively impermeable layer of rock or sediment.

**perennial stream:** Streams that normally have surface flow year-round in all or part of their course. Non-perennial streams are normally dry during part of the year.

**permeability:** A property of a material that allows liquids or gases to pass through it.

**phenology:** The seasonal changes in plant and animal life cycles, such as emergence of insects or migration of birds.

**photic zone:** Zone within which light penetrates below the ocean surface.

**physiography:** Refers to the description of the Earth's landforms and surface features.

**piggery:** Pig farms.

**pinniped:** Widely distributed and diverse group of fin-footed, semiaquatic marine mammals; commonly known as seals.

**plant associations:** Plant communities of a specific type (or types) and geography (or geographies).

**plateau:** A large area of elevated plain, tableland, or flat-topped region.

**plutonic rocks:** Rocks formed from cooling magma below the Earth's surface.

**point source pollution:** Section 502 (14) of the Clean Water Act defines point source pollution as pollution that comes from "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged."

**points of presence:** Connections or access points between two different networks, or different components of one network.

**population:** Interbreeding organisms occupying a certain space; the number of people or other living creatures in a designated area.

**Portland cement:** Cement that is made from limestone and clay that turns to a paste and hardens with water.

**predation:** The relationship between two organisms of different species in which one of them acts as predator that captures and feeds on the other organism that serves as the prey.

**predatory open-access journal:** Predatory journals are issued by publishers that "are characterized by various levels of deception and lack of transparency in their operations...they may claim a stringent peer-review where none really exists".<sup>16</sup> Open access journals are available online and require no fee or membership; they are accessible to anyone who has access to the internet.

**prehistoric sites:** The physical evidence of human activity that occurred prior to European contact.

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<sup>16</sup> Elliott, Carl. 2012. *On Predatory Publishers: a Q&A with Jeffrey Beall*. Brainstorm Blog--The Chronicle of Higher Education. June 5, 2012. Accessed: June 2016. Retrieved from: <http://www.chronicle.com/blogs/brainstorm/on-predatory-publishers-a-qa-with-jeffrey-beall/47667>

**Prevention of Significant Deterioration increment:** The maximum allowable increase in pollutant concentration that is allowed to occur above a baseline concentration for a pollutant.

**prime farmland:** Land that possesses the required characteristics for producing food, feed, fiber, and oilseed crops.

**procellariiform:** An order of seabirds that includes albatrosses and petrels.

**proposed species:** Species that have been proposed for listing as threatened or endangered in the *Federal Register* after the completion of a status review and consideration of other protective conservation measures.

**public safety answering points:** Call centers responsible for answering calls to an emergency telephone number for police, fire, and emergency medical services.

**public safety entity:** An entity that provides public safety services (*47 USC § 1401(26)*).

**public safety infrastructure:** Any infrastructure used by a public safety entity as defined in the Middle Class Tax Relief and Job Creation Act of 2012, including infrastructure associated with police, EMS, and fire services.

**pupping grounds:** Sites where marine mammals birth and rear their young.

**radiant flux:** The amount of energy per unit time radiated from a source.

**radiative forcing index:** Radiative forcing is the difference between the radiation absorbed by Earth and the energy reflected back to space.

**radio frequency emissions:** Refers to radio frequency radiation emitted by devices.

**radio frequency radiation:** “Electromagnetic radiation in the frequency ranges 3 kilohertz (kHz) - 300 Megahertz (MHz), and 300 MHz - 300 gigahertz (GHz), respectively.”<sup>17</sup>

**recovery:** A population or community’s partial or full return to a previous condition before a stressor was introduced.

**recreational fishery:** Fishing when the catch is for personal use, pleasure, or competition.

**recruitment:** The number of new individuals reaching reproductive age in a given population over a given time interval (typically measured over a year).

**redundancy:** The duplication of equipment or processes to help maintain continuity of operations.

**refugia:** An area of stable environmental conditions that protects wildlife and organisms from environmental change.

**Rhus:** A specific genus of vines, shrubs, or small trees native to temperate and warm regions.

**riparian zone:** Areas near wetlands, rivers, or streams.

**rock ripping:** The breakup and removal of rock material with heavy equipment such as an excavator.

**runup:** The height the wave reaches above sea level before washing to shore.

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<sup>17</sup> Occupational Health and Safety Administration. Undated. *Radiofrequency and Microwave Radiation*. Retrieved from: <https://www.osha.gov/SLTC/radiofrequencyradiation/>



**rutting (soil):** Soil indentations caused by equipment operation in moist conditions or in soils with lower bearing strength. See soil rut.

**sedimentary rocks:** Rocks formed by the deposition of material at the Earth's surface and within bodies of water.

**Selective Catalytic Reduction:** Add-on nitrogen dioxides control placed in the exhaust stream following the engine and involves injecting ammonia into the flue gas. The ammonia reacts with the nitrogen dioxides in the presence of a catalyst to form water and nitrogen.

**sessile:** Unable to move; attached to the substrate.<sup>18</sup>

**shield volcano:** A volcano that is above the ocean surface, has broad and gentle slopes, and is composed of fluid basalt.

**short ton:** One short ton is equal to 2,000 pounds.

**silt curtain:** Floating barrier used in marine construction, dredging, and remediation to control silt and sediment in a body of water.

**silt fence:** Designed to trap sediment in the area where construction or soil disturbance is taking place to minimize or avoid soil erosion and sedimentation. The fence is typically 2- to 3-feet tall, buried 8 to 12 inches into the soil, and secured with stakes.

**Sirenian:** An order of fully aquatic, herbivorous mammals that inhabit swamps, rivers, estuaries, marine wetlands, and coastal marine waters.

**site fidelity:** The tendency of an animal to return to a previously occupied location.

**sky glow:** The overall diffusion of artificial light into the sky.

**smolt:** A young fish undergoing its first migration from freshwater to the ocean.

**soarer:** A bird that flies to a considerable altitude and maintains elevation without moving its wings by using ascending air currents.

**soft ground conditions:** A soft site exists where noise travels away from the source over porous ground or normal unpacked earth capable of absorbing noise energy such as grass, trees, or other ground surfaces suitable for the growth of vegetation, such as farmland.

**soil rut:** A sunken track or groove made by vehicle or equipment activity. See rutting.

**sole-source aquifer:** An aquifer that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer.

**species diversity:** An ecological measure of the variety of organisms present in an ecological community including the richness (number of species) and abundance (number of individuals of each species).

**storm water filtration:** Use of a filtering media (sand, soil, gravel, peat, or compost) in storm water filtration structures to remove pollutants from storm water runoff.

**stratovolcanoes:** Also called composite volcanoes, are cone-shaped and consist of alternate layers of lava and other volcanic material such as ash.

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<sup>18</sup> National Oceanic and Atmospheric Administration. 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SPO-69. October 2005. Revised Edition, June 2006.

**stream reach:** Any specified length of a stream.

**submarine volcano:** Volcanoes that occur beneath the ocean surface.

**subsistence fishery:** Fishing when the catch is shared and consumed directly by the families and kin of the fishermen, rather than being sold.

**substrate:** Material such as sand and cobble that is associated with or occurs on the bottom of a body of water.<sup>19</sup>

**subwatershed:** USGS subwatershed refers to the USGS 12-digit hydrologic unit code (HUC12), which averages approximately 40 square miles, depending on the region.

**succession:** A gradual process of a plant or animal community successively giving way to another until a stable state is reached.

**suicide contagion:** Direct or indirect exposure to suicide or suicidal behaviors within one's family, peer group, or media reports that can result in an increase in suicide or suicidal behaviors, especially in adolescents and young adults.<sup>20</sup>

**symbiont:** Two organisms that live in symbiosis (mutually beneficial relationship) with one another. Algae species are symbionts with corals.

**take:** *Take* is defined differently by various federal and state regulations, but the most commonly accepted definition is that of the U.S. Endangered Species Act that defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct."

**taxonomic group:** A group of biological organisms that have shared characteristics.

**taxonomy:** Science of naming and classifying organisms or specimens.

**tectonic plate:** The solid pieces of rock (or earth) that collide, move apart, or slide past each other over geologic time.

**tectonism:** Forces affecting the structural deformation, uplift, and movement of the earth's crust.

**temperate forest:** Forests found in regions with mild climates that receive heavy rainfall.

**terrestrial:** Of, or related to, the land.

**thermokarst:** The process by which landforms result from the thawing of ice-rich permafrost or the melting of ice.<sup>21</sup>

**threatened species:** According to the Endangered Species Act, a *threatened* species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

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<sup>19</sup> National Oceanic and Atmospheric Administration. 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SpO-69. U.S. Department of Commerce. Accessed: August 8, 2015. Retrieved from: <https://www.st.nmfs.noaa.gov/st4/documents/FishGlossary.pdf>

<sup>20</sup> U.S. Department of Health and Human Services. 2015. *Mental Health and Substance Abuse: Suicide*. Accessed: August 2015. Retrieved from: <http://www.hhs.gov/answers/mental-health-substance-abuse/suicide/suicide-contagion.html>

<sup>21</sup> Van Everdingen. 1998 (revised 2005). *Multi-Language Glossary of Permafrost and Related Ground-Ice Terms; In: Chinese, English, French, German, Icelandic, Italian, Norwegian, Polish, Romanian, Russian, Spanish, and Swedish*. The Arctic Institute of North America. The University of Calgary. Accessed: September 12, 2016. Retrieved from: [http://globalcryospherewatch.org/reference/glossary\\_docs/Glossary\\_of\\_Permafrost\\_and\\_Ground-Ice\\_IPA\\_2005.pdf](http://globalcryospherewatch.org/reference/glossary_docs/Glossary_of_Permafrost_and_Ground-Ice_IPA_2005.pdf)

**time (soils):** Soil properties are dependent on the period over which other processes act on them.

**tonne:** One tonne is a unit of measure in the International System of Units that is equivalent to 1 metric ton and equivalent to 1.1023 U.S. tons, which are also known as short tons.

**topography:** The unique features and shapes of the land (e.g., valleys and mountains).

**Total Maximum Daily Load:** Maximum pollutant amount a waterbody can receive while still meeting water quality standards.

**total radiative forcing:** The difference between the visible light absorbed by Earth and the energy reflected back to space.

**trachyte:** A type of fine-grained volcanic rock.

**traditional cultural property:** A place “eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community’s history, and (b) are important in maintaining the continuing cultural identity of the community.”<sup>22</sup>

**translocation:** The capture, transport, and release (or introduction) from one location to another.

**trophic:** The feeding habits or relationships of different organisms in a food chain or food web.<sup>23</sup>

**trophic structure:** The way organisms utilize food resources leading to energy transfer within an ecosystem.<sup>24</sup>

**tsunami:** Large ocean waves that form as a result of water displacement.

**tundra:** A vast, flat, treeless Arctic region of Europe, Asia, and North America in which the subsoil is permanently frozen.

**turbidity:** A measure of the clarity of a liquid. When many fine particles are suspended in water, the turbidity is high.

**U.S. Exclusive Economic Zone:** The U.S. Exclusive Economic Zone is a 200-mile ocean boundary around the coastline of U.S. states and territories in which the U.S. asserts exclusive commercial fishing rights.

**ultra-high frequency:** The UHF band covers frequencies ranging from 300 MHz to 3000 MHz.

**unclassified area:** Any area that cannot be classified on the basis of available information as meeting the national primary or secondary air quality standard for a pollutant.

**understory:** The forest layer of smaller trees and shrubs that grows under the taller tree canopy, replacing the older trees as they die.

**ungulate:** The classification of mammals having hooves.

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<sup>22</sup> National Park Service. 1998. *National Register Bulletin: Guidelines for Evaluating and Documenting Traditional Cultural Properties*. Accessed: September 24, 2015. Retrieved from: <http://www.nps.gov/nr/publications/bulletins/nrb38/>

<sup>23</sup> NOAA (National Oceanic and Atmospheric Administration). 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SpO-69. U.S. Department of Commerce. Accessed: August 8, 2015. Retrieved from: <https://www.st.nmfs.noaa.gov/st4/documents/FishGlossary.pdf>

<sup>24</sup> NOAA (National Oceanic and Atmospheric Administration). 2006. *NOAA Fisheries Glossary*. NOAA Technical Memorandum NMFS-F/SpO-69. U.S. Department of Commerce. Accessed: August 8, 2015. Retrieved from: <https://www.st.nmfs.noaa.gov/st4/documents/FishGlossary.pdf>

**unicameral legislature:** A legislature consisting of one chamber (a single house, for example).

**unincorporated territory:** In U.S. law, an unincorporated territory is an area controlled by the U.S. government “where fundamental rights apply as a matter of law, but other constitutional rights are not available.”<sup>25</sup>

**urban:** Densely developed residential, commercial, and other non-residential areas.

**urban electronic noise:** An area with a concentration of cell phone towers and users, which by sheer volume and level of use, creates a zone of electromagnetic noise.

**vascular plants:** Plants that possess conducting tissues to transport nutrients and water throughout the plant.

**vector:** An organism that carries and transmits an infectious pathogen to another living organism.

**vernal pools:** Formed in basin depressions and are ponded only during the wetter part of the year; also known as ephemeral pools.<sup>26</sup>

**very high frequency:** The VHF band covers frequencies ranging from 30 MHz to 300 MHz.

**visual landscape:** What observers can readily see from a given vantage point.

**water resources:** Surface waterbodies and groundwater systems, including streams, rivers, lakes, canals, ditches, estuarine waters, floodplains, aquifers, wetlands, and other aquatic habitats.

**watershed:** USGS watershed refers to the USGS 10-digit hydrologic unit code (HUC10), which averages approximately 230 square miles, depending on the region.

**wetland alternation:** Any changes where the area remains a wetland and is not lost or converted, but the impacts cause a change in the type of wetland or a decrease in wetland function.

**wetland loss or conversion:** The actual loss of wetland habitat due to fill or conversion to a non-wetland habitat.

**wetlands:** Wetlands generally include swamps, marshes, bogs and similar areas. The USEPA defines wetlands as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

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<sup>25</sup> U.S. General Accounting Office. 1997. *U.S. Insular Areas, Application of the U.S. Constitution*. November 1997. Accessed: June 22, 2015. Retrieved from: <http://www.gao.gov/archive/1998/og98005.pdf>

<sup>26</sup> U.S. Environmental Protection Agency. 2015. *Vernal Pools*. Accessed: October 2015. Retrieved from: <http://water.epa.gov/type/wetlands/vernal.cfm>

# First Responder Network Authority



## Nationwide Public Safety Broadband Network Final Programmatic Environmental Impact Statement for the Non-Contiguous United States

### Volume 8

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#### **Cooperating Agencies**

Federal Communications Commission  
General Services Administration  
U.S. Department of Agriculture—Natural Resource Conservation Service  
U.S. Department of Agriculture—Rural Utilities Service  
U.S. Department of Agriculture—U.S. Forest Service  
U.S. Department of Commerce—National Telecommunications and  
Information Administration  
U.S. Department of Defense—Department of the Air Force  
U.S. Department of Energy  
U.S. Department of Homeland Security

May 2017

Cover Art Sources:

- DVM (Digital Vector Maps). 2007. Blank Puerto Rico Outline. Digital Map. Accessed: April 2017. Retrieved from: <http://digital-vector-maps.com/state-maps-detail/2194/Blank-Puerto-Rico-Outline-Adobe-Illustrator.htm>
- Environmental Resources Management, Inc. 2017. Map artwork: contiguous United States and states of Alaska and Hawaii.
- Getty Images. Undated. Maps of Guam, U.S. Virgin Islands, and American Samoa. Accessed: April 2017. Retrieved from: <http://www.gettyimages.com/>
- Marine Mammal Commission. Undated. *Polar bear (Ursus maritimus)*. Uncredited Marine Mammal Commission Photograph. Accessed: February 2017. Retrieved from: <https://www.mmc.gov/priority-topics/species-of-concern/polar-bear/>
- Nakano, Hajime. 2006. *Latte Stones in Latte Stone Park, Hagnata, Guam*. Photograph. Wikimedia Commons. Accessed: March 2017. Retrieved from: [https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)  
<[https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte\\_stones\\_in\\_Hagatna.jpg](https://upload.wikimedia.org/wikipedia/commons/a/ad/Latte_stones_in_Hagatna.jpg)>
- NPS (National Park Service). 2016. *Fruit Bat [White-necked Flying Fox (Pteropus tonganus)]*. Uncredited NPS Photograph. Accessed: January 2016. Retrieved from: <http://www.nps.gov/npsa/learn/education/fruit-bats-are-our-friends.htm>
- Tapilatu, R. 2016. *Leatherback Turtle*. Photograph. National Marine Fisheries Service. Accessed: March 2017. Retrieved from: [http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback\\_r.tapilatu.jpg](http://www.nmfs.noaa.gov/pr/species/turtles/images/leatherback_r.tapilatu.jpg)
- U.S. Census Bureau, Department of Commerce. 2012. TIGER/Line Shapefile, Commonwealth of the Northern Mariana Islands. Metadata updated May 17, 2013. Accessed: April 2017. Retrieved from: <https://catalog.data.gov/dataset/tiger-line-shapefile-2012-state-commonwealth-of-the-northern-mariana-islands-current-census-tra>
- USFWS (U.S. Fish and Wildlife Service). 2013a. *Mariana Fruit Bat Pteropus mariannus / Fanihi*. Uncredited USFWS Photograph. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/guam/wildlife\\_and\\_habitat/mariana\\_fruit\\_bat.html](http://www.fws.gov/refuge/guam/wildlife_and_habitat/mariana_fruit_bat.html)
- \_\_\_\_\_. 2013b. *Nēnē Branta sandvicensis / Hawaiian Goose*. Photograph by Laura Beauregard, USFWS. Accessed: January 2016. Retrieved from: [http://www.fws.gov/refuge/Hakalau\\_Forest/wildlife\\_and\\_habitat/nene.html](http://www.fws.gov/refuge/Hakalau_Forest/wildlife_and_habitat/nene.html)
- \_\_\_\_\_. 2015. *Rota blue damselfly (Ischura luta)*. Photograph by A. Asquith, USFWS. Accessed: January 2016. Retrieved from: <https://www.fws.gov/news/ShowNews.cfm?ID=4DA36523-E516-A820-414BB2B0165E7461>
- \_\_\_\_\_. 2016. *West Indian Manatee*. Photograph by Keith Ramos, USFWS. Accessed: January 2016. Retrieved from: <http://www.fws.gov/southeast/wildlife/mammal/manatee/>

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## APPENDICES

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## ACRONYMS AND ABBREVIATIONS

|                   |                                                            |                   |                                                                       |
|-------------------|------------------------------------------------------------|-------------------|-----------------------------------------------------------------------|
| °F                | degree Fahrenheit                                          | ASPA              | American Samoa Power Authority                                        |
| °N                | degrees north                                              | ATO               | Air Traffic Organization                                              |
| µg/m <sup>3</sup> | microgram(s) per cubic meter                               | ATWC              | Alaska Tsunami Warning Center                                         |
| µPa               | micro Pascal                                               | AURORA            | Alaska Uniform Response Online Reporting Access                       |
| %                 | percent                                                    | BACT              | best available control technology                                     |
| A                 | attained                                                   | BCE               | before Common Era                                                     |
| AAC               | Alaska Administrative Code                                 | BCR               | Bird Conservation Regions                                             |
| AAFIS             | Alaska Public Safety Identification System                 | BGEPA             | Bald and Golden Eagle Protection Act                                  |
| AAQS              | Ambient Air Quality Standards                              | BLM               | Bureau of Land Management                                             |
| ACHP              | Advisory Council on Historic Preservation                  | BLS               | U.S. Bureau of Labor Statistics                                       |
| ACS               | American Community Survey (U.S. Census Bureau)             | BMP               | best management practice                                              |
| ADEC              | Alaska Department of Environmental Conservation            | BRFSS             | Behavioral Risk Factor Surveillance System                            |
| ADFG              | Alaska Department of Fish and Game                         | BSAI              | Bering Sea/Aleutian Island                                            |
| AGL               | above ground level                                         | BWG               | BioInitiative Working Group                                           |
| AIRFA             | American Indian Religious Freedom Act                      | CAA               | Clean Air Act                                                         |
| AJRCCM            | American Journal of Respiratory and Critical Care Medicine | CAB               | Clean Air Branch                                                      |
| AKNHP             | Alaska National Heritage Program                           | CARB              | California Air Resources Board                                        |
| AKOSH             | Alaska Occupational Safety and Health                      | CBIA              | Coastal Barrier Improvement Act of 1990                               |
| AKWAS             | Alaska Warning System                                      | CBRA              | Coastal Barrier Resources Act of 1982                                 |
| ALMR              | Alaska Land Mobile Radio                                   | CCP               | Comprehensive Conservation Plan                                       |
| ANCSA             | Alaska Native Claims Settlement Act                        | CDC               | Center for Disease Control                                            |
| ANFIRS            | Alaska Fire Incident Reporting System                      | CDLNR             | Commonwealth Department of Lands and Natural Resources                |
| ANSI              | American National Standards Institute                      | CE                | Common Era                                                            |
| APE               | Area of Potential Effect                                   | CELCP             | Coastal and Estuarine Land Conservation Program                       |
| APLIC             | Avian Power Line Interaction Committee                     | CEPD              | Caribbean Environmental Protection Division                           |
| APSIN             | Alaska Public Safety Information Network                   | CEQ               | Council on Environmental Quality                                      |
| AQCR              | air quality control region                                 | CERCLA            | Comprehensive Environmental Response, Compensation, and Liability Act |
| ARFF              | Aircraft Rescue and Firefighting                           | CFMC              | Caribbean Fisheries Management Council                                |
| ARMS              | Alaska Records Management System                           | CFR               | Code of Federal Regulations                                           |
| ARPA              | Archaeological Resources Protection Act of 1979            | cfs               | cubic feet per second                                                 |
| AS                | Alaska Statute                                             | CH <sub>4</sub>   | methane                                                               |
| ASAC              | American Samoa Administrative Code                         | CHC               | Commonwealth Health Center                                            |
| ASCA              | American Samoa Code Annotated                              | CIA               | Central Intelligence Agency                                           |
| ASCMP             | American Samoa Coastal Management Program                  | CMIP3             | Coupled Model Intercomparison Project phase 3                         |
| ASDHS             | American Samoa Department of Homeland Security             | CNMI              | Commonwealth of Northern Mariana Islands                              |
| ASDMWR            | American Samoa Department of Marine and Wildlife Resources | CNMIAC            | Commonwealth of Northern Mariana Islands Administrative Code          |
| ASEPA             | American Samoa Environmental Protection Agency             | CO                | carbon monoxide                                                       |
| ASHPO             | American Samoa Historic Preservation Office                | CO <sub>2</sub>   | carbon dioxide                                                        |
|                   |                                                            | CO <sub>2</sub> e | carbon dioxide equivalents                                            |
|                   |                                                            | COMAR             | Committee on Man and Radiation                                        |

|         |                                                                    |                  |                                                           |
|---------|--------------------------------------------------------------------|------------------|-----------------------------------------------------------|
| CPA     | Commonwealth Ports Authority                                       | FirstNet         | First Responder Network Authority                         |
| CRMP    | Coastal Resources Management Program                               | FMP              | Fishery Management Plan                                   |
| CSP     | Central South Pacific                                              | FPPA             | Farmland Protection Policy Act of 1981                    |
| CUC     | Commonwealth Utilities Corporation                                 | FR               | Federal Register                                          |
| CWA     | Clean Water Act                                                    | ft               | feet                                                      |
| CZMA    | Coastal Zone Management Act                                        | g/hp-hr          | grams per horsepower-hour                                 |
| CZMP    | Coastal Zone Management Program                                    | g/mi             | grams per mile                                            |
| DACA    | Deployable Airborne Communications Architecture                    | GAP              | Gap Analysis Program                                      |
| DAR     | Division of Aquatic Resources (Hawaii)                             | GCA              | Guam Code Annotated                                       |
| DAWR    | Division of Aquatic and Wildlife Resources (Guam)                  | GDA              | Guam Department of Agriculture                            |
| dB      | decibel(s)                                                         | GEPA             | Guam Environmental Protection Agency                      |
| dba     | A-weighted decibel(s)                                              | GHG              | greenhouse gas                                            |
| DBCP    | 1,2-dibromo-3-chloropropane                                        | GIS              | geographic information system                             |
| dBZ     | Z-weighted decibel(s)                                              | GMP              | General Management Plan                                   |
| DCP     | 1,2-dichloropropane                                                | GOA              | Gulf of Alaska                                            |
| DEC     | Department of Environmental Conservation                           | GRHP             | Guam Register of Historic Places                          |
| DHHL    | Department of Hawaiian Homelands                                   | GWP              | global warming potential                                  |
| DLNR    | Department of Land and Natural Resources (Hawaii)                  | H <sub>2</sub> S | hydrogen sulfide                                          |
| DMA     | Disaster Mitigation Act of 2000                                    | HDOH             | Hawaii Department of Health                               |
| DNER    | Department of Natural and Environmental Resources of Puerto Rico   | HEI              | Health Effects Institute                                  |
| DOA     | Department of Agriculture                                          | HHCA             | Hawaiian Homes Commission Act of 1920                     |
| DOD     | Department of Defense                                              | HI-EMA           | Hawaii Emergency Management Agency                        |
| DOE     | U.S. Department of Energy                                          | HIANG            | Hawaii Air National Guard                                 |
| DOH     | Department of Health                                               | HIARNG           | Hawaii Army National Guard                                |
| DOH-CAB | Hawaii Department of Health, Clean Air Branch                      | HIHWNMS          | Hawaiian Islands Humpback Whale National Marine Sanctuary |
| DOT     | U.S. Department of Transportation                                  | HIOSH            | Hawaii Occupational Safety and Health Division            |
| DPNR    | Department of Planning and Natural Resources (U.S. Virgin Islands) | hp               | horsepower                                                |
| DPS     | Department of Public Safety                                        | HRD              | (Guam) Historic Resources Division                        |
| EA      | Environmental Assessment                                           | HRHP             | Hawaii Register of Historic Places                        |
| EAS     | Emergency Alert System                                             | HRS              | Hawaii Administrative Rules, Revised Statute              |
| EBS     | Emergency Broadcast System                                         | HTA              | Hawai'i Tourism Authority                                 |
| EDB     | ethylene dibromide                                                 | HUC              | hydrologic unit code                                      |
| EFH     | essential fish habitat                                             | I/M              | Inspection/Maintenance                                    |
| EMS     | emergency medical services                                         | IARC             | International Agency for Research on Cancer               |
| ENSO    | El Niño/Southern Oscillation                                       | IBA              | Important Bird Area                                       |
| EO      | Executive Order                                                    | IEEE             | Institute of Electrical and Electronics Engineers         |
| EPCRA   | Emergency Planning and Community Right-to-Know Act                 | IFC              | International Finance Corporation                         |
| ERP     | effective radiated power                                           | in               | inches                                                    |
| ESA     | Endangered Species Act                                             | IPCC             | Intergovernmental Panel on Climate Change                 |
| ESI     | Environmental Sensitivity Index                                    | IR               | ionizing radiation                                        |
| FAA     | Federal Aviation Administration                                    | ITCZ             | Intertropical Convergence Zone                            |
| FAD     | Fish Aggregating Device                                            | IUCN             | International Union for Conservation of Nature            |
| FCC     | Federal Communications Commission                                  | kg/gal           | kilograms per gallon                                      |
| FEMA    | Federal Emergency Management Agency                                | KIRC             | Kaho'olawe Island Reserve Commission                      |

|                    |                                                           |                   |                                                               |
|--------------------|-----------------------------------------------------------|-------------------|---------------------------------------------------------------|
| LAER               | lowest achievable emission rate                           | NOAA              | National Oceanic and Atmospheric Administration               |
| lb/day             | pounds per day                                            | NOx               | nitrogen oxides                                               |
| lb/hp-hr           | pounds per horsepower-hour                                | NP                | National Park                                                 |
| LBJ                | Lyndon B. Johnson                                         | NPDES             | National Pollutant Discharge Elimination System               |
| Ldn                | day-night average sound level                             | NPL               | National Priorities List                                      |
| Leq                | equivalent noise levels                                   | NPS               | National Park Service                                         |
| LNG                | liquefied natural gas                                     | NPSBN             | nationwide public safety broadband network                    |
| LTE                | Long Term Evolution                                       | NRCS              | Natural Resources Conservation Service                        |
| µg/m <sup>3</sup>  | microgram(s) per cubic meter                              | NRHP              | National Register of Historic Places                          |
| µPa                | micro Pascal                                              | NSPS              | New Source Performance Standards                              |
| m/s                | meter per second                                          | NTIA              | National Telecommunications and Information Administration    |
| MBTA               | Migratory Bird Treaty Act                                 | NVSR              | National Vital Statistics Report                              |
| mg/m <sup>3</sup>  | Milligram(s) per cubic meter                              | NWI               | National Wetland Inventory                                    |
| mgd                | million gallons per day                                   | NWR               | National Wildlife Refuge                                      |
| MHz                | megahertz                                                 | NWWS              | National Weather Wire Satellite System                        |
| MLRA               | Major Land Resource Area                                  | OHA               | Office of History and Archaeology                             |
| mm/s               | millimeters per second                                    | OIA               | Office of Insular Affairs (USDI)                              |
| MMPA               | Marine Mammal Protection Act                              | OSHA              | Occupational Safety and Health Administration                 |
| MOA                | Memorandum of Agreement                                   | PA                | Programmatic Agreement                                        |
| MPA                | Marine Protected Area                                     | PAG               | Port Authority of Guam                                        |
| mph                | miles per hour                                            | PAHO              | Pan American Health Organization                              |
| MSA                | Magnuson-Stevens Fishery Conservation and Management Act  | PCB               | polychlorinated biphenyl                                      |
| MTR                | Military Training Route                                   | PCP               | pentachlorophenol                                             |
| MUID               | Map Unit Identification Data                              | PCS               | Personal Communications Service                               |
| MW                 | megawatt                                                  | PDO               | Pacific Decadal Oscillation                                   |
| mW/cm <sup>2</sup> | milliwatts per centimeter squared                         | PEIS              | Programmatic Environmental Impact Statement                   |
| N                  | north; not attained                                       | PL                | Public Law                                                    |
| N <sub>2</sub> O   | nitrous oxide                                             | PM                | particulate matter                                            |
| NA                 | not applicable; not assessed                              | PM <sub>10</sub>  | particulate matter up to 10 micrometers in diameter           |
| NAAQS              | National Ambient Air Quality Standards                    | PM <sub>2.5</sub> | particulate matter up to 2.5 micrometers in diameter          |
| NAGPRA             | Native American Graves Protection and Repatriation Act    | POPs              | points of presence                                            |
| NANSR              | Nonattainment New Source Review                           | ppm               | parts per million                                             |
| NAWAS              | National Warning System                                   | PRDNER            | Puerto Rico Department of Natural and Environmental Resources |
| NCA                | National Climate Assessment                               | PREQB             | Puerto Rico Environmental Quality Board                       |
| NCD                | non-communicable disease                                  | PR OSHA           | The Puerto Rico Occupational Safety and Health Administration |
| NCDC               | National Climatic Data Center                             | PRASA             | Puerto Rico Aqueduct and Sewer Authority                      |
| NCN                | no common name                                            | PREPA             | Puerto Rico Electric Power Authority                          |
| NCRP               | National Council on Radiation Protection and Measurements | PRSHPO            | Puerto Rico State Historic Preservation Office                |
| ND                 | no data                                                   | PSD               | Prevention of Significant Deterioration                       |
| NE                 | northeast                                                 | PUAG              | Public Utility Agency of Guam                                 |
| NEPA               | National Environmental Policy Act                         | Pub. L.           | Public Law                                                    |
| NESHAP             | National Emission Standards for Hazardous Air Pollutants  |                   |                                                               |
| NFIP               | National Flood Insurance Program                          |                   |                                                               |
| NFIRS              | National Fire Incident Reporting System                   |                   |                                                               |
| NHPA               | National Historic Preservation Act                        |                   |                                                               |
| NIR                | non-ionizing radiation                                    |                   |                                                               |
| NMFS               | National Marine Fisheries Service                         |                   |                                                               |
| NMHC               | non-methane hydrocarbon compounds                         |                   |                                                               |
| NMOG               | non-methane organic compounds                             |                   |                                                               |
| NNE                | north-northeast                                           |                   |                                                               |

|                 |                                                                                      |                  |                                                             |
|-----------------|--------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------|
| PV              | photovoltaic                                                                         | UVA              | University of Virginia                                      |
| RAN             | radio access network                                                                 | VdB              | vibration decibel(s)                                        |
| RCP             | Representative Concentration Pathway                                                 | VIC              | Virgin Islands Code                                         |
| RCRA            | Resource Conservation and Recovery Act                                               | VIPA             | Virgin Islands Port Authority                               |
| RF              | radio frequency                                                                      | VISHPO           | Virgin Islands State Historic Preservation Office           |
| RIN             | Regulation Identification Number                                                     | VOC              | volatile organic compound                                   |
| rms             | root mean square                                                                     | vog              | volcanic smog                                               |
| ROW             | right-of-way                                                                         | VRM              | Visual Resource Management                                  |
| SAAQS           | State Air Quality Standards                                                          | W                | watt(s)                                                     |
| SAFETEA-LU      | Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users | W/m <sup>2</sup> | watts per meters squared                                    |
| SARA            | Superfund Amendments and Reauthorization Act of 1986                                 | WAPA             | Water and Power Authority                                   |
| SE              | Standard of Error                                                                    | WHO              | World Health Organization                                   |
| SHPO            | State Historic Preservation Office                                                   | WIMARCS          | West Indies Marine Animal Research and Conservation Science |
| SIP             | State Implementation Plan                                                            | WNP              | Western North Pacific                                       |
| SLR             | sea level rise                                                                       | WNW              | west-northwest                                              |
| SMA             | Special Management Area                                                              | WPC              | watts per channel                                           |
| SMS             | Scenery Management System                                                            | WPRFMC           | Western Pacific Regional Fishery Management Council         |
| SO <sub>2</sub> | sulfur dioxide                                                                       |                  |                                                             |
| SO <sub>x</sub> | sulfur oxides                                                                        |                  |                                                             |
| SPCC            | Spill Prevention, Control, and Countermeasure                                        |                  |                                                             |
| SPCZ            | South Pacific Convergence Zone                                                       |                  |                                                             |
| SPOC            | State Single Point of Contact                                                        |                  |                                                             |
| SRES            | Special Report on Emission Scenarios                                                 |                  |                                                             |
| SSA             | sole source aquifer                                                                  |                  |                                                             |
| STATSGO2        | State Soil Geographic [Database]                                                     |                  |                                                             |
| SW              | southwest                                                                            |                  |                                                             |
| TAAQS           | Territory Ambient Air Quality Standards                                              |                  |                                                             |
| TCP             | traditional cultural property                                                        |                  |                                                             |
| TEMCO           | Territorial Emergency Management Coordinating Office                                 |                  |                                                             |
| TMDL            | Total Maximum Daily Load                                                             |                  |                                                             |
| TOC             | total organic compound                                                               |                  |                                                             |
| tpy             | tons per year                                                                        |                  |                                                             |
| TRI             | Toxic Release Inventory                                                              |                  |                                                             |
| TSCA            | Toxic Substances Control Act                                                         |                  |                                                             |
| U.S.            | United States                                                                        |                  |                                                             |
| UAMES           | University of Alaska Museum Earth Sciences                                           |                  |                                                             |
| USACE           | U.S. Army Corps of Engineers                                                         |                  |                                                             |
| USC             | United States Code                                                                   |                  |                                                             |
| USDA            | U.S. Department of Agriculture                                                       |                  |                                                             |
| USDI            | U.S. Department of the Interior                                                      |                  |                                                             |
| USEPA           | U.S. Environmental Protection Agency                                                 |                  |                                                             |
| USFWS           | U.S. Fish and Wildlife Service                                                       |                  |                                                             |
| USGCRP          | U.S. Global Climate Change Research Program                                          |                  |                                                             |
| USGS            | U.S. Geological Survey                                                               |                  |                                                             |
| USVIDOH         | U.S. Virgin Islands Department of Health                                             |                  |                                                             |
| USVIPD          | U.S. Virgin Islands Police Department                                                |                  |                                                             |

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## **APPENDIX A**

### **Invited Cooperating Agencies**

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## INVITED COOPERATING AGENCIES

The following is a list of agencies invited to become cooperating agencies:

- Advisory Council on Historic Preservation
- Environmental Protection Agency
- Executive Office of the President—Council on Environmental Quality
- Federal Communications Commission (accepted invitation)
- General Services Administration (accepted invitation)
- U.S. Army Corps of Engineers
- U.S. Department of Agriculture
- U.S. Department of Agriculture—Farm Service Agency
- U.S. Department of Agriculture—Natural Resources Conservation Service (accepted invitation)
- U.S. Department of Agriculture—Rural Utilities Service (accepted invitation)
- U.S. Department of Agriculture—U.S. Forest Service (accepted invitation)
- U.S. Department of Commerce—National Marine Fisheries Service
- U.S. Department of Commerce—National Oceanic and Atmospheric Administration
- U.S. Department of Commerce—National Telecommunications and Information Administration (accepted invitation)
- U.S. Department of Commerce—National Weather Service
- U.S. Department of Defense—Department of the Air Force (accepted invitation)
- U.S. Department of Defense—National Guard Bureau
- U.S. Department of Defense—Operational Environmental Planning and Readiness
- U.S. Department of Energy (accepted invitation)
- U.S. Department of Health and Human Services
- U.S. Department of Health and Human Services—Centers for Disease Control and Prevention
- U.S. Department of Homeland Security (accepted invitation)
- U.S. Department of Homeland Security—Federal Emergency Management Agency (accepted invitation)
- U.S. Department of Homeland Security—U.S. Coast Guard (accepted invitation)

- U.S. Department of Homeland Security—U.S. Customs and Border Protection (accepted invitation)
- U.S. Department of Justice—Federal Bureau of Investigation
- U.S. Department of Justice—Natural Resources Section
- U.S. Department of the Interior—Bureau of Indian Affairs
- U.S. Department of the Interior—Bureau of Land Management
- U.S. Department of the Interior—Bureau of Reclamation
- U.S. Department of the Interior—National Park Service
- U.S. Department of the Interior—Office of Environmental Affairs
- U.S. Department of the Interior—U.S. Fish and Wildlife Service
- U.S. Department of the Interior—U.S. Geological Survey
- U.S. Department of Transportation—Federal Aviation Administration
- U.S. Department of Transportation—Federal Highway Administration
- U.S. Department of Transportation—Federal Railroad Administration

## **APPENDIX B**

### **First Responder Network Authority Nationwide Public Safety Broadband Network Programmatic Environmental Impact Statement Scoping Summary Report**

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## **FirstNet Nationwide Public Safety Broadband Network Programmatic Environmental Impact Statement**

### **Scoping Summary Report**

#### *Overview*

The First Responder Network Authority (FirstNet), an independent authority within the Department of Commerce, is preparing five regional Programmatic Environmental Impact Statements (PEIS) to evaluate the potential impacts of establishing of a nationwide public safety broadband network (NPSBN) based on a single national network architecture. Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 § 6203(f), *Pub. L. No. 112-96, 126 Stat. 156 (2012) (codified at 47 USC § 1401 et seq.)* charges FirstNet with taking all actions necessary to ensure the building, deployment, and operation of NPSBN, by, at a minimum:

- Ensuring nationwide standards for use and access to the network;
- Issuing open, transparent, and competitive requests for proposals to the private sector;
- Encouraging use of existing commercial wireless infrastructure to speed deployment; and
- Managing and overseeing the implementation and execution of contracts or agreements with non-Federal entities to build, operate, and maintain the network.

FirstNet has determined that a PEIS is the appropriate level of environmental review (at this point in the process prior to having site-specific projects) under the National Environmental Policy Act of 1969 (NEPA). FirstNet will use the NEPA planning process to encourage agency and public involvement in the review of the proposed projects. Public involvement allows for full and fair discussion of the project scope and potential environmental impacts. The procedural aspects of NEPA promote better decision-making by providing a means for open communication between FirstNet and the public.

The Council of Environmental Quality regulations (*40 CFR §§ 1500-1508*) provide guidance on opportunities for public participation. Public participation activities include providing notice to potentially interested parties, holding public meetings, soliciting comments, and making the PEISs available to the public. This report provides an overview of the FirstNet PEIS scoping activities, including the public scoping meetings and comments received during the comment period.

### *Public Notification*

On November 12, 2014, FirstNet published a Notice of Intent (NOI) in the *Federal Register* to prepare five coordinated PEISs (79 FR § 67156 [November 12, 2014]). This initiated a 45-day scoping comment period that ended on December 29, 2014. The NOI, provided in **Attachment A**, stated that FirstNet would be developing regional PEISs and solicited input from the public on potential concerns associated with the Proposed Action and the purpose and need, and provided background information on the project. The NOI also included an announcement of PEIS scoping meetings.

FirstNet placed advertisements in local newspapers to invite the public to the scoping meetings, identifying the dates and locations. Publication of the notices occurred in the following papers:

- Washington Post and Washington Post Express (November 23, 2014)
- Honolulu Star-Advertiser (November 30, 2014)
- San Francisco Chronicle (November 30, 2014)
- Arizona Republic and Arizona Daily Star (November 30, 2014)
- Kansas City Star (December 7, 2014)
- The Times-Picayune (December 7, 2014)
- New York Times (December 14, 2014)

Copies of the newspaper notices are included in **Attachment B**.

### *Scoping Meetings*

FirstNet held seven in-person scoping meetings throughout the nation. These meetings provided the general public and interested stakeholders opportunities to learn about the Proposed Action, talk directly with FirstNet environmental staff, and provide input regarding the scope of the analysis and alternatives. Organized as informal gatherings, the scoping meetings provided the public with an opportunity to learn about FirstNet, alternative ways to implement the NPSBN that will be analyzed in the PEISs, and the overall NEPA process. The meetings also provided the public with the opportunity to give comments and input to the FirstNet team. FirstNet held scoping meetings at the following locations:

- *Washington, D.C.* - Tuesday, November 25, 2014; 4-8 p.m.  
Department of Commerce lobby, 1401 Constitution Avenue NW, Washington, DC 20230
- *Honolulu, HI* - Tuesday, December 2, 2014; 4-8 p.m.  
Neal Blaisdell Center, 777 Ward Avenue, Honolulu, HI 96814
- *San Francisco, CA* - Thursday, December 4, 2014; 4-8 p.m.  
Holiday Inn Civic Center, 50 Eighth Street, San Francisco, CA 94103
- *Tucson, AZ* - Thursday, December 4, 2014; 4-8 p.m.  
Embassy Suites – Williams Center, 5335 E. Broadway Boulevard, Tucson, AZ 85711

- *Kansas City, MO* - Tuesday, December 9, 2014; 4-8 p.m.  
Kansas City University of Medicine and Biosciences, Classroom Annex Building,  
Classroom A, 1750 East Independence Avenue, Kansas City, MO 64106
- *New Orleans, LA* - Thursday, December 11, 2014; 5-9 p.m.  
Loyola University, Thomas Hall, 6363 St. Charles Avenue, New Orleans, LA 70118
- *New York, NY* - Monday, December 15, 2014; 4-8 p.m.  
New York University, Kimmel Center Grand Hall, 60 Washington Square South,  
New York, NY 10012

Each scoping meeting included a poster session that allowed individuals to review posters describing the Proposed Action, purpose and need, alternatives considered, geographic scope, and the NEPA process. The posters and handouts provided at the meetings are included in **Attachment C**. At each meeting, attendees could fill out a comment card and sign up for the distribution list.

Attendance lists from the meetings are included in **Attachment D** (redacted due to personal information provided). Nineteen people attended the seven scoping meetings. FirstNet received written comments from 48 individuals and organizations (one commenter submitted two comments). Table 1 provides the breakdown of comments received for each meeting and during the scoping comment period. Comments received both via U.S. Postal Service mail and electronically (email) were counted once as U.S. Postal Service.

**Table 1. Summary of Scoping Period Comments Received**

| Comment Format                              | Number |
|---------------------------------------------|--------|
| <b>Scoping Meetings</b>                     |        |
| <b>November 25, 2014 (Washington, DC)</b>   |        |
| Attendees                                   | 6      |
| Written Comments                            | 0      |
| <b>December 2, 2014 (Honolulu, HI)</b>      |        |
| Attendees                                   | 0      |
| Written Comments                            | 0      |
| <b>December 4, 2014 (San Francisco, CA)</b> |        |
| Attendees                                   | 0      |
| Written Comments                            | 0      |
| <b>December 4, 2014 (Tucson, AZ)</b>        |        |
| Attendees                                   | 2      |
| Written Comments                            | 0      |
| <b>December 9, 2014 (Kansas City, MO)</b>   |        |
| Attendees                                   | 3      |
| Written Comments                            | 0      |

| Comment Format                             | Number |
|--------------------------------------------|--------|
| <b>December 11, 2014 (New Orleans, LA)</b> |        |
| Attendees                                  | 4      |
| Written Comments                           | 1      |
| <b>December 15, 2014 (New York, NY)</b>    |        |
| Attendees                                  | 4      |
| Written Comments                           | 0      |
| <b>Email</b>                               | 41     |
| <b>U.S. Postal Service Mail</b>            | 7      |
| <b>Written Comments</b>                    | 1      |
| <b>Total Attendees</b>                     | 19     |
| <b>Total Comments</b>                      | 49     |

### *Summary of Comments*

The public and local agencies raised several concerns during the scoping comment period. FirstNet reviewed the comments received and grouped them by resource area or PEIS topic. Table 2 summarizes the general concerns raised during scoping.

**Table 2. Summary of Comments Received during Scoping**

| Issues/Concerns                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Agencies to provide FirstNet with state-specific environmental compliance information and points of contact</li> </ul>                                                                                     |
| <ul style="list-style-type: none"> <li>Agencies to provide FirstNet with contacts within their local organizations and trade organizations</li> </ul>                                                                                             |
| <ul style="list-style-type: none"> <li>Concern that placement of towers would impact historic/recreational/ecological study use of a specific area (i.e., new tower in Tucson, AZ at/on Tumamoc Hill or in/near the historic district)</li> </ul> |

Table 3 provides a summary of the comments received from federal agencies, state agencies, and local government organizations; comments are paraphrased and condensed from the actual comments. The environmental analysis included in the PEIS will rely on the full text of the comments as submitted. Original copies of the comments received are included in **Attachment E** (redacted due to personal information). **Attachment F** provides text of comments received and FirstNet responses.



**Table 3. Summary of Comments Received from Federal, State, and Local Government**

| Agency / Interest Group                                        | Comment Summary                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Federal Government</b>                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| U.S. Environmental Protection Agency, Region 9 (Ann McPherson) | <ul style="list-style-type: none"> <li>• Notification of areas of particular concern, including impacts to water, air, biological resources, invasive species, and habitat protection</li> <li>• Included information regarding suggested content for particular topics and resource areas</li> </ul>                                                                                                                             |
| <b>State Government</b>                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Virginia Department of Environmental Quality (Ellie Irons)     | <ul style="list-style-type: none"> <li>• Request for Federal Consistency Determination under the Coastal Zone Management Act</li> </ul>                                                                                                                                                                                                                                                                                           |
| Virginia Department of Environmental Quality (Mark Alling)     | <ul style="list-style-type: none"> <li>• Water: ensure that construction best management practices will be used to avoid erosion and sedimentation; provide point of contact for wetland permits and for construction and stormwater permits</li> <li>• Waste: ensure that hazardous and solid waste be disposed of according to Virginia regulations; provide point of contact for hazardous and solid waste concerns</li> </ul> |
| <b>Local Government Organizations</b>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Orleans Parish Communications District (Catherine Cargo)       | <ul style="list-style-type: none"> <li>• Provide outreach to Neighborhood Empowerment Network Association (NENA), Association of Public-Safety Communications Officials (APCO), and their local chapters</li> </ul>                                                                                                                                                                                                               |
| Pima County, Arizona, District 5 Supervisor (Richard Elias)    | <ul style="list-style-type: none"> <li>• Concern that FirstNet activities may affect cultural resources in Tucson, Arizona (i.e., Tumamoc Hill)</li> </ul>                                                                                                                                                                                                                                                                        |

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## **ATTACHMENT A**

### **Notice of Intent**

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# Notices

Federal Register

Vol. 79, No. 218

Wednesday, November 12, 2014

This section of the FEDERAL REGISTER contains documents other than rules or proposed rules that are applicable to the public. Notices of hearings and investigations, committee meetings, agency decisions and rulings, delegations of authority, filing of petitions and applications and agency statements of organization and functions are examples of documents appearing in this section.

## DEPARTMENT OF COMMERCE

### Census Bureau

#### Proposed Information Collection; Comment Request; Survey of Housing Starts, Sales, and Completions

**AGENCY:** U.S. Census Bureau, Commerce.

**ACTION:** Notice.

**SUMMARY:** The Department of Commerce, as part of its continuing effort to reduce paperwork and respondent burden, invites the general public and other Federal agencies to take this opportunity to comment on proposed and/or continuing information collections, as required by the Paperwork Reduction Act of 1995.

**DATES:** To ensure consideration, written comments must be submitted on or before January 12, 2015.

**ADDRESSES:** Direct all written comments to Jennifer Jessup, Departmental Paperwork Clearance Officer, Department of Commerce, Room 6616, 14th and Constitution Avenue NW., Washington, DC 20230 (or via the Internet at [jjessup@doc.gov](mailto:jjessup@doc.gov)).

**FOR FURTHER INFORMATION CONTACT:** Requests for additional information or copies of the information collection instrument(s) and instructions should be directed to Erica Filipek, U.S. Census Bureau, MCD, CENHQ Room 7K057, 4600 Silver Hill Road, Washington, DC 20233, telephone (301) 763-5161 (or via the Internet at [Erica.Mary.Filipek@census.gov](mailto:Erica.Mary.Filipek@census.gov)).

#### SUPPLEMENTARY INFORMATION:

##### I. Abstract

The U.S. Census Bureau plans to request a three-year extension of the current Office of Management and Budget (OMB) clearance of the Survey of Housing Starts, Sales and Completions, also known as the Survey of Construction (SOC). The SOC collects

monthly data on new residential construction from a sample of owners or builders. The Census Bureau uses the Computer-Assisted Personal Interviewing (CAPI) electronic questionnaires SOC-QI/SF.1 and SOC-QI/MF.1 to collect data on start and completion dates of construction, physical characteristics of the structure (floor area, number of bathrooms, type of heating system, etc.), and if applicable, date of sale, sales price, and type of financing. The SOC provides widely used measures of construction activity, including the economic indicators Housing Starts and Housing Completions, which are from the New Residential Construction series, and New Residential Sales.

We sample about 1,700 new buildings each month (20,400 per year). We inquire about the progress of each building multiple times until it is completed (and a sales contract is signed, if it is a single-family house that is built for sale). For single-family buildings, we conduct an average of 8.17 interviews and for multifamily buildings, we conduct an average of 7.0 interviews. The total number of interviews conducted each year for single-family buildings is about 107,844 and for multifamily buildings is about 50,400. Each interview takes 5 minutes on average. Therefore, the total annual burden is 13,187 hours.

##### II. Method of Collection

The Census Bureau uses its field representatives to collect the data. The field representatives conduct interviews to obtain data.

##### III. Data

*OMB Control Number:* 0607-0110.  
*Form Number(s):* SOC-QI/SF.1 and SOC-QI/MF.1.

*Type of Review:* Regular submission.  
*Affected Public:* Individuals or households, business, or other for-profit institutions.

*Estimated Number of Respondents:* 20,400.

*Estimated Time per Response:* 5 minutes.

*Estimated Total Annual Burden Hours:* 13,187.

*Estimated Total Annual Cost to Public:* The estimated cost to the respondent is \$404,841 based on an average hourly pay for the respondent of \$30.70. This estimate was taken from the Department of Labor, Bureau of

Labor Statistics, Occupational Employment Statistics Survey for 2013.  
*Respondent's Obligation:* Voluntary.  
*Legal Authority:* Title 13 U.S.C. 182.

##### IV. Request for Comments

Comments are invited on: (a) Whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information shall have practical utility; (b) the accuracy of the agency's estimate of the burden (including hours and cost) of the proposed collection of information; (c) ways to enhance the quality, utility, and clarity of the information to be collected; and (d) ways to minimize the burden of the collection of information on respondents, including through the use of automated collection techniques or other forms of information technology.

Comments submitted in response to this notice will be summarized and/or included in the request for OMB approval of this information collection; they also will become a matter of public record.

Dated: November 6, 2014.

**Glenna Mickelson,**

*Management Analyst, Office of the Chief Information Officer.*

[FR Doc. 2014-26734 Filed 11-10-14; 8:45 am]

**BILLING CODE 3510-07-P**

## DEPARTMENT OF COMMERCE

### National Telecommunications and Information Administration

#### First Responder Network Authority

[Docket Number: 141104926-4926-01]

RIN 0660-XC014

#### Notice of Intent To Prepare Programmatic Environmental Impact Statements and Conduct Scoping for the Nationwide Public Safety Broadband Network

**AGENCY:** First Responder Network Authority, National Telecommunications and Information Administration, U.S. Department of Commerce.

**ACTION:** Notice of Intent.

**SUMMARY:** The First Responder Network Authority ("FirstNet") announces its intent to prepare five regional

Programmatic Environmental Impact Statements (“PEISs”) and conduct public scoping meetings to evaluate the potential environmental impacts of the proposed nationwide public safety broadband network. The specific locations, dates, and times for the scoping meetings will be announced on the FirstNet Web site, no later than one week prior to each meeting.

**DATES:** The scoping period for this notice will begin on the date of publication of this notice and will end December 29, 2014. Comments to this notice must be submitted on or before December 29, 2014.

**ADDRESSES:** The public is invited to submit written comments to this Notice. Written comments may be submitted electronically via email to [PEIScomments@firstnet.gov](mailto:PEIScomments@firstnet.gov) or by mail (to the address listed in **FOR FURTHER INFORMATION CONTACT**). Comments received will be made a part of the public record and may be posted to FirstNet’s Web site ([www.firstnet.gov](http://www.firstnet.gov)) without change. Comments should be machine readable and should not be copy-protected. All personally identifiable information (e.g., name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business

information or otherwise sensitive or protected information.

**FOR FURTHER INFORMATION CONTACT:** Amanda Pereira, NEPA Coordinator, First Responder Network Authority, National Telecommunications and Information Administration, U.S. Department of Commerce, 12201 Sunrise Valley Drive, M/S 243, Reston, VA 20192.

**SUPPLEMENTARY INFORMATION:** The Middle Class Tax Relief and Job Creation Act of 2012 (Pub. L. 112–96, Title VI, 126 Stat. 256 (codified at 47 U.S.C. 1401 *et seq.*)) (the “Act”) created and authorized FirstNet to take all actions necessary to ensure the building, deployment, and operation of an interoperable, nationwide public safety broadband network (“NPSBN”) based on a single, national network architecture. The Act meets a long-standing and critical national infrastructure need, to create a single, nationwide network that will, for the first time, allow police officers, fire fighters, emergency medical service professionals, and other public safety entities to effectively communicate with each other across agencies and jurisdictions.

The National Environmental Policy Act of 1969 (42 U.S.C. 4321–4347) (“NEPA”) requires federal agencies to

undertake an assessment of environmental effects of their proposed actions prior to making a final decision and implementing the action. NEPA requirements apply to any federal project, decision, or action that may have a significant impact on the quality of the human environment. NEPA also establishes the Council on Environmental Quality (“CEQ”), which issued regulations implementing the procedural provisions of NEPA (see 40 CFR parts 1500–1508). Among other considerations, CEQ regulations at 40 CFR 1508.28 recommend the use of *tiering* from a “broader environmental impact statement (such as a national program or policy statements) with subsequent narrower statements or environmental analysis (such as regional or basin wide statements or ultimately site-specific statements) incorporating by reference the general discussions and concentrating solely on the issues specific to the statement subsequently prepared.”

Due to the geographic scope of FirstNet (all 50 states, the District of Columbia, and five territories) and the diversity of ecosystems potentially traversed by the project, FirstNet has elected to prepare five regional PEISs. The five PEISs will be divided as follows:

| East                                                                                                                                                                                                     | Central                                                                                                                                                                               | West                                                             | South                                                                                                                                                                 | Non-contiguous                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Delaware<br>District of Columbia<br>Connecticut<br>Maine<br>Maryland<br>Massachusetts<br>New Hampshire<br>New Jersey<br>New York<br>Pennsylvania<br>Rhode Island<br>Vermont<br>Virginia<br>West Virginia | Colorado<br>Illinois<br>Indiana<br>Iowa<br>Kansas<br>Michigan<br>Minnesota<br>Missouri<br>Montana<br>Nebraska<br>North Dakota<br>Ohio<br>South Dakota<br>Utah<br>Wisconsin<br>Wyoming | Arizona<br>California<br>Idaho<br>Nevada<br>Oregon<br>Washington | Alabama<br>Arkansas<br>Florida<br>Georgia<br>Kentucky<br>Louisiana<br>Mississippi<br>New Mexico<br>North Carolina<br>Oklahoma<br>South Carolina<br>Tennessee<br>Texas | Alaska<br>American Samoa<br>CNMI<br>Guam<br>Hawaii<br>Puerto Rico<br>U.S. Virgin Islands |

Once a PEIS is completed and a Record of Decision (ROD) is signed, the proposed FirstNet projects can begin to submit the site-specific environmental documentation to determine if the proposed project has been adequately evaluated in the PEIS or warrants a Categorical Exclusion, an Environmental Assessment, or an Environmental Impact Statement.

Dated: November 6, 2014.

**Genevieve Walker,**

*Director of Environmental Compliance, First Responder Network Authority.*

[FR Doc. 2014–26772 Filed 11–10–14; 8:45 am]

**BILLING CODE 3510–TL–P**

## DEPARTMENT OF COMMERCE

### National Telecommunications and Information Administration

#### First Responder Network Authority

#### Special Meeting of the First Responder Network Authority Board Finance Committee

**AGENCY:** First Responder Network Authority, National Telecommunications and Information

## **ATTACHMENT B**

### **Newspaper Notices**

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# Made of mushrooms and wasp spit, the drone goes green

Students' plan could solve the mess made by crashing robots

BY RACHEL FELTMAN

A group of college students has created an environmentally friendly drone — think veggie leaver.

Led by one of NASA's synthetic biology experts, the students made an unmanned aerial vehicle almost entirely out of biodegradable materials. After a crash, these little fliers would basically disappear.

Drones can be a great help in dealing with environmental issues, flying into protected wooded areas to count the surviving population of an endangered animal, or over remote coral reefs to assess their condition.

But sometimes they can turn into litter: If a drone goes down in a protected area, it might not be possible for anyone to retrieve the hunk of metal and plastic.

"I have colleagues who do remote sensing in sensitive areas, and there was a UAV lost for a couple months in an area you really wouldn't want to lose one in," said Lynn Rothschild, of NASA's Ames Research Center.

Rothschild serves as an adviser for a team competing in the International Genetically Engineered Machine competition, and the issue of downed-drone litter seemed like a good one for her group to tackle.

"Normally I just give them free reign, but then there are 15 very bright students who all want to do 15 or 30 different things," she said. "So this year, I suggested an overall project. But they really just ran with it from there."

One of her students found a company called Ecovative. Design that was growing the team's dream material: Blocks of fungal foam.

Mushrooms are made up of a

structure called mycelium. It grows looking almost like a spider web when it's spread out, but it can grow to fit the confines it's placed in, eventually forming a tough chunk of foamy material. By putting mycelium into a mold filled with a tasty growing medium — like dead leaves or straw — you can create a custom-shaped mushroom block. Or in this case, a custom-shaped mushroom drone frame. A blast of heat kills the mycelium to stop its growth.

"You end up with this great material that just leftover fungal bits," Rothschild said. To make the frame more durable, the students created a bioplastic to coat it.

You can make a kind of veggie leather using bacteria that create cellulose — the tough stuff that creates cell walls in plants. The bacterial cellulose is grown in a sheet and harvested, then wrapped around the mycelium frame. When it dries, it's tough

and hard.

But the team's biohacking didn't stop there: They also harnessed the power of the insect world to keep their drone from dissolving in midair. The drone is covered in proteins cloof from paper wasp saliva, which the insects use to waterproof their nests.

For now, that's as far as the drone's biodegradability goes: It still uses a traditional rotor, battery and controls. But other

researchers around the world are working on creating biodegradable versions of these components, Rothschild said. And her team is investigating the use of biological sensors, which would allow them to replace some of the sensors on the drone with bacteria.

"Eventually, I'd say that most, if not all, of the drone could be made from biological materials," she said.

Rothschild is excited about the ways the drone could be used in research on Earth, but she has bigger plans for them, too: She has already submitted a proposal to NASA to push this technology forward for Mars missions. The lightweight, unobtrusive, home-grown nature of the robots would make them perfect for use on the red planet.

More at [washingtonpost.com/blogs/speaking-of-science/](http://washingtonpost.com/blogs/speaking-of-science/)

## Islamic State kills tribesmen in Iraq

REUTERS

BAGHDAD — Islamic State militants have killed at least 25 members of a Sunni Muslim tribe in a village on the eastern edge of the provincial capital Ramadi, local officials said Saturday in apparent revenge for tribal opposition to the radical Islamists.

They said the bodies of the men from the Abu Fahd tribe were discovered by the Iraqi army when it launched a counteroffensive against the Islamic State forces near the capital of Anbar province.

Last month, Islamic State fighters killed hundreds of members of the Abu Nimr tribe in Anbar in an attempt to break local resistance to their advances in the Sunni Muslim province they have largely controlled for nearly a year.

Islamic State, which has seized control of large parts of Syria and Iraq, continues to gain territory in Anbar despite three months of U.S.-led airstrikes.

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November 25, 2014 from 4-8 PM  
Department of Commerce lobby  
1401 Constitution Ave NW  
Washington, DC 20230

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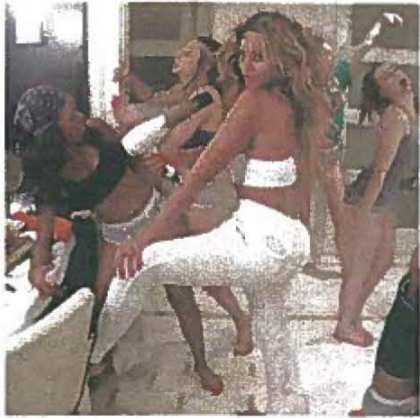
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**NEHA PRAKASH AT MASHABLE.COM** analyzes  
the music video dropped late Friday by  
Beyonce. For "7/11," a surprise single from the  
singer's four-disc Platinum Edition Box Set,  
due out today, the DIY-esque video features  
Beyonce twerking, doing the Harlem Shake  
and wearing a "kale" sweatshirt.

**"That was one of the most  
disrespectful headlines  
I have ever read."**

**COMMENTER DERRICFROMDC AT  
TMZ.COM** is outraged by celebrity  
news website TMZ's headline  
announcing the death of former D.C.  
Mayor Marion Barry. When TMZ posted  
the article Sunday morning, headlined  
"CRACK MAYOR DEAD AT 78," it  
prompted outrage on social media. A  
petition asking TMZ to apologize for  
and remove the distasteful headline  
garnered more than 10,000 signatures  
by Sunday evening.

**"Can I just say how much  
I love that every single  
comment here is pointing  
out the superiority of the  
single blade razor?"**

**COMMENTER NATHAN LOFTIES  
AT FACEBOOK.COM** finds the main  
takeaway of a photo posted last week  
by Gillette to its Facebook page. In  
honor of its 110th anniversary, the  
men's razor maker posted an image  
of its 1904 patent alongside the  
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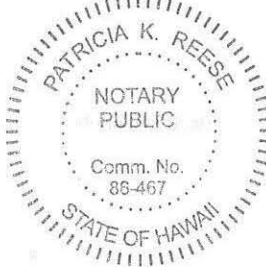
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Doc. Date: DEC - 1 2014 # Pages: 1

Notary Name: Patricia K. Reese First Judicial Circuit

Doc. Description: Affidavit of  
Publication

*Patricia K. Reese* DEC - 1 2014  
Notary Signature Date



Lisa Kaukani being duly sworn, deposes and says that she is a clerk, duly authorized to execute this affidavit of Oahu Publications, Inc. publisher of The Honolulu Star-Advertiser and MidWeek, that said newspapers are newspapers of general circulation in the State of Hawaii, and that the attached notice is true notice as was published in the aforementioned newspapers as follows:

Honolulu Star-Advertiser 1 times on:  
11/30/2014

Midweek Wed. 0 times on:

\_\_\_\_\_ times on:

And that affiant is not a party to or in any way interested in the above entitled matter.

*Lisa Kaukani*

Lisa Kaukani

Subscribed to and sworn before me this 1<sup>st</sup> day

of December A.D. 2014

*Patricia K. Reese*  
Patricia K. Reese, Notary Public of the First Judicial Circuit, State of Hawaii

My commission expires: Oct 07, 2018

Ad # 0000692549

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Lori Gomez

Declares that:

The annexed advertisement has been regularly published  
In the

**SAN FRANCISCO CHRONICLE**

Which is an was at all times herein mentioned  
established as newspaper of general circulation in the  
City and County of San Francisco, State of California, as  
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**SAN FRANCISCO CHRONICLE**

(Name of Newspaper)

901 Mission Street

San Francisco, CA 94103

From

11/30/14

To

11/30/14

Namely on

11/30/14

(Dates of Publication)

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12/4/14

At San Francisco, California

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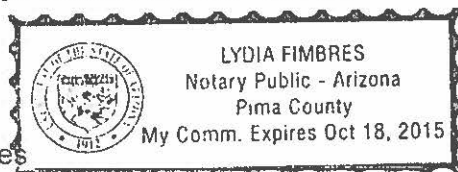
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Publish November 30, 2014 • Arizona Daily Star

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of Medicine and Biosciences  
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1750 East Independence Avenue  
Kansas City, MO 64106**

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For more information please visit [www.firstnet.gov](http://www.firstnet.gov).



## METRO AREA BRIEFS

## Police arrest suspect in Algiers shooting death

New Orleans police have arrested the man they say fatally shot a 50-year-old man Sunday night in Algiers. Jerome Bailey, 26, was picked up Wednesday at his mother's home in Marrero and booked with second-degree murder and aggravated battery. He is accused of killing Cornell Glover, according to police and court records. Authorities found Glover shot multiple times in the 3300 block of De Amies Street. Police created an "inmate participation" with helping detective Troell Murdock identify Bailey as the suspect and shooter. Bailey appeared in court Thursday, where records show his bond was set at \$650,000.

## Man found fatally shot in the 7th Ward

New Orleans police are investigating the shooting death of a man Saturday morning in the 7th Ward. The incident was reported before 7:30 a.m. in the 4500 block of North Roman Street. When officers arrived, they found an unidentified man fatally shot in the grass, police said. Dozens of people gathered at the block. A young woman consoled with grief and sobbed and wailed. "I can't see my husband. He promised he'd never leave me," homicide detective Joseph Alphonse said in a dispatch of the investigation. A police information officer said a call to CrimeStoppers at 504-822-1111.

## Victim ID'd in shooting near Tulane and Broad

Authorities on Friday identified the victim of a fatal shooting near New Orleans police headquarters. Ronald Rudek, 31, was shot multiple times Thursday night in the 2800 block of Gravier Street, according to the Orleans Parish Coroner's Office. Police found Rudek about 8:20 p.m. in the 2800 block of Gravier Street, near the Orleans Parish Criminal District Court house. He was taken to a hospital, where he was pronounced dead. Several yellow evidence markers dotted the sidewalk in front of a LaSalle Apartments, formerly home to the LaSalle brewery, as investigators searched for clues along Gravier. A group of four people lingered outside the yellow police tape, marveling at the apparent brazenness of shooting someone so close to police headquarters. "How could you feel safe when this building has a million cameras, and police are right here?" asked one of the onlookers, who wished to remain anonymous. "How can that be safe?"

## LaPlace man arrested for mailed marijuana

A LaPlace man has been jailed on a charge of receiving a pound of high-grade marijuana via the U.S. Postal Service, authorities said Friday. The marijuana was mailed from Los Angeles to a fictitious person at 51633rd Avenue and ended up at the LaPlace post office, according to the letter. The district attorney's office said the man was arrested on a search warrant for the package. After 35-year-old Alan Butcher collected it, he exceeded the warrant, arrested the man and arrested him Thursday. The state's Office of Attorney General said the man was charged with possession of marijuana, driving on a suspended license and driving without a rear-view mirror. He remained in custody Friday in lieu of a \$50,750 bond.

## Pedestrians targeted in armed robberies

New Orleans police are investigating three armed robberies that occurred over a four-hour period Friday night. Around 5:45 p.m. in the 4700 block of Poydras Street, two men approached the victims, ages 14 and 16, demanding their property. The teens complied, according to NOPD's major offense report. Three hours later, two suspects in a vehicle approached a man in the 3700 block of Baronne Street, seeking cash. The 36-year-old victim gave up his money and the perpetrators fled, according to police reports. The last incident was reported at 8:59 p.m. at Lombard and Poydras streets. Two suspects armed with handguns demanded property from two women and a man, police said. The suspects took a purse from a 17-year-old woman. Anyone with information is asked to call CrimeStoppers at 504-822-1111.

## Man wounded in drive-by

A 24-year-old man was wounded in a drive-by shooting on a 7th

Ward street Friday night. New Orleans police said. The incident was reported at 8:48 p.m. in the 1800 block of Lafayette Street. The victim said a vehicle pulled up and fired on him. He was struck in the leg and taken to a hospital by car, police said. On Saturday morning, police would return to the neighborhood after a man was found shot to death in the 5200 block of North Roman Street. Anyone with information should call CrimeStoppers at 504-822-1111.

## Teen accused of shooting up porch in Kenner

A teenager Friday shot up part about a porch on a Kenner man's porch except for his intended victim. Bullets struck the porch, the handrail, the garbage can and even the phone that the victim was holding, police said. The assault unfolded about noon in the 400 block of Warren Street. Police said a 75-year-old man was sitting on his porch when Darren "Damon" Thomas, 18, Apt. C, 350 West Napoleon Street, Kenner, began shooting at him. Thomas fled but was eventually found about a half mile away in the 1000 block of Farrar Avenue and arrested. The victim and other witnesses identified him as the gunman, police said. They booted him with a temporary restraining order. The gun was not found, but police said Thomas' hand rested on the porch railing. They were still investigating the motive for the shooting.

## Second suspect booked in Arondale burglary

The second suspect in an Arondale home burglary was identified Friday by the Jefferson Parish Sheriff's Office. Deputy Sheriff Michael Smith, 35, 445 Nicole Blvd., Arondale, said the suspect was identified as a man who had been seen leaving a Martini parlor after shooting property stolen in the burglary. Jefferson made the connection after the Sheriff's Office distributed an image from the parlor's surveillance camera, which identified the man. The man was identified as a man who was previously identified as Jameson Wood, 31, 601 West 1st Ave., Arondale, and anyone with information on his whereabouts was asked to call CrimeStoppers at 504-822-1111.

## Suspect nabbed blacks from store robbery

After a Kenner grocery store was robbed Wednesday afternoon, police chased down a suspect and arrested him four blocks away. They booked Tami McGee, 31, Apt. A, 1117 42nd St., Kenner, with simple robbery and resisting an officer. The robbery was reported at 4:25 p.m. at the Kenner levelers, 4103 Williams Blvd. Police said a customer was looking at a four-to-six percent behind the counter when he jumped onto the counter, snatched the product and ran out. Police said they found McGee running in the 3700 block of 42nd Street, chased him and arrested him.

## Plaqueholders drive-by strikes home, vehicle

Plaqueholders Parish Sheriff's Office is investigating an early morning drive-by shooting in the 400 block of Walker Road in Belle Meade. At least two bullets were fired into a home, and a vehicle was struck, police said. The incident was reported at 4:25 p.m. at the Kenner levelers, 4103 Williams Blvd. Police said a customer was looking at a four-to-six percent behind the counter when he jumped onto the counter, snatched the product and ran out. Police said they found McGee running in the 3700 block of 42nd Street, chased him and arrested him.

— From staff reports

## Algiers street improvements officially start

## Project designed for greater safety

From staff reports

Improvements to Gen. de Gaulle Drive and Newton Street are just the beginning of a plan to rehabilitate Algiers streets, officials said Thursday. Elected officials, business leaders and residents met the ribbon on the \$3 million Paths to Progress project designed to make streets safer and add sidewalks, ramps and landscaping. About \$15 million has been spent on Algiers streets in the past two to three years. Another \$50 million is being spent on Gen. de Gaulle to address chronic flooding on the community's main east-west route, said state Sen. David Lefebvre, D-Algiers.

More construction is coming. Work will begin on MacArthur Boulevard and South Street in the next few months, Lefebvre said, and efforts are underway to find money to fix Old Bohemian Highway. Repairs already planned for St. Bernard, Berkley and Huxford, said Mark Demigan, New Orleans public works director.

"This is the beginning, far from the end," Lefebvre said. "When you're able to not have to bring your car in and get it aligned every week, it makes a difference. The streets are something that government can

do." State Rep. Jeff Arnold, D-Algiers, said the investment in infrastructure is paying off. He pointed to the newly expanded Algiers Plaza on Gen. de Gaulle and two new buildings under construction on a large vacant tract on Gen. de Gaulle near Life Center Drive.

"It's not a coincidence that you're seeing economic development starting to bloom," Arnold said. "The improvement, coming on Gen. de Gaulle, is a sign of things to come." The Paths to Progress program is a \$50 million initiative to rehabilitate 60 street segments in New Orleans and Jefferson Parish. It is sponsored by the state Department of Transportation and Development, Federal Highway Administration, Regional Planning Commission and New Orleans.

He thanked state Transportation Secretary Sherri Lott, Arnold and Regional Planning Commission Executive Director Walter Brooks for helping secure funding. "When you're dealing with limited resources and how to make things happen, it's not easy to say you've done something," Lefebvre said. "Secretary Lott has figured out how to do it. She has a can-do attitude." In the past five years, almost \$1.2 billion has been spent on infrastructure in Jefferson and Orleans, Lott said. "The Paths to Progress is a testament of our continued commitment to this area," she said.

## Gretna considers garage sale limits

## Officials want them on weekends only

By Andrea Shaw

Complaints about garage sales lasting several days in residential neighborhoods prompted Gretna officials to consider restricting the sales to Saturdays and Sundays. A measure on the City Council agenda next week would limit yard sales, rummage sales and estate sales to those days from 8 a.m. until 5 p.m.

Councilman Wayne Rau said some residents called road closures to complain about neighbors who hold garage sales five or six days a week, which disrupt their quality of life. "We're

trying to set some limits. We're trying to lighten and clean up the sidewalks," he said.

Residents must still apply and pay a \$25 fee for a permit, and only two permits are issued within a 12-month period, "per piece of residential real property." They must be displayed prominently during set-up and the event.

The proposed amendment also prohibited sales from being purchased for the purpose of resale and home garage sale signs from public property, including night poles.

Violated rules could carry up to 15 days in jail and a \$500 fine. The council meets Dec. 10 at 5:30 p.m. at City Hall, 1001 N. Long Avenue and Second Street.

Andrea Shaw can be reached at andrea@nola.com or 504-825-3780.

## Plans for pharmacy on Magazine Street met with mixed reactions

## Sale of alcohol opposed by some

By Richard A. Webster

Plans to turn a vacant store space that once housed a Blockbuster Video on Magazine Street into a CVS pharmacy have been met with opposition from nearby residents. The Optima Movement, a neighborhood group, is opposing the plan.

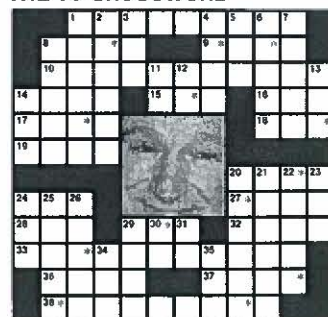
"The corner building at Louisiana Avenue and Magazine Street has sat largely vacant since the recent wave of Blockbuster Video closings. Though the Subway sandwich shop and Green Tea Chinese Restaurant remain open on the Louisiana Avenue side of the building, the building is a eyesore," the group said. "We hope to buy the building,

renovate it completely, and use the entire space for a pharmacy," said Landrus, attorney Michael Sherman in a meeting with neighbors Tuesday evening.

Residents say they oppose the opening of another drug store in the neighborhood because there is already a Walgreens located a few blocks away. But their main objection is to CVS plan to sell alcohol.

"Sherman said the store would not sell any alcohol as single for individual consumption, but neighbors said that the Walgreens down the street has thrived despite an agreement not to sell alcohol," the story reports. "If the CVS receives permission to sell alcohol, they said, the Walgreens will likely feel compelled to follow suit." The City Planning Commission and the City Council must approve the story. "Now, CVS hopes to buy the building,

## THE TV CROSSWORD



W37

**CERTIFICATION OF PUBLICATION**

DEC 16 2014 20

I, Alice Weber, in my capacity as a Principal Clerk of the Publisher of The New York Times a daily newspaper of general circulation printed and published in the City, County and State of New York, hereby certify that the advertisement annexed hereto was published in the editions of The New York Times on the following date or dates, to wit on

DEC 14 2014 20

Alice Weber

Approved:

Maria Lannullo

THIS CERTIFICATION  
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WITHOUT NYT RAISED SEAL

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New York University  
Kimmel Center, Grand Hall  
60 Washington Square South  
New York, NY 10012

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## **ATTACHMENT C**

### **Scoping Meeting Posters and Handouts**

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# Programmatic Environmental Impact Statement

## What are the Project Alternatives?

### Mixed Technologies Alternative:

FirstNet intends to construct a long-term evolution (LTE) nationwide public safety broadband network (NPSBN) using a combination of the following methods:

- Collocation of the network equipment on existing towers, poles and structures, some of which would require structural hardening or reinforcement to improve disaster resistance and resiliency;
- Construction of new communication towers, poles and associated structures to include generators, equipment sheds, fencing, and concrete pads;
- Collocation on existing fiber facilities, including lighting dark fiber and installation of new fiber on existing poles and in existing conduit;
- Installation of new conduit and fiber using trenching (including vibratory plowing) or directional boring (including horizontal directional drilling);
- Deployment of satellite phones and other portable satellite technology;
- Installation of microwave facilities for cell-site backhaul communication; and
- Utilization of deployable technologies to reach rural and remote areas. Deployable technologies encompass a range of items, generally characterized as the following:
  - Cell on Wheels (COW): a cellular base station on a trailer with an expandable antenna mast and usually a microwave or satellite link back to the main controller;
  - Cell on Light Truck (COLT): a cellular base station on a light truck platform with an expandable antenna mast and usually a microwave or satellite link back to the main controller;
  - System on Wheels (SOW): a full base station and controller on a trailer/truck/big rig/etc. A SOW is a fully self-contained cellular system that can provide an island system with no need for satellite/microwave link back; applicability of this type of deployable technology may be limited if there is no internet connectivity; and,
  - Deployable Aerial Communications Architecture: Aerial vehicles, including, but not limited to, drones, weather balloons, and blimps, which would be deployed at high altitudes and are capable of providing wide-area coverage, although with relatively low capacity/throughput.

### Deployable Technologies Only Alternative:

Procure, deploy, and maintain a nationwide fleet of mobile communications systems to provide temporary coverage in areas not covered by existing, usable infrastructure, as there would be no collocation of equipment or new construction. Generally, these units would be deployed at times of an incident to the affected area. These mobile communication units would be temporarily installed and may use existing satellite, microwave, or radio systems for backhaul.

### No Action Alternative:

Under the No Action Alternative, the Nationwide Public Safety Broadband Network (NPSBN) would not be constructed; there would be no nationwide, coordinated system dedicated to public safety interoperable communications. The existing multiplicity of communications networks would remain in place, as would the current, known limitations and problems of existing communication networks during times of emergency or disaster. This alternative would require an act of Congress to revise the Act, which currently requires the NPSBN.

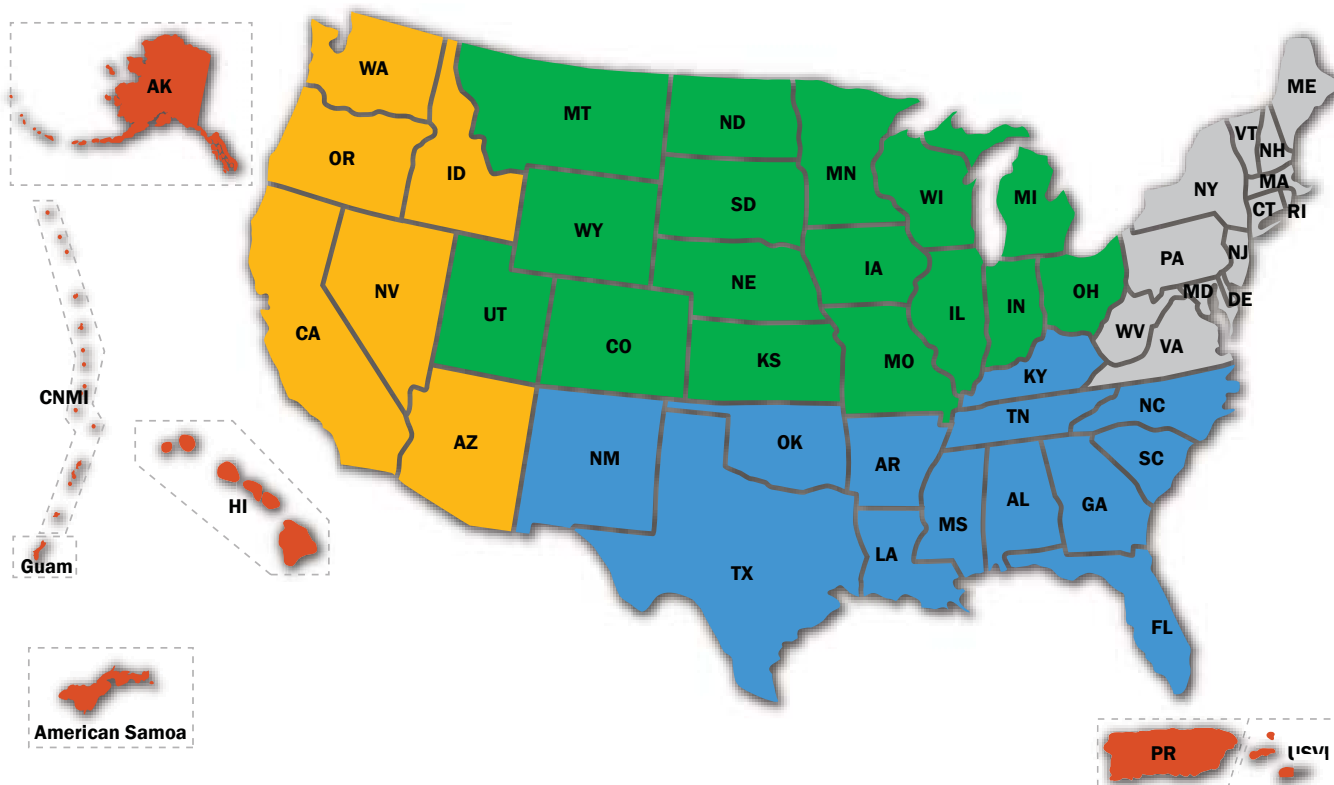




The FirstNet Programmatic Environmental Impact Statement project area would cover the geography of 50 states, 5 territories, the District of Columbia, and 566 tribal nations. Over the past 30 years, wireless operators have invested tens of billions of dollars in terrestrial networks covering over 60% of the U.S. land mass. The Nationwide Public Safety Broadband Network (NPSBN) is intended to provide nationwide service, including substantial rural milestones as part of each phase of the construction and deployment of the network.

The programmatic approach allows FirstNet to identify and define three categories of actions: those types of actions that would not have a significant impact on the environment; those actions that would not have a significant impact if certain mitigation measures or best management practices are implemented; and those actions that will require site-specific analysis to determine the nature and extent of impacts.

-  **East** – comprised of FEMA regions 1, 2, and 3 (with the exception of PR and USVI)
-  **Central** – comprised of FEMA regions 5, 7, and 8
-  **South** – comprised of FEMA regions 4 and 6
-  **West** – comprised of FEMA regions 9 and 10 (except for AK and the Pacific Islands)
-  **Non-Contiguous** – comprised of AK, HI, PR, USVI, CNMI, AS, and Guam







# Programmatic Environmental Impact Statement

## NEPA Process

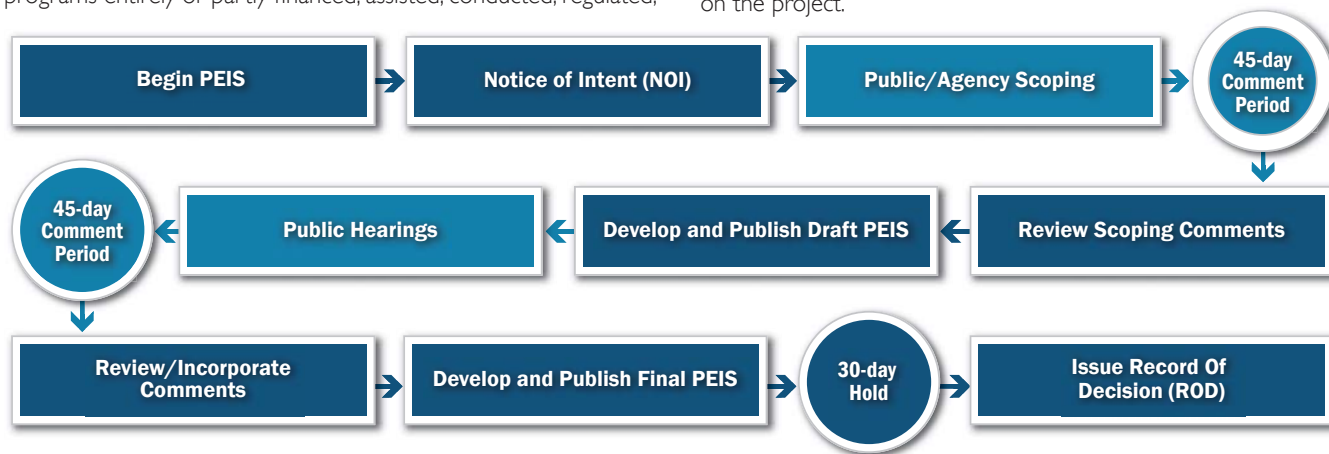
The National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.) provides a framework to evaluate the impact of major federal actions on the environment and allows the public the opportunity to provide input on implementation alternatives. NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions. NEPA also established the Council on Environmental Quality (CEQ). As part of the Executive Office of the President, CEQ coordinates federal environmental efforts and is responsible for advising the President on environmental policy matters. CEQ has also promulgated regulations implementing NEPA which are binding for all federal agencies. These regulations address the procedural provisions of NEPA and the administration of the NEPA process, including preparation of Environmental Impact Statements (EIS).

NEPA is applicable to all "major" federal actions affecting the quality of the human environment. A major federal action is an action with effects that may be major and which are potentially subject to federal control and responsibility. These actions may include new and continuing activities, including projects and programs entirely or partly financed, assisted, conducted, regulated,

or approved by federal agencies; new or revised agency rules, regulations, plans, policies, or procedures; and legislative proposals. FirstNet has determined the construction, operation, and maintenance of the Nationwide Public Safety Broadband Network (NPSBN) qualifies as a major federal activity under these criteria and triggers a NEPA review.

Because of this, FirstNet is required to comply with NEPA, which requires that the government examine the environmental, social, historic, and cultural impacts of its proposed actions before it irretrievably commits resources to undertake them. Furthermore, FirstNet must comply with its own NEPA implementing procedures, which were finalized and published in the Federal Register on April 29, 2014. On November 12, 2014, FirstNet published a Notice of Intent (NOI) to prepare five coordinated Programmatic Environmental Impact Statements (PEIS) in the Federal Register. The PEISs will analyze the direct, indirect, and cumulative impacts of the alternative approaches to the construction, operation, and maintenance of the NPSBN on natural, cultural, and social resources.

The NEPA process is depicted in the diagram below. The light blue coloring indicates those opportunities for the public to comment on the project.



The PEIS process started with publication of the Notice of Intent in the Federal Register on November 12, 2014. The scoping/public comment period for this PEIS will end on December 29, 2014.

Currently, the PEIS is at the scoping phase. During the scoping phase, a wide range of partners including the public, interest groups, and agencies at all levels of government are encouraged to provide input about the project. The PEIS will incorporate and build upon the prior planning efforts, environmental studies, and public input.

All of the collected information will form the basis for a range of alternatives to implement the project and eventually the selection of a preferred alternative.

The preferred alternative will be identified in the Draft PEIS when it is made available to the public for review and comment. A 45-day public comment period with public hearings similar to the scoping meetings will be held. The Final PEIS will incorporate comments received on the Draft PEIS. After publication of the Final PEIS, FirstNet will make the decision regarding the selection of an alternative within a Record of Decision.



# Programmatic Environmental Impact Statement

## Public Involvement

The National Environmental Policy Act (NEPA) regulations require that a lead agency preparing an Environmental Impact Statement (EIS) is to involve the public, along with government agencies, American Indian tribes, private-sector organizations, and other interested parties in scoping (40 CFR 1501.7).

The public scoping process for the FirstNet Programmatic EIS (PEIS) began with publication of the Notice of Intent in the Federal Register on November 12, 2014. Scoping is the first phase of the NEPA analysis process and gives interested parties the chance to comment on the proposed action and to offer suggestions about the issues to be considered in the EIS analyses. Interested government agencies, American Indian tribes, private-sector organizations, and the general public are encouraged to participate in this scoping process. The scoping period will last for 45 days, ending on December 29, 2014. Written comments can be submitted either electronically or by paper copy. Information and public comments received during the Scoping Period will be reviewed for consideration in the development of each regional Draft PEIS.

To receive updates and announcements regarding the project and public involvement opportunities on this project, email [PEISComments@firstnet.gov](mailto:PEISComments@firstnet.gov).

**Public Scoping Comment Period: November 12 to December 29, 2014**

## Scoping Meetings

FirstNet is holding scoping meetings in the following locations to obtain comments from the public:

- Tuesday, November 25: Washington DC, 4 – 8 p.m., EST
- Tuesday, December 2: Honolulu, HI, 4 – 8 p.m., HST
- Thursday, December 4: San Francisco, CA, 4 – 8 p.m., PST
- Thursday, December 4: Tucson, AZ, 4 – 8 p.m., MST
- Tuesday, December 9: Kansas City, MO, 4 – 8 p.m., CST
- Thursday, December 11: New Orleans, LA, 5 – 9 p.m., CST
- Monday, December 15: New York, NY, 4 – 8 p.m., EST

Each scoping meeting will provide an opportunity for the public to speak with subject matter experts and FirstNet staff. The scoping meetings are an open format, allowing the public to drop in at their convenience throughout the evening. Comments can be provided to FirstNet staff with a note taker present to transcribe their comments. In addition, attendees can provide their comments in writing at the meeting.

## Submitting Comments

The public is invited to submit written comments for consideration during scoping. Written comments may be submitted electronically via email to [PEISComments@firstnet.gov](mailto:PEISComments@firstnet.gov), in person using the comment forms provided at this scoping meeting, or by mail to:

Amanda Pereira, NEPA Coordinator  
FirstNet  
12201 Sunrise Valley Drive, M/S 243  
Reston, VA 20192

*Comments received will be made a part of the public record and may be posted to the FirstNet website without change. Comments should be machine readable and should not be copy-protected. All personally identifiable information (e.g., name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.*

## How Are Scoping Comments Used?

Scoping for the Draft PEIS will provide several key elements to assist in the preparation of the document:

1. Gathering information and ideas from the public and key stakeholder groups, such as the public safety community, about the analytical issues related to the Nationwide Public Safety Broadband Network;
2. Making determinations about which issues should be analyzed; and
3. Identifying alternatives to the proposed action that should be considered for analysis.

The scoping process is ongoing and critical to informing federal agency actions, in that it begins before the PEIS analyses are initiated and continues throughout document development of the PEIS.





# Programmatic Environmental Impact Statement

## What is the Proposed Action?

The purpose of the proposed action is to develop a nationwide, interoperable, public safety broadband network (NPSBN). The goal of FirstNet is to provide dedicated services that are comparable to or better than those services public safety has access to today through commercial broadband wireless carriers. These applications and services are intended to enhance the ability of the public safety community to perform more reliably, effectively and safely. FirstNet's goal is that the NPSBN would also provide a backbone to allow for improved communications by carrying high-speed data, location information, images, and, eventually, streaming video. This capability is intended to increase situational awareness during an emergency and improve the ability of the public safety community to effectively engage in those critical activities.

## Description of the Proposed Action

The Proposed Action would encompass the design, construction, and operation of the NPSBN by FirstNet or a partner organization(s). By statute, the network must have several characteristics, including security, resiliency, backwards compatibility with existing commercial networks, integration with public safety access point (PSAPs) or their equivalents, substantial rural coverage, it must be built to open, non-proprietary, commercially available standards, and it must use existing infrastructure to the maximum extent economically desirable.

FirstNet intends to construct a core network, comprised of all standard Evolved Packet Core elements under the 3rd Generation Partnership Project (3GPP) standards (including the Serving and Packet Data Network Gateways, Mobility Management Entity, and the Policy and Charging Rules Function), device services, location services, billing functions, and all other network elements and functions other than the Radio Access Network (RAN). FirstNet expects to construct RAN networks that would consist of all cell site equipment, antennas, and backhaul equipment and services required to enable wireless communications with devices using the public safety broadband spectrum. In addition, FirstNet must continue to maintain and improve the NPSBN to account for new and evolving technologies.





## The Promise of FirstNet

### WHAT IS THE FIRST RESPONDER NETWORK AUTHORITY (FIRSTNET)?

FirstNet is an independent authority within the U.S. Department of Commerce's National Telecommunications and Information Administration. FirstNet is governed by a 15-member Board consisting of the Attorney General of the United States, the Secretary of Homeland Security, the Director of the Office of Management and Budget, and 12 members appointed by the Secretary of Commerce. The FirstNet Board is composed of representatives from public safety; local, state and federal government; and the wireless industry.

Signed into law on February 22, 2012, the [Middle Class Tax Relief and Job Creation Act](#) created FirstNet. The law gives FirstNet the duty to build, operate and maintain the first high-speed, nationwide wireless broadband network dedicated to public safety entities. FirstNet will provide a single interoperable platform for public safety communications.

### WHAT WILL BE POSSIBLE WITH THE FIRSTNET NETWORK?

The FirstNet network will improve citizen and responder safety and increase the efficiency and effectiveness of emergency response through cutting edge broadband communications. Imagine a day when a single communications network can be used to dispatch EMS personnel, a medical helicopter, police officers, and fire personnel from different jurisdictions all at the same time, utilizing voice, video, and data at broadband speeds.

Public safety personnel using the FirstNet network will be able to share applications, access databases, and provide better informed responses to incidents through integrated communications.

FirstNet's goal is to provide public safety-grade reliability and nationwide coverage so all public safety personnel can count on the network when they are on the job. FirstNet is also aiming to provide coverage solutions that let public safety "take the network along" to the destination in certain geographies. FirstNet will create a nationwide standard of service while affording localized customization and control.

When the FirstNet network launches, it will provide mission-critical, high-speed data services to supplement the voice capabilities of today's Land Mobile Radio (LMR) networks. Initially, the FirstNet network will be used for sending data, video, images and text. The FirstNet network will also carry location



## **WHY WAS FIRSTNET CREATED?**

The public safety community fought hard to fulfill the 9/11 Commission's last standing recommendation and lobbied Congress to pass legislation establishing a dedicated, reliable network for advanced data communications nationwide. During emergencies, public safety personnel need priority access and preemption, which are not available on commercial networks.

## **HOW WILL THE FIRSTNET NETWORK BENEFIT PUBLIC SAFETY?**

Using the FirstNet network will improve situational awareness, decision-making and responder and citizen health and safety. Just as smartphones have changed personal lives, FirstNet devices and applications will ultimately change the way public safety operates. FirstNet devices will work anywhere on the network and will save time when seconds matter. A market of millions of public safety users will bring savings opportunities to state and local budgets. FirstNet will bring the benefits of a single, nationwide, interoperable network that is built to open standards to public safety agencies across the country. With millions of users on a single network, FirstNet can take advantage of increased vendor competition and economies of scale to drive down the final cost to the public safety user.

## **WHAT WILL USERS PAY FOR FIRSTNET'S SERVICES?**

FirstNet intends to offer services at a compelling and competitive cost to attract millions of public safety users and make FirstNet self-sustaining. The use of FirstNet services and applications will be voluntary. The costs for FirstNet services and devices have not yet been set.

## **HOW WILL STATES AND AGENCIES PARTICIPATE IN THE BUILDOUT OF FIRSTNET?**

The law that established FirstNet requires it to consult with regional, state, tribal and local jurisdictions to ensure that the FirstNet network is designed to meet the needs of public safety across the country. State consultation will be a collaborative process, involving key stakeholders and leadership from each state and territory, and will be iterative to allow for enhancements and improvements from the state and territory. FirstNet will work through the designated single officer or governmental body during consultation to gather requirements from key stakeholders for developing its deployment plan. Additional information on state consultation is available at <http://firstnet.gov/consultation>.



**FirstNet™**

# PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

## Public Involvement

The public scoping process began with publication of the Notice of Intent in the Federal Register on November 12, 2014. Scoping is the first phase of the NEPA analysis process and gives interested parties the chance to comment on the proposed action and to offer suggestions about the issues to be considered in the EIS analyses. Interested government agencies, American Indian tribes, private-sector organizations, and the general public are encouraged to participate in this scoping process.

The scoping period will last for 45 days, ending on December 29, 2014. Written comments can be submitted either electronically or by paper copy. Information and public comments received during the scoping period will be reviewed for consideration in the development of each regional Draft PEIS.

## Submitting Comments

The public is invited to submit written comments for consideration during scoping. Written comments may be submitted electronically via email to **PEIScomments@firstnet.gov** or by mail to:

Amanda Pereira, NEPA Coordinator  
FirstNet  
12201 Sunrise Valley Drive, M/S 243  
Reston, VA 20192

*Comments received will be made a part of the public record and may be posted to the FirstNet website without change. Comments should be machine readable and should not be copy-protected. All personally identifiable information (e.g., name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.*





# PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

## What is NEPA?

The National Environmental Policy Act of 1969 (NEPA) provides a framework to evaluate the impact of major Federal actions on the environment and through the PEIS process, allows the public the opportunity to provide input on implementation alternatives.

The NEPA process is depicted in the diagram below. The light blue coloring indicates those opportunities for the public to comment on the project.



The PEIS process began with publication of the Notice of Intent in the Federal Register on November 12, 2014. The scoping/public comment period for this PEIS will end on December 29, 2014.



# PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

## Description of the Project Area

The FirstNet Programmatic Environmental Impact Statement project area would cover the geography of 50 states, 5 territories, the District of Columbia, and 566 Federally recognized tribes. Over the past 30 years, wireless operators have invested tens of billions of dollars in terrestrial networks covering over 60% of the U.S. land mass. The NPSBN is intended to provide nationwide service, and it is intended to include milestones that address wilderness and rural coverage gaps.

The project area is divided into five regions:

-  **East** – comprised of FEMA regions 1, 2, and 3 (with the exception of PR and USVI)
-  **Central** – comprised of FEMA regions 5, 7, and 8
-  **South** – comprised of FEMA regions 4 and 6
-  **West** – comprised of FEMA regions 9 and 10 (except for AK and the Pacific Islands)
-  **Non-Contiguous** – comprised of AK, HI, PR, USVI, CNMI, AS, and Guam





# PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

## **What are the Project Alternatives?**

### **Mixed Technologies Alternative:**

Potential elements to be considered for the construction of a long-term evolution (LTE) nationwide public safety broadband network (NPSBN):

- Collocation of the network equipment on existing towers, poles and structures;
- Construction of new communication towers, poles and associated structures;
- Collocation on existing fiber facilities;
- Installation of new conduit and fiber using trenching or directional boring;
- Deployment of satellite phones and other portable satellite technology;
- Installation of microwave facilities for cell-site backhaul communication; and
- Utilization of deployable technologies to reach rural and remote areas, such as;
  - Cell on Wheels (COW)
  - Cell on Light Truck (COLT)
  - System on Wheels (SOW)
  - Deployable Aerial Communications Architecture: Aerial vehicles, including, but not limited to, drones, weather balloons, and blimps, which would be deployed at high altitudes and are capable of providing wide-area coverage, although with relatively low capacity/throughput.

### **Deployable Technologies Alternative:**

Procure, deploy, and maintain a nationwide fleet of mobile communications systems to provide temporary coverage in areas not covered by existing, usable infrastructure, for deployment at times of an incident to the affected area. These mobile communication units would be temporarily installed and may use existing satellite, microwave, or radio systems for backhaul.

### **No Action Alternative:**

Under the No Action, the NPSBN would not be constructed; there would be no nationwide, coordinated system dedicated to public safety interoperable communications. This alternative would require an act of Congress to revise the Act, which currently requires the NPSBN.



# PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

## What is the Proposed Action?

The proposed action is to develop a nationwide, interoperable, public safety broadband network (NPSBN) with the goal of being comparable to or better than those services public safety has access to today through commercial broadband wireless carriers. These applications and services are intended to enhance the ability of the public safety community to perform more reliably, effectively and safely.

FirstNet's goal is that the NPSBN would also provide a backbone to allow for improved communications by carrying high-speed data, location information, images, and, eventually, streaming video. This capability is intended to increase situational awareness during an emergency and improve the ability of the public safety community to effectively engage in those critical activities.

## Description of the Proposed Action

The Proposed Action would encompass the design, construction, and operation of the nationwide NPSBN by FirstNet or a partner organization(s). By statute, the network must have several characteristics, including security, resiliency, backwards compatibility with existing commercial networks, integration with public safety answering points (PSAPs) or their equivalents, substantial rural coverage, it must be built to open, non-proprietary, commercially available standards, and it must use existing infrastructure to the maximum extent economically desirable.

FirstNet intends to construct a core network, comprised of all standard Evolved Packet Core elements under the 3rd Generation Partnership Project (3GPP) standards, device and location services, billing functions, and all other network elements other than the Radio Access Network (RAN). FirstNet expects to construct RAN networks that would consist of all cell site equipment, antennas, and backhaul equipment required to enable wireless communications with devices using the public safety broadband spectrum.

Finally, the Act states that FirstNet must continue to maintain and improve the NPSBN to account for new and evolving technologies.

## **ATTACHMENT D**

### **Attendance Lists**

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## **ATTACHMENT E**

### **Comments**

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## **ATTACHMENT F**

### **Responses to Comments**

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**FirstNet Nationwide Public Safety Broadband Network  
Programmatic Environmental Impact Statement  
Scoping Comments**

| Date Rec'd | Format | Name           | Organization                                             | Topic                                           | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Response                                                                                                                                                                                                                                                                                                                            |
|------------|--------|----------------|----------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11/18/2014 | Mail   | Ellie L. Irons | Commonwealth of VA - Department of Environmental Quality | RFI                                             | <p>Dear Ms. Pereira:</p> <p>This letter responds to the above Notice of Intent, which appeared in the November 12 Federal Register (Volume 79, Number 218) at pages 67156-67157 (hereinafter cited as "the Notice").</p> <p>The Department of Environmental Quality ("DEQ") is responsible for coordinating Virginia's review of federal environmental documents prepared pursuant to the National Environmental Policy Act ("NEPA") and responding to appropriate federal officials on behalf of the Commonwealth. DEQ also coordinates Virginia's review of federal consistency determinations and certifications prepared pursuant to the Coastal Zone Management Act ("CZMA") and the Virginia Coastal Zone Management Program ("VCP").</p> <p>DESCRIPTION OF PROPOSED ACTION</p> <p>According to the Notice, the First Responder Network Authority ("FirstNet") is a unit of the Department of Congress, created by the Middle Class Tax Relief and Job Creation Act of 2012 (Public Law 112-96, codified at Title 47, United States Code sections 1401 et seq.) and authorized to "take all actions necessary to ensure the building, deployment, and operation of an interoperable, nationwide public safety broadband network." The network is intended to "allow police officers, fire fighters, emergency medical service professionals, and other public safety entities to effectively communicate with each other across agencies and jurisdictions." (Notice, page 67157, center column).</p> <p>According to the Notice, FirstNet will prepare five regional Programmatic Environmental Impact Statements (PEISs) and conduct scoping meetings, notice of which will be given in the FirstNet web site (<a href="http://www.firstnet.gov">http://www.firstnet.gov</a>). Following completion of the PEISs, proponents of proposed projects will submit site-specific environmental documentation to determine whether a proposed project warrants a Categorical Exclusion, an Environmental Assessment, or an Environmental Impact Statement. The concept of tiering (see National Environmental Policy Act regulations at Title 40, Code of Federal Regulations, part 1508, section 1508.28) will be employed as FirstNet moves from the five PEISs to regional, basin-wide, or site-specific project considerations (Notice, pages 67156-67157).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.                                                                                                                                                                                  |
| 11/18/2014 | Mail   | Ellie L. Irons | Commonwealth of VA - Department of Environmental Quality | Scoping / Request for copies of DPEIS and FPEIS | <p>ENVIRONMENTAL REVIEW UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT: PROJECT SCOPING AND AGENCY INVOLVEMENT</p> <p>While this Office does not participate in scoping efforts beyond the advice given herein, other agencies are free to provide scoping comments concerning the preparation of the NEPA document. Accordingly, we are sharing this response to the Notice, and copies of the Notice itself, with selected state and local Virginia agencies whose responsibilities may affect, or be affected by, the plans and/or projects considered in the PEIS covering the eastern states. These agencies are likely to include the following (note: starred (*) agencies administer one or more of the enforceable policies of the Virginia Coastal Zone Management Plan; see "Federal Consistency ..." heading, next):</p> <p>Department of Environmental Quality:</p> <ul style="list-style-type: none"> <li>-Office of Environmental Impact Review</li> <li>-Northern Regional Office*</li> <li>-Piedmont Regional Office*</li> <li>-Tidewater Regional Office</li> <li>-Valley Regional Office</li> <li>-Blue Ridge Regional Office</li> <li>-Southwest Regional Office</li> </ul> <p>"Division of Air Program Coordination"</p> <p>"Division of Land Protection and Revitalization (formerly Waste Division)"</p> <p>Office of Stormwater Management"</p> <p>Department of Conservation and Recreation Department of Health (Division of Water Programs)"</p> <p>Department of Game and Inland Fisheries"</p> <p>Virginia Marine Resources Commission" Department of Historic Resources Department of Forestry</p> <p>Department of Transportation</p> <p>Department of Mines, Minerals, and Energy</p> <p>Virginia State Police</p> <p>Department of Emergency Management.</p> <p>In keeping with our regular practice, we will solicit comments from regional planning district commissions and localities when EISs, EAs, or federal consistency documents (again, see next heading) are prepared for programs or projects, based on their nature and geographic impacts.</p> <p>In order to ensure an effective coordinated review of the PEIS, we will require at least 19 copies of it when it is published. This submission may include at least 3 printed copies and 16 CDs, or at least 3 printed copies and an electronic copy available for download at a web site or ftp site. If the PEIS addresses geographic reach or impacts of the program or projects, then it should include one or more U.S. Geological Survey topographic maps as part of its information. We recommend, as well, that project details unfamiliar to people outside FirstNet be adequately described in the PEIS.</p>                                                                                                                                                                                                                                                           | Due to the nationwide scope of our current programmatic analysis and the considerable size of the documents, it may not be possible for FirstNet to provide hard copies of the draft and final documents to all interested parties. However, the documents will be available for download on our website to all interested parties. |
| 11/18/2014 | Mail   | Ellie L. Irons | Commonwealth of VA - Department of Environmental Quality | Coastal Zone Management Act                     | <p>FEDERAL CONSISTENCY UNDER THE COASTAL ZONE MANAGEMENT ACT</p> <p>Pursuant to the Coastal Zone Management Act of 1972, as amended, and the Federal Consistency Regulations (15 CFR Part 930), federal projects with reasonably foreseeable effects on Virginia's coastal uses or resources must be conducted in a manner which is consistent, to the maximum extent practicable, with the Virginia Coastal Zone Management Program (VCP). The VCP is comprised of a network of programs administered by several agencies.</p> <p>FirstNet must submit a federal consistency determination (FCD) which analyzes the coastal effects of the project in light of the enforceable policies of the VCP (first enclosure), and provides a commitment to comply with the enforceable policies. In addition, we invite FirstNet's attention to the advisory policies of the VCP (second enclosure). Requirements for the contents of FCDs are found in the Federal Consistency Regulations (15 CFR Part 930, Sub-part D, sections 930.39) and also in DEQ's Federal Consistency Information Package (available online at <a href="http://www.deq.virginia.gov/Portals/0/DEQ/EnvironmentalImpactReview/FederalConsistencyManual.7.27.11.pdf">http://www.deq.virginia.gov/Portals/0/DEQ/EnvironmentalImpactReview/FederalConsistencyManual.7.27.11.pdf</a>. The Federal Consistency Information Package defines Virginia's coastal zone, among other things.</p> <p>The Federal Consistency Regulations allow up to 60 days for our review of an FCD (15 CFR Part 930, Sub-part C, section 930.41(b)).</p> <p>The FCD may be submitted as a part of and EIS or separately, as you prefer. We recommend that the FCD for a particular project or plan be submitted with the Final EIS rather than the Draft EIS, in order that it reflect resolution of coastal issues that may arise during the comment period for the Draft EIS.</p> <p>In the event broadband network project proponents should seek FirstNet licensing or permitting for their projects, the Federal Consistency Regulations have slightly different requirements and time frames. Three examples of these differences will suffice here:</p> <ul style="list-style-type: none"> <li>• The federal consistency document is called a "federal consistency certification" rather than a "federal consistency determination."</li> <li>• Projects or plans subject to federal licensing or permitting must be consistent with the enforceable policies of the VCP; the qualifier "to the maximum extent practicable" applies only to direct federal actions.</li> <li>• The time frame for the state's response is 180 days, with a requirement that the state provide a progress report in 90 days and an explanation of the reason for further delay in the response.</li> </ul> <p>The Federal Consistency Regulations address federal licensing and permitting in Sub- part D (sections 930.50 through 930.66).</p> | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.                                                                                                                                                                                  |

**FirstNet Nationwide Public Safety Broadband Network  
Programmatic Environmental Impact Statement  
Scoping Comments**

| Date Rec'd | Format                | Name                  | Organization                                             | Topic                               | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Response                                                                                                                                                                                                            |
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| 11/18/2014 | Mail                  | Ellie L. Irons        | Commonwealth of VA - Department of Environmental Quality | Information on existing environment | <p>DATABASE LIST</p> <p>Below is a list of databases that may assist you in the preparation of the NEPA document:</p> <ul style="list-style-type: none"> <li>• DEQ Online Database: Virginia Environmental Geographic Information Systems</li> <li>Information on Permitted Solid Waste Management Facilities, Impaired Waters, Petroleum Releases, Registered Petroleum Facilities, Permitted Discharge (Virginia Pollution Discharge Elimination System Permits) Facilities, Resource Conservation and Recovery Act (RCRA) Sites, Water Monitoring Stations, National Wetlands Inventory <a href="http://www.deq.virginia.gov/ConnectWithDEQNEGIS.aspx">www.deq.virginia.gov/ConnectWithDEQNEGIS.aspx</a></li> <li>• DEQ Virginia Coastal Geospatial and Educational Mapping System (GEMS)</li> <li>Virginia's coastal resource data and maps; coastal laws and policies; facts on coastal resource values; and direct links to collaborating agencies responsible for current data <a href="http://128.172.160.131/gems2/">http://128.172.160.131/gems2/</a></li> <li>• DEQ Permit Expert</li> <li>Helps determine if a DEQ permit is necessary <a href="http://www.deq.virginia.gov/permitexpert/">www.deq.virginia.gov/permitexpert/</a></li> <li>• OHR Data Sharing System</li> <li>Survey records in the OHR inventory <a href="http://www.dhr.virginia.gov/archives/datasharingsys.htm">www.dhr.virginia.gov/archives/datasharingsys.htm</a></li> <li>• OCR Natural Heritage Search</li> <li>Produces lists of resources that occur in specific counties, watersheds or physiographic regions <a href="http://www.dor.virginia.gov/naturalheritage/tsearchtool.shtml">www.dor.virginia.gov/naturalheritage/tsearchtool.shtml</a></li> <li>• DGIF Fish and Wildlife Information Service Information about Virginia's Wildlife resources <a href="http://va/fwis.org/fwis/">http://va/fwis.org/fwis/</a></li> <li>• Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Database: Superfund Information Systems</li> <li>Information on hazardous waste sites, potentially hazardous waste sites and remedial activities across the nation, including sites that are on the National Priorities List (NPL) or being considered for the NPL <a href="http://www.epa.gov/superfund/sites/cursites/index.htm">www.epa.gov/superfund/sites/cursites/index.htm</a></li> <li>• EPA RCRAInfo Search</li> <li>Information on hazardous waste facilities <a href="http://www.epa.gov/enviro/facts/rcrainfo/search.html">www.epa.gov/enviro/facts/rcrainfo/search.html</a></li> <li>• EPA Envirofacts Database</li> <li>EPA Environmental Information, including EPA-Regulated Facilities and Toxics Release Inventory Reports <a href="http://www.epa.gov/enviro/index.html">www.epa.gov/enviro/index.html</a></li> <li>• EPA NEPAAssist Database</li> <li>Facilitates the environmental review process and project planning <a href="http://nepaassisttool.epa.gov/nepaassist/entry.aspx">http://nepaassisttool.epa.gov/nepaassist/entry.aspx</a></li> <li>If you have questions about the environmental review process and/or the federal consistency review process, please feel free to contact me (telephone (804) 698-4325 or e-mail <a href="mailto:ellie.iron@deq.virginia.gov">ellie.iron@deq.virginia.gov</a>) or John Fisher of this Office (telephone (804)698-4339 or e-mail <a href="mailto:john.fisher@deq.virginia.gov">john.fisher@deq.virginia.gov</a>).</li> <li>I hope this information is helpful to you.</li> <li>Ellie L. Irons, Program Manager Environmental Impact Review</li> </ul> | Thank you for your comment.                                                                                                                                                                                         |
| 12/2/2014  | Mail                  | Mark Alling           | Commonwealth of VA - Department of Environmental Quality | Water Resources                     | <p>Dear Ms. Pereira:</p> <p>I have reviewed the Scoping for the above referenced project proposed by the National Telecommunications and Information Administration to prepare five regional Programmatic Environmental Impact Statements and conduct scoping meetings. FirstNet intends to build, deploy and operate an interoperable, nationwide public safety broadband network based on a single national network which will allow police, fire emergency medical and other professionals and entities to effectively communicate with each other across agencies and jurisdictions. PRO comments for this project are as follows:</p> <p>Water: Where building and deployment cross or impact surface and groundwater features, erosion and sediment controls should be properly implemented and maintained throughout all phases of construction. E &amp; S controls and Best Management Practices (BMPs) should be inspected/repaired before and after rain events. Please follow all standards and specifications under the Virginia DCR Erosion &amp; Sediment Controls Handbook (1992, 3rd Edition). DEQ recommends maximizing pervious surface areas and green spaces in the construction design to reduce runoff and the environmental impact associated with urban runoff.</p> <p>Please contact Allison Dunaway at (804) 527-5086 for questions dealing with permitting of construction in and near wetlands. Please contact Emilee Adamson at (804) 527-5072 for questions dealing with construction or industrial stormwater permitting.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.                                                                  |
| 12/2/2014  | Mail                  | Mark Alling           | Commonwealth of VA - Department of Environmental Quality | Waste                               | <p>Waste: Hazardous or solid waste materials generated should be tested and removed in accordance with the Virginia Hazardous Waste Management Regulations (9 VAC 20-60) and/or the Virginia Solid Waste Management Regulations (9 VAC 20-80). Please understand that it is the generator's responsibility to determine if a solid waste meets the criteria of a hazardous waste and as a result be managed as such. In addition, asbestos waste, lead waste, or contaminated residues generated must be handled and disposed of in accordance with the VSWMR or VHWMR as applicable. DEQ recommends that pollution prevention principles be implemented to reduce the amount of wastes at the source, such as the re-use and recycling of waste materials. If you have any questions concerning hazardous/solid waste management, please contact Jason Miller at (804)527-5028.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.                                                                  |
| 12/2/2014  | Mail                  | Mark Alling           | Commonwealth of VA - Department of Environmental Quality | Air                                 | <p>Air: DEQ recommends following all air quality standard and specifications to reduce or avoid the emissions of VOCs, especially during periods of high ozone. Fugitive dust should be kept to a minimum, (9 VAC 5-40-5630 et seq). Permits may be required for any boilers or fuel-burning equipment. For further questions, please contact James Kyle at (804) 527-5047.</p> <p>Sincerely,<br/>Mark S. Alling<br/>Water Monitoring and Planning Manager</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.                                                                  |
| 12/11/2014 | Meeting (New Orleans) | Catherine Cargo       | Orleans Parish Communications District (OPCD)            | FirstNet outreach                   | Work on outreach to NENA APCO and their local chapters.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | FirstNet will continue to provide information regarding the NEPA process to our stakeholders and provide opportunities for all interested parties to provide input during the release of the draft and final PEISs. |
| 12/11/2014 | Mail and Email        | Ronald P. Spark, M.D. | Public                                                   | Biological Resources                | <p>Ms. Pereira:</p> <p>For over a decade I've been one of the hundreds of Tucsonans who daily walk Tucson's Tumamoc Hill. Sited in the midst of Downtown, this volcanic outcropping and Sonoran desert respite affords both the layman and the scientist the engagement and delight in a more than 100 years of reclaimed natural setting. In particular, I'm continually amazed when observing the broadly diverse and robust desert plants and animal species.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Thank you for your comment.                                                                                                                                                                                         |
| 12/11/2014 | Mail and Email        | Ronald P. Spark, M.D. | Public                                                   | Cultural / Historic resources       | <p>Its built structures are of a recognized historic character and the trencheras and rock art recall the place as being sacred to the indigenous and extant peoples.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Thank you for your comment.                                                                                                                                                                                         |
| 12/11/2014 | Mail and Email        | Ronald P. Spark, M.D. | Public                                                   | Aesthetics / Recreational Use       | <p>As a physician, I am touched by seeing some walkers using canes, braces and, even oxygen, to ascend and absorb the meaningfulness of the Hill. The place has an innate inspiring character. I trust the National Wifi Network will ensure the Public Safety but we must not allow any footprint to lessen the intrinsic public, scientific and cultural value of Tumamoc Hill.</p> <p>Sincerely yours,<br/><br/>Ronald P. Spark, M.D.<br/>Past-President, Pima County Medical Society<br/>Clinical Associate Professor, University of Arizona College of Medicine</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Thank you for your comment.                                                                                                                                                                                         |

**FirstNet Nationwide Public Safety Broadband Network  
Programmatic Environmental Impact Statement  
Scoping Comments**

| Date Rec'd | Format           | Name               | Organization          | Topic                         | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Response                                                                                                                                                                                    |
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| 12/15/2014 | Email            | Michael Rosenzweig | University of Arizona | NOI                           | <p>Dear Ms. Pereira,</p> <p>Please accept the attached pdf file as my comment on the proposed FirstNet system in Pima County, Arizona.</p> <p>BTW I met with four FirstNet people in Tucson at the scoping meeting. They brought professionalism and interest to it. I thought they included their contact information in the material they gave me, but I could not find it when I returned home. The first name of the leader was Genevieve and I would like very much to get in touch and thank her.</p> <p>Sincerely,<br/>Mike</p> <p>Michael I. Rosenzweig<br/>Director<br/>Tumamoc: People &amp; Habitats<br/>Professor<br/>University of Arizona</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Thank you for your comment.                                                                                                                                                                 |
| 12/15/2014 | Email Attachment | Michael Rosenzweig | University of Arizona | Cultural / Historic resources | <p>Because of its location in the heart of Tucson, and its prominent elevation and many straight-line radio access paths to the city, this US National Historic Landmark was selected as one of the sites for a transmission tower in the Pima County system to insure interoperability among first responders. The tower is now working as legs for numerous antennae. But its construction was an historic mistake because it greatly erodes the integrity of the NHL.</p> <p>As it seems likely that FirstNet's new technology will collocate by default on the Tumamoc tower, I believe FirstNet needs to learn about the NHL so that its decisions will be fully informed and not directed to such a default position for lack of background data.</p> <p>I add that the County of Pima &amp; The University of Arizona agreed that as new technology was needed to replace the old on Tumamoc, the new would be deployed elsewhere and the old removed from Tumamoc Hill.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies to comply with all requirements.                                          |
| 12/15/2014 | Email Attachment | Michael Rosenzweig | University of Arizona | Cultural / Historic resources | <p>Ownership</p> <p>The Landmark has four major ownership divisions:</p> <ul style="list-style-type: none"> <li>• 350 acres of fee simple land; owner, U of A</li> <li>• 200 acres from the original U of A land grant</li> <li>• 300 acres open space; owner, Pima County</li> <li>• 20 acres of former landfill; owner, City of Tucson (capped with an ecologically sound, evapotranspirative layer of soil that makes it available for experiments)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Thank you for your comment.                                                                                                                                                                 |
| 12/15/2014 | Email Attachment | Michael Rosenzweig | University of Arizona | Biological Resources          | <p>Ecology</p> <p>Founded as The Carnegie Desert Botanical Laboratory in 1903, it instantly became a leader in ecological research. In 1975, the US Department of the Interior designated part of it and some of its structures a US National Historical Landmark. In 1981, the State of Arizona designated the Hill an "Environmental Research Natural Area."</p> <p>Most of what the world knows about the physiology and ecology of Arizona's iconic saguaro cactus comes from research that began on Tumamoc Hill in 1903 and continues to this very day. In 1985, University and USGS investigators were finally able to establish the nature of the sporadic reproduction of saguaros — it had taken us 80 years! More recently, the Hill hosted the discovery that the isotope ratios of saguaro cactus spines allow us to measure, for the first time, the climate of the Sonoran Desert during the past two centuries. And in 2014, one of its saguaros provided a tissue sample that resulted in the first genome description of any cactus species in the world.</p> <p>Tumamoc Hill is the site of nine plant ecology study quadrats that date from 1906 and are the world's oldest permanent ecology study plots. From 2010-2012, all quadrats were resurveyed with modern optical and digital tools, given GPS coordinates and re-measured. All the data of the previous century-plus were digitized, filed with the National Park Service and made publicly available via the Ecological Society of America.</p> <p>Beginning in 1982, long transects were established to record and understand the ecology of more than 100 species of annuals (wildflowers). We now have an unbroken and growing record of 33 generations, capable of detecting subtle variations in environmental conditions such as water regime and weather.</p> | Thank you for your comment.                                                                                                                                                                 |
| 12/15/2014 | Email Attachment | Michael Rosenzweig | University of Arizona | Cultural / Historic resources | <p>Conservation</p> <p>In 1987, the Interior Dept added the remainder of the 680-acre scientific reservation to the landmark in recognition of the Hill's importance to conservation. In 1906, it banished its active stone quarries and excluded domestic grazers and browsers with a 5(+) mile-long fence in order to allow the desert to return to a natural state. Thus was established the world's first restoration ecology project. It is the Hill's conservation status, one of national and international historical significance, whose integrity is severely damaged by the tower.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Thank you for your comment.                                                                                                                                                                 |
| 12/15/2014 | Email Attachment | Michael Rosenzweig | University of Arizona | Cultural / Historic resources | <p>Archaeology</p> <p>For nearly half a century, research on Tumamoc Hill has produced archaeological knowledge about the people who farmed in Tucson starting thousands of years ago. Archaeological remains on the Hill include massive, 2300-yr old trincheras (encircling walls and terraces), more than 150 structures, an array of almost 1000 petroglyphs, and an elaborate prehistoric trail system. The Hill was the site of three successive hilltop settlements with masonry architecture. Very recent work with the isotopes in potsherds shows that, for two millennia or more, Native Americans have been gathering together on the Hill from all around the Tucson basin. In 2010, the US Department of the Interior designated the land and its remains, The Tumamoc Hill Archaeological District of the United States of America.</p> <p>The present communications tower and its associated structures sit on the mesa top where much of the most charismatic ruins are located.</p> <p>Archaeologists must quickly rebury any new excavation to protect it. Any hope of creating an educational experience for visitors is thwarted.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Thank you for your comment.                                                                                                                                                                 |
| 12/15/2014 | Email Attachment | Michael Rosenzweig | University of Arizona | Cultural / Historic resources | <p>Significance to Native American Cultures</p> <p>Tumamoc Hill is a centerpiece of the history of the ancestors of Arizona's O'odham, including the Tohono O'odham Nation, the Ak Chin Indian Community, the Gila River Indian Community, and the Salt River (Pima-Maricopa) Indian Community. The Hill is sacred to all of them. The same is true of the Hopi Nation, and the Pasqua Yaqai, too.</p> <p>Both the University of Arizona and Pima County respect the sensitivity and traditions of native people regarding Tumamoc Hill. The university and the Nations agreed in writing that the footprint of western culture on the Hill would not be increased. When their permission was sought by the county to erect the current tower, they consented only because they were told it was necessary to save lives. Absent that consideration, they would surely prefer to see the tower removed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/15/2014 | Email Attachment | Michael Rosenzweig | University of Arizona | Aesthetics / Recreational Use | <p>Walking the Hill</p> <p>Each week, thousands of people wend their way along the Tumamoc Hill Road, ascending 800 feet to its mesa top. Without promotion or marketing, "Walking the Hill" has become a Tucson institution woven into the fabric of the community, uniting people from every socio-economic group within our region. The Hill hosts approximately 300,000 to 500,000 walking trips per year. For many, their Tumamoc walk has become a daily ritual.</p> <p>Recently the University of Arizona College of Medicine has begun work on a research project focused on the walkers. It studies the effects of the green desert environment in the midst of an urban heat island on the allostatic load of stress, well-being and spirituality.</p> <p>Meanwhile, despite the crowds, the Hill has no security apparatus or personnel. Instead it relies on the honor and sound judgment of walkers to stay off the mesa top itself. But the need for good security for the FirstNet system would seem to promise tension between the need for reliable interoperability and the demand for liberal public use. Put simply, if FirstNet's needs interfere with easy access to Tumamoc by walkers, the result will be a sustained gnashing of teeth.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Thank you for your comment.                                                                                                                                                                 |
| 12/15/2014 | Email Attachment | Michael Rosenzweig | University of Arizona | Cultural / Historic resources | <p>SUMMARY OF IMPACTS</p> <p>Use of the mesa top of Tumamoc Hill for a communication tower to support interoperability in Pima County will have the following negative impacts.</p> <ul style="list-style-type: none"> <li>• It will establish, far into the future, a communication superstructure that amounts to a serious cultural, environmental and historical mistake.</li> <li>• It will erode the integrity of a National Historic Landmark.</li> <li>• It will prevent important archaeological resources from being made available to educate the public.</li> <li>• Either it will risk a clash between public use of the Hill for recreation, or else it will occupy an area without security.</li> <li>• It will frustrate the desire of six Native American nations to reduce the presence of unwelcome technical apparatus on a Hill invested with deep religious significance.</li> </ul> <p>Michael Rosenzweig 15 December 2014.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |

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| 12/15/2014 | Email  | Paul Dayton                | University of California San Diego | Cultural / Historic resources | Dear Friends,<br>this note relates to the importance of including Tumamoc Hill, in Tucson, Arizona, in FirstNet. I write to support the inclusion of this facility. As you know it has several historic buildings but its most important ongoing legacy is the science.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.                                                                                                                                      |
| 12/15/2014 | Email  | Paul Dayton                | University of California San Diego | Biological Resources          | It very much is the home of the science of desert ecology starting over 100 years ago with Carnegie support. Over the century some of the best desert ecologists in the world spent their careers there developing a unique understanding of the evolution of a desert ecosystem over the last 100 thousand years. In recent time they established unique baseline data on desert plants that span most of the century. They organization is unique and the facility priceless. I hope you can help protect it with FirstNet.<br>Sincerely<br>Paul Dayton                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/16/2014 | Email  | Rich Watson                | Public                             | Cultural / Historic resources | I recently heard about the future involvement of First Net on Tumamoc Hill and am encouraged that the Federal Government is concerned about secure communications. However, on a more personal level, I am concerned about maintaining the integrity of this unique and irreplaceable historical and scientific resource. Unique, in part, because it has been guarded, researched and protected by the University of Arizona and many others for over a century. In ancient times, this was home to native people long before Europeans imagined our existence and a strong remnant of those people is still intact on the property. In addition, severe encroachment by recreational users (welcomed with sensitivity), the City of Tucson and high traffic on the perimeter causes substantial risk to this delicate property. Prior to construction of the new towers on Tumamoc, I was personally involved in discussions relating to use, impact and future maintenance. When bonds are passed, funding is available and agreement reached between multiple agencies and jurisdictions it is easy to make well intended promises. Such promises were made prior to the tower development with good intentions. History dictates that memories become short and promises are forgotten over time. In this particular case, it is my sincere hope that you take seriously your new responsibility as a joint caretaker of the history, management and protection of Tumamoc. Once damaged or destroyed, it can never be restored. Consequently, it is imperative that all who are caretakers never lose vigilance as we move into the future. Please respect the ancient people, the century of scientific study and Dr.Michael Rosenzweig, who is a highly qualified and deeply invested steward of this property.<br>Rich Watson | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.                                                                                                                                      |
| 12/16/2014 | Email  | Russell P. Long, CRB, CLHS | Long Realty Company                | Cultural / Historic resources | To Whom It May Concern,<br><br>Tumamoc Hill has been a fixture in our family since the very early 1900's when our great grandfather, Burton Bovee, began working there. Long before we every visited there and as children our mother told us tales of Burton working there, riding his horse and mule all over the Tucson basin collecting samples and specimens. As adults we became aware of the cultural and historical significance of the site as a result of the approximately 3,000 year old Hohokam Indian village atop the hill as well the historic volcanic stone buildings and their current uses. Certainly Tumamoc Hill is a local and national treasure worthy of preservation. Please feel free to contact me if you would like to discuss this or have questions.<br>Thank you.<br><br>Russell P. Long, CRB, CLHS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.                                                                                                                                      |
| 12/19/2014 | Email  | R. Brooks Jeffrey          | University of Arizona              | Cultural / Historic resources | Ms. Pereira:<br>I'm writing at the request of Dr. Michael Rosenzweig to express my advocacy on behalf of Tumamoc Hill's preservation as a rich cultural landscape. Instead of a long essay defining cultural landscapes (if you don't already know) and recognizing Tumamoc Hill's significance as a multi-layered tell of natural and cultural features, I've attached a presentation I've given many times as a vehicle to educate the various constituencies for whom Tumamoc Hill holds value. I hope this assists to inform any future decisions that may impact Tumamoc Hill. Feel free to contact me directly with any specific questions.<br>Sincerely, Brooks<br>R. Brooks Jeffrey                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.                                                                                                                                      |
| 12/20/2014 | Mail   | Michael Kaiserman          | Public                             | Cultural / Historic resources | Dear Ms. Pereira,<br>I am writing to you to encourage your organization to join forces with many other organizations that are already supporting members for the preservation of the archaeology, cultural history and ecology of Tumamoc Hill. It is my perception that the FirstNet activity would provide a beneficial service to significantly broaden the exposure Tumamoc Hill would have nationally. As I have travelled to Egypt, Greece, Turkey, Israel , Great Britain, Norway, and Mexico were I have visited many of the historical and ancient wonders, not to mention many sites here in the U.S., I believe Tumamoc Hill ranks up there with all these sites in the same historical and ancient context. I trust your organization will come to the same conclusion and move forward with plans to include Tumamoc Hill in the FirstNet activity.<br>Thank you very much for your consideration.<br>Michael Kaiserman<br>Engineering Fellow, Raytheon Missile Systems (Retired)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/22/2014 | Email  | Bruce Hilpert              | Public                             | Cultural / Historic resources | I urge you to protect the cultural resources on the top of Tumamoc Hill in Tucson. This historic/prehistoric site has unique constructions that give insight into the prehistory of the Southwest. Further constructions endangers these resources. I urge you to limit construction on this site to areas that have been previously disturbed and allow no further destruction of these resources.<br>Thank you,<br>Bruce Hilpert                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/22/2014 | Email  | Charles Broder             | Public                             | Cultural / Historic resources | Allowing first responders to communicate with each other is a very important goal. I sincerely hope that this goal will not be allowed to compromise the important cultural remnants and significance of Tumamoc Hill. It is a treasure which must be preserved.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/22/2014 | Email  | Gayle Harrison Hartman     | Public                             | Cultural / Historic resources | Firstnet,<br>I don't know exactly what you are planning for Tumamoc Hill but you need to know that it is a National Historic Landmark and, as an archaeological site, is listed on the National Register of Historic Places. The hill was used by prehistoric people at least as long ago as 500 B.C. The summit is surrounded by low basalt "walls" (linear rock piles extending for many yards), and the summit itself contains dozens of prehistoric pit structures. There are also over 700 examples of prehistoric rock art on the summit and slopes of the hill. These were recently recorded and published as "Tumamoc Rock Art Revisited: With a Focus on Temporal Affiliation and Management" by Gayle Harrison Hartmann and Peter C. Boyle. The monograph was part of Arizona State Museum Archaeological Series No. 208; the entire publication was entitled New Perspectives on the Rock Art and Prehistoric Settlement Organization of Tumamoc hill, Tucson, Arizona, edited by Gayle Harrison Hartmann and Peter C. Boyle. It is extremely important that no damage be done to the basalt "walls," (trincheras in Spanish), pit house structures, rock art and other manifestations of prehistoric or historic activity on the hill. If you have not already done so, please contact Todd Pilezel at the Arizona State Museum as soon as possible. He is the archaeologist in charge of protecting the hill. pilezel@email.arizona.edu.<br>Thank you,<br>Gayle Harrison Hartmann                                                                                                                                                                                                                                                                                                                                         | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/22/2014 | Email  | Georgia Erdmann            | Arizona Site Steward               | Cultural / Historic resources | Thank you for your consideration when you make decisions regarding placing a tower on Historic Tumamoc Hill. It is a great relief to know that you will use the pads that are already in existence and thus save some endangerment of this ancient site. It is such a great opportunity to work together to honor the ancient archaeology of the area. Thank you again.<br>Respectfully,<br>Georgia Erdmann                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/22/2014 | Email  | Jane Levin                 | Public                             | Cultural / Historic resources | I am a volunteer archeological site steward in Pima County. I am writing to encourage you to restrict any construction on the antenna pads on Tumamoc Hill. The trincheras there are ancient and precious and need to be protected.<br>Thank you for your consideration.<br>Sincerely,<br>Jane Levin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |



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| 12/22/2014 | Email  | Jaye S. Smith                  | Public                                        | Cultural / Historic resources | <p>Dear Ms. Pereira:<br/>As a Pima County resident and an avid archaeological enthusiast, I am extremely concerned about the proposed impact to the most important site, both historically and archaeologically, in Pima County - Tumamoc Hill. This site is extremely important for ongoing research about Hohokam Cultures, as well as immense local historical value to many of Pima County's first pioneer families, the University of Arizona, the UA School of Anthropology and the Arizona State Museum.</p> <p>Please help protect Tumamoc Hill by limiting the proposed construction to the existing antenna pads. I fully realize the importance of providing advanced communications for our first responders, but it is also important to protect the ancient trincheras sites and petroglyphs such as those found on Tumamoc Hill that we can never replace or restore once impacted. So many important archaeological sites in Pima County have been lost in recent years; we just can not afford to lose a treasure as important as Tumamoc Hill. As a proud member the Arizona State Museum, the Arizona Archaeological and Historical Society and Archaeology Southwest, I am committed to offer whatever help or assistance is needed to develop a plan that will provide the necessary communications structure and preserve this irreplaceable Hohokam site.</p> <p>Thank you for your attention;<br/>Sincerely,<br/>Jaye S. Smith</p> | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/22/2014 | Email  | Judith Reisman                 | Site Steward                                  | Cultural / Historic resources | <p>As an archeological site steward, I help protect a very old Hohokam site from theft and vandalism. I am in complete support of creating a first responders wifi network, but respectfully ask that any new hardware installations on Tumamoc Hill be confined to existing hardware sites so that the rest of this precious archeological site remains. It is wonderful to think of using the internet to help our first responders in disasters and emergencies. It is also wonderful that you all are so ready to be partners in preserving the rest of the aspects of this site.</p> <p>Thank you,<br/>Judith Reisman, site steward</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/22/2014 | Email  | Katlin Meadows & Albert Lannon | Wild Heart Ranch                              | Cultural / Historic resources | <p>Please limit FirstNet construction on Tucson's Tumamoc Hill to existing antenna sites so that new footprints are not created. Any new work away from already-disturbed areas will impact negatively on ancient archeological sites, sites that contain habitation and farming areas, rock art with an amazing number of solstice and equinox markers, and artifacts that continue to help archaeologists understand the ancient history of this important area.</p> <p>Several years ago we helped document some of those solstice markers. To stand on the top of Tumamoc Hill as the sun rose in the east and the full moon set in the west on the Winter Solstice and see the sudden light -- "sun daggers"-- on petroglyphs mark the changing of the season was a magical and humbling experience. It speaks to the knowledge, skill, and ability of those ancient people as something well worth preserving.</p> <p>Thank you,<br/>Katlin Meadows &amp; Albert Lannon</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/22/2014 | Email  | Katherine Cerino               | Arizona Archaeological and Historical Society | Cultural / Historic resources | <p>First, I am pleased with the Firstnet efforts - this seems like a very sensible idea. The purpose of this note is to bring to your attention the importance archaeologically of Tumamoc Hill in Tucson. The Hill has already been impacted by many towers some of which are no longer in use. I would like to ensure that the development you carry out on the Hill uses the existing disturbed footprint rather than adding to it. The Hill is archaeologically unique in the Tucson Basin in that it has some of the earliest habitation sites dating to 500 BC and some of the earliest pottery in the Basin. It was later used by the Hohokam people who pecked rock art over a great deal of the hill concentrating on the top where developmental impact is greatest. In addition, there are unique prehistoric walls around the hill. It was clearly an important and sacred place in the past and if you go up there today and simply look at the spectacular 380 degree view without even considering the importance of the past it is obviously a special place.</p> <p>Thank you,<br/>Katherine Cerino</p>                                                                                                                                                                                                                                                                                                                                   | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/22/2014 | Email  | Lance Trask                    | Public                                        | Cultural / Historic resources | <p>Dear Sir or Madam;<br/>I applaud the government for coming up with plans to have Wi-Fi available to first responders and an agency to oversee those plans. Communication at the beginning of an event is critical and can make the difference between life and death. It is likely that antennae(s) or repeaters will be considered at a location called Tumamoc Hill. It is ideal because it has a 360 degree view of a considerable portion of Southern Arizona. It is also on the National Register and holds valuable cultural resources. Some disturbances have already occurred on Tumamoc Hill and I urge you to consider placing any equipment in areas already impacted. Access to the top of the hill is via existing roads and these roads should be adequate for transporting and installing the equipment for the proposed Wi-Fi system. Currently the top of the hill is off limits and behind locked gates, so any installed equipment will be fairly well protected.</p> <p>I also urge you to work closely with the archaeological community within the Tucson area as they can provide expertise and work with the agency so it's needs are met and the cultural resources are preserved for the future.</p> <p>Thank you very much,<br/>Lance K. Trask</p>                                                                                                                                                                           | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/22/2014 | Email  | Linda Steljes                  | Public                                        | Cultural / Historic resources | <p>As a historically and archaeologically sensitive area, I am asking that FirstNet help protect the ancient trincheras on Tumamoc Hill by restricting construction to the existing antenna pads, so our first responders can communicate while still allowing Pima County and the University of Arizona to protect this important place of the past. I am a member of Arizona State Parks Site Stewards, and we are all volunteers who devote our time and energy to preserving, monitoring and protecting historical Hohokam and other paleo-Indian sites in Arizona. Human history in the Southwest (and everywhere) is essential to understanding our ancestors and we should all be stewards of the sites that reveal clues to human civilization and how people lived in the past. What may not look important to the untrained eye can hold great significance to our understanding.</p> <p>Thank you for your attention on this matter. We can all work together to preserve and protect our history.</p> <p>Sincerely,<br/>Linda Steljes</p>                                                                                                                                                                                                                                                                                                                                                                                                      | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/22/2014 | Email  | Peggy Wenrick                  | Arizona Site Steward                          | Cultural / Historic resources | <p>I understand how important the project proposed for installation on Tumamoc Hill in Tucson, Arizona is for promoting quick response in emergencies. However, I want to stress the need for careful planning and execution of the project. I am an Arizona Site Steward who regularly monitors the condition of the archeological district elements on Tumamoc. Even after many visits, I am still awed to realize that early peoples created structures and lived in this special space. I request that every effort be made to minimize the footprint of the upcoming work and strongly urge the structure(s) be confined to the antennae pads already existing.</p> <p>Thank you for the opportunity to comment.</p> <p>Peggy Wenrick</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/22/2014 | Email  | Peter J. Baum                  | Public                                        | Cultural / Historic resources | <p>Hello Ms Pereira,<br/>Please accept my fervent plea that any Firstnet access to, and construction on, Tumamoc Hill be done with the utmost sensitivity to the petroglyphs and ruins of Tucson's first public architecture, going back over two thousand years! I've called Tucson home for fifty 50 years and worked downtown for the last 38. I've had the privilege of spending time atop the hill with extraordinary experts Paul and Suzi Fish, as well as fascinating petroglyph experts. I've sadly watched Tumamoc being "loved too much" by looters, and "loved too little" by Pima County's and the University of Arizona's budgetary stinginess. Too much irreversible damage has been done already.</p> <p>Please encourage Firstnet to be extraordinarily sensitive to the unique culture treasures still left on Tumamoc, minimize work to existing pads and overall tread with the lightest footprint possible.</p> <p>Thank you<br/>Peter J. Baum</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/22/2014 | Email  | Robert Wenrick                 | Arizona Site Steward                          | Cultural / Historic resources | <p>I understand how important the project proposed for installation on Tumamoc Hill in Tucson, Arizona is for promoting quick response in emergencies. However, I want to stress the need for careful planning and execution of the project. I am an Arizona Site Steward who regularly monitors the condition of the archeological district elements on Tumamoc. Even after many visits, I am still awed to realize that early peoples created structures and lived in this special space. I request that every effort be made to minimize the footprint of the upcoming work and strongly urge the structure(s) be confined to the antennae pads already existing.</p> <p>Thank you for the opportunity to comment.</p> <p>Robert Wenrick</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |

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| 12/23/2014 | Email  | Denise Waldo           | Pima County Procurement              | Cultural / Historic resources | Please help protect the ancient trincheras on Tumamoc Hill by restricting construction to the existing antenna pads, so our first responders can communicate while still allowing Pima County and the University of Arizona to protect this important place of the past. My husband & I have been involved in a volunteer program to help protect archaeology sites for years. We are lucky in Arizona to have many wonderful & important sites, Tumamoc Hill being one of them. We respectfully ask that you consider the adverse impact your project could have on this site & do all you can to help protect it.<br>Thank you.<br>Denise Waldo, CPPB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/23/2014 | Email  | Fran Maiuri            | Public                               | Cultural / Historic resources | Dear Ms. Amanda Pereira:<br>I am a resident of Tucson, Arizona and I am writing to ask you to minimize the impact on Tumamoc Hill in Tucson, AZ during the construction of the FirstNet communication system. This is an extremely rich Archaeological site, one of the most important in the Tucson area. There is much on the mountain that could still inform us about our early ancestors and those features and artifact should not be disturbed. I understand the value of the FirstNet communication being put in place and support the project as long as the land where current antenna pads exist is used for the work. Please do not disturb any of the rest of this site, the archaeological site and any of the natural features and environment. Let's do this work so that the area where our prehistoric ancestors lived, worked, worshipped and recreated is untouched                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/23/2014 | Email  | Fran Maiuri            | Public                               | Biological Resources          | and where native plants, animals, insects and birds continue to enjoy this natural area within Tucson. What is disturbed cannot be brought back again and will no longer be available as natural habitat and for future research and better understanding of the past.<br>Thank you.<br>Sincerely,<br>Fran Maiuri                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                  |
| 12/23/2014 | Email  | John A. Armstrong      | Public                               | Cultural / Historic resources | Please help preserve areas of archaeological interest on Tumamoc Hill in Tucson, Arizona by limiting construction to existing antenna pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/23/2014 | Email  | Keith Bagwell          | District Five Pima County Supervisor | NOI                           | Ms. Amanda Pereira,<br>Please see the attached letter, submitted on behalf of District Five Pima County Supervisor Richard Elias as comments on activities FirstNet is considering with regard to Tumamoc Hill in Tucson, Arizona. The original letter will be sent to you via postal mail.<br>Yours truly,<br>Keith Bagwell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/23/2014 | Email  | M. Nichols             | Public                               | Cultural / Historic resources | Tumamoc Hill is a critical site of an ancient inhabited area, 10,000 plus years ago, in North America. There is only one other site similar to this one, in Sonora, Mexico. It is imperative that old pads be used for the towers, protecting the areas that have not been disturbed. This site is not only a treasure for the residents of Tucson and the University of Arizona, it is a treasure on the North American Continent. Your help in protecting this site is invaluable and will become an excellent public relations tool as your company expands. Thank you for becoming partners in protecting such a unique and ancient example of early civilization in the Americas.<br>M. Nichols                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/23/2014 | Mail   | Richard Elias          | Pima County Board of Supervisors     | Cultural / Historic resources | Dear Ms. Pereira,<br>It has come to my attention that FirstNet activities might have an impact on Tumamoc Hill, an iconic landmark that towers over the west side of the Tucson metropolitan area, in the Pima County District that I am elected to represent. Tumamoc Hill is a very special place. As a result the Pima County Board of Supervisors, upon which I serve, bought 320 acres of land on and around the hill in 2009 to protect it from development and unsuitable uses. There are now 860 acres of land on and around the hill protected in perpetuity.<br>This hill was inhabited by Native Americans for thousands of years, ancestors of today's Tohono O'odham Nation members, and carries an O'odham name, Tumamoc, which is their word for horned lizard. Remains of their residency and farming on the hill are visible and subject of substantial study.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/23/2014 | Mail   | Richard Elias          | Pima County Board of Supervisors     | Biological Resources          | The Carnegie Foundation established a Desert Botanical Laboratory on Tumamoc Hill in 1903 to study scientifically the unique flora of the Sonoran Desert, and the buildings associated with it are together a National Historic Landmark. A University of Arizona operation since 1960, the laboratory has studied desert flora continuously for longer than any other facility in the world. Its records are priceless.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements.                                                                                                                                      |
| 12/23/2014 | Mail   | Richard Elias          | Pima County Board of Supervisors     | Aesthetics / Recreational Use | Tumamoc's unique shape and urban presence set it off as a unique and special sight for area residents and their visitors. The narrow, winding road up it leading to the laboratory has become a very popular exercise path for thousands of local residents.<br>Tumamoc Hill is a special iconic feature that deserves protection and its many fragile features require careful treatment.<br>Sincerely<br>Richard Elias<br>District Five Pima County Supervisor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/23/2014 | Email  | Sherry Massie          | Public                               | Cultural / Historic resources | Dear Ms. Pereira,<br>I understand that FirstNet is a federal program which will allow first responders all over the U.S. to communicate with each other, as needed, by deploying a new national Wi-Fi network using a reserved public safety broadband range. I think this is a wonderful goal for our nation, but I realize this may also impact a very important historical/archaeological site - the ancient trincheras on Tumamoc Hill in Tucson, AZ. Would you please consider restricting construction to the existing antenna pads so that as little impact as possible occurs to this historic area?<br>Although I have lived in Tucson for 13 years, I only recently visited this site through the auspices of the Arizona Archaeological and Historical Society. I had no idea that there were trincheras there dated to 300 B.C., and that there was evidence of Hohokam settlement dating to 800 A.D. I saw some amazing rock art, as well as evidence of solar markers and alignments.<br>It's an impressive site so close to a major urban area, and one that needs to be preserved for everyone to be able to have to same opportunity as I had to learn and enjoy part of our southwestern legacy.<br>I hope you will be able to complete your Wi-Fi goal as well as helping preserve this important landmark.<br>Thank you for your consideration.<br>Sincerely yours,<br>Sherry Massie | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/24/2014 | Email  | Aaron D. Flesch, Ph.D. | University of Arizona                | Cultural / Historic resources | Dear Ms. Amanda Pereira:<br>It has come my attention that the activities of Firstnet may eventually affect the ecological, social, and cultural values of Tumamoc Hill. Thus, I wanted to write to you to express the value of Tumamoc so that this information can be applied when evaluating the potential impacts of any proposed Firstnet activities on or around Tumamoc.<br>Tumamoc Hill is a National Historic Landmark, a U.S. Archaeological District, and its value to the local, regional, national, and global communities are immense.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |

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| 12/24/2014 | Email  | Aaron D. Flesch, Ph.D. | University of Arizona                                                      | Biological Resources          | As an ecologist that works on the Hill, and as a member of the Tucson community that walks the Hill and helps interpret its natural history and ecology to the public, I can speak specifically about Tumamoc's ecological and social values. In the first decade of the 1900s, some of our nation's first ecologists were tasked with locating a site to study desert plants and placing what would become the US' first ecological research station. At that time when the landscape was largely undeveloped and options for placing the stations nearly unlimited, they considered sites in Arizona, New Mexico, California, and the neighboring Mexican states of Sonora and Chihuahua. In the end, they chose Tumamoc for the site because of its remarkable diversity, exceptional natural qualities, and the fact that the Hill and surroundings included a large number of plant communities for study. Those facts speak to the uniqueness and incredible value of the Hill and the natural vegetation that still covers it. For the next 100 years scientists working on the Hill have made immeasurable contributions to our understanding of how the natural world is structured and how it functions, and those activities continue to this day under the leadership of Director Rosenzweig.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/24/2014 | Email  | Aaron D. Flesch, Ph.D. | University of Arizona                                                      | Aesthetics / Recreational Use | As the surroundings around the Hill have changed over the last 100 years, the values of Tumamoc have grown. Tumamoc sees tens or perhaps hundreds of thousands of visitors each year of all ages and backgrounds. Many of those visitors live in a suburban or urban environment where they have little opportunity to experience the Sonoran Desert in its natural state and to connect with nature on deeper spiritual and aesthetic levels. Those qualities and experiences are offered by Tumamoc because of its close proximity to those populations and the accessibility the University of Arizona and the station's Director have provided. Please consider the remarkable and multifaceted values of Tumamoc Hill and the Desert Laboratory in your plans and proposals related to the FirstNet project. Feel free to contact me at the address below if I can be of help.<br>My regards<br>Aaron D. Flesch, Ph.D.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/24/2014 | Email  | Brian Metcalf          | Public                                                                     | Cultural / Historic resources | Ms. Amanda: I am contacting you regarding the planned update of the communications infrastructure on Tumamoc Hill for first responders. Tumamoc is almost in the heart of Tucson. It is been a protected area of biological research for over a century, contains invaluable archaeological artifacts that are well over 2000 years old. I ask you to please protect those irreplaceable resources for future generations. Please restrict your construction activities to existing antenna pads.<br>Thank you.<br><br>Brian Metcalf                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/24/2014 | Mail   | Courtney Rose, Ph.D.   | Pima County Sustainability and Conservation                                | Cultural / Historic resources | Dear Ms. Pereira:<br>This letter is a response to the request for comments on the proposed undertaking published in the Notice in the Federal Register (Vol. 79, No. 218). Tumamoc Hill has several important federal and state designations. Comprised of some 870 acres, it is an Archaeological District listed in the National Register of Historic Places and the Desert Laboratory was designated a National Historic Landmark in 1965. In 1976, the Desert Laboratory and Tumamoc Hill were together designated a National Environmental Study Area by the Department of Interior, and designated by the State of Arizona as a State Scientific and Educational Natural Area in 1981. Tumamoc Hill is also considered a traditional cultural property and ancestral site to local Tribes.<br>Tumamoc Hill's peak rises to an elevation of 3,108 ft (947 m) above sea level. Located just west of downtown Tucson in T14S, R13E, Sections 9, 10, 16, and 15, the preservation of its cultural and scientific significance is of great importance to the local community and at a national level. Land ownership includes the University of Arizona on behalf of the Board of Regents, Pima County, Arizona State Land Department, and the City of Tucson.<br>Archaeological surveys of Tumamoc Hill began in the 1970s followed by subsequent limited archaeological excavations. Known as Cemamagi Do'ag in O'odham, Tumamoc Hill, archaeological site designated AZ AA-16-5(ASM), is known to have multiple prehistoric occupations that left behind remnants of large rock walls (trincheras), petroglyphs, agricultural fields, pit-houses, and O'odham cemeteries.<br>A recent undertaking on Tumamoc Hill included the consolidation of wireless facilities and replacing several towers with a single communications tower (by the Pima County Wireless Integrative Network (PCWIN) project implemented in 2014). As the construction included consolidation and the dismantling unused buildings, the overall footprint was reduced. State, Federal, and Tribal consultation resulted in a determination of Adverse Effect to the Area of Potential Effect for Direct Effects and for Visual Effects to the Tumamoc Hill Archaeological District. The undertaking licensed by the Federal Communications Commission (FCC) required an Environmental Assessment to fulfill requirements under the National Environmental Policy Act (NEPA) and a Memorandum of Agreement was executed to fulfill Section 106 of the National Historic Preservation Act (NHPA). Mitigation strategies included archaeological data recovery and cultural sensitivity education program in accordance with the Arizona State Historic Preservation Office and the Advisory Council on Historic Preservation. The University of Arizona Tumamoc Hill Cultural Resources Policy and Management Plan (2008) specifies tribal interests in restoring Tumamoc Hill to its former natural condition. | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/24/2014 | Mail   | Courtney Rose, Ph.D.   | Pima County Sustainability and Conservation                                | Cultural / Historic resources | In summary, Tumamoc Hill official designations include:<br>-The Desert Laboratory (comprising 870 acres on Tumamoc Hill) was designated a National Historic Landmark in 1965, and in 1966 was listed in the National Register of Historic Places (National Register No. 66000190). Active biological studies are ongoing on a portion of the hill, which was designated as a National Environmental Study area in 1976 by the U.S. Department of the Interior and designated as an Arizona State Scientific and Educational Natural Area in 1981 by the Arizona State Parks Board.<br>-The same 870 acres comprises the Tumamoc Hill Archaeological District, which was listed in the National Register of Historic Places in 2010.<br>-The Tohono O'odham Nation, the Hopi Tribe, the Pascua Yaqui Tribe, the Gila River Indian Community, the Ak-Chin Indian Community, and the Salt River Pima-Maricopa Indian Community consider Tumamoc Hill an ancestral site of cultural significance.<br>-Should FirstNet propose to include Tumamoc Hill in its network planning, it is critical that the cultural, natural, and scientific significance of this site be considered and impacts to the site be avoided.<br>Sincerely,<br>Courtney Rose, Ph.D., Program Coordinator<br>Pima County Office of Sustainability & Conservation<br>Cultural Resources and Historic Preservation Division                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/24/2014 | Email  | Courtney Rose, Ph.D.   | Pima County Public Works Center, Office of Sustainability and Conservation | NOI                           | Good afternoon:<br>Please see attached document with comments regarding Tumamoc Hill, located in Tucson, Arizona. The letter is a response to a request for comments by the First Responder Network Authority NOI to Prepare Programmatic Environmental Impact Statements and Conduct Scoping for the Nationwide Public Safety Broadband Network [Federal Register/Vol 79/No. 218].<br>Thank you for your consideration.<br>Courtney Rose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/26/2014 | Email  | Steve Long             | Long Realty Company                                                        | Cultural / Historic resources | Thank you Russell! Let me know how I can help.<br>Steve<br><br>On Tue, Dec 16, 2014 at 6:36 AM, Long, Russell <longs@longrealty.com> wrote:<br>To Whom It May Concern,<br><br>Tumamoc Hill has been a fixture in our family since the very early 1900's when our great grandfather, Burton Bovee, began working there. Long before we every visited there and as children our mother told us tales of Burton working there, riding his horse and mule all over the Tucson basin collecting samples and specimens. As adults we became aware of the cultural and historical significance of the site as a result of the approximately 3,000 year old Hohokam Indian village atop the hill as well the historic volcanic stone buildings and their current uses. Certainly Tumamoc Hill is a local and national treasure worthy of preservation. Please feel free to contact me if you would like to discuss this or have questions.<br>Thank you.<br>Russell P. Long, CRB, CLHS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/27/2014 | Email  | Quincy M. Kennedy      | Public                                                                     | Cultural / Historic resources | Thank you for offering to read our comments on the proposed communications towers on Tumamoc Hill. I study archaeology and am intimately aware of the hill's value as a cultural resource. Communication for first responders is very important, but please be careful with the cultural resources up there.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/28/2014 | Email  | Doug Little            | Public                                                                     | Cultural / Historic resources | Please protect the ancient trincheras on Tumamoc Hill by restricting construction to the existing antenna pads, so our first responders can communicate while still allowing Pima County and the University of Arizona to protect this important place of the past.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/28/2014 | Email  | Larry Venable          | University of Arizona                                                      | Cultural / Historic resources | I am writing to explain to you the high cultural, historic and ecological value of Tumamoc, a research station of the University of Arizona in Tucson. This property is sacred to 5 southwestern native American tribes, with human constructions dating back at least 2,000 years.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |

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| 12/28/2014 | Email            | Larry Venable      | University of Arizona                          | Biological Resources          | <p>Since 1903 it has been an ecological research station, first of the Carnegie Institute of Washington, now of the University of Arizona. Important work in the history of ecology was and is conducted here. Some ongoing long-term ecological projects have been running for over 100 years and the data has been recently archived at Ecological Archives, Ecological Society of America. There are over 20 ongoing ecological projects, some funded by the National Science Foundation.</p> <p>I invite you to please join us in preserving and enhancing this wonderful long-standing resource.</p> <p>Larry Venable</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/28/2014 | Email            | Marilyn Guida      | Public                                         | Cultural / Historic resources | <p>Dear Ms Amanda Pereira,</p> <p>I write to urge that the FirstNet need for access to Tumamoc Hill in Tucson, Arizona will contribute to preservation of the cultural, archaeological and biological resources of the area by making use of the existing pads for the antennas, transmitters, and other equipment needed by FirstNet.</p> <p>This is an area of cultural significance to the Tohono O'odham Tribe from the 15th Century to modern times. It also contains evidence of occupation from the Early Agricultural Period of the indigenous people as far back as 2,000 years ago as well as the Hohokam people circa A.D. 800 (1100 years ago). This length of human occupation is highly significant and an important reason why modern construction in this area should not be expanded. The University of Arizona currently manages many currently active research projects into the cultural and biological resources of this area. This is an additional reason why expansion of present areas impacted construction should not be allowed.</p> <p>Perhaps most important of all is the impact to the Tohono O'odham people who have used this area for at least five centuries and continue to use it today. As the first Americans, we should respect their longstanding rights to use of Tumamoc Hill as our first priority.</p> <p>Thank you for considering this plea,</p> <p>Marilyn Guida</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/28/2014 | Email            | Michael Rosenzweig | University of Arizona                          | Cultural / Historic resources | <p>Dear Ms Pereira,</p> <p>I have more to add to the FirstNet scoping process.</p> <p>As I promised, I have tracked down and am sending a number of documents relating to Tumamoc Hill. Eight pdf files are attached. (There could have been more if there had been more time.)</p> <p>The files include:</p> <p>** three from county documents of November 2007. One of these contains comments of US Rep Raúl M. Grijalva, as well as the strong point made by Dr. Ned Norris Jr. (Chairman of the Tohono O'odham Nation), i.e., that Tumamoc has spiritual significance to the Nation and other tribes. (By the way, Pima County, in early 2009, did buy the land mentioned in the discussions. I have a video of the auction.)</p> <p>** three from The University of Arizona management plan for Tumamoc. These cover the 2007 plan of the City of Tucson, acknowledgment of the importance of the Hill to native tribes, and restrictions on lessees to prevent further degradation of the Hill.</p> <p>** an excerpt from an Island Press book about restoration ecology, acknowledging that Tumamoc Hill originated this crucial part of environmental conservation.</p> <p>** an excerpt from a recent newsletter of the University's Dept of Ecology &amp; Evolutionary Biology.</p> <p>Thank you again for the care you have taken to learn about our area in preparation for FirstNet planning.</p> <p>Sincerely,</p> <p>Michael Rosenzweig<br/>Director, Tumamoc: People &amp; Habitats<br/>University of Arizona Tucson</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/29/2014 | Email Attachment | Ann McPherson      | U.S. Environmental Protection Agency Region IX | NOI                           | <p>Dear Ms. Pereira :</p> <p>The U.S. Environmental Protection Agency has reviewed the November 12, 2014 Notice of Intent to prepare Programmatic Environmental Impact Statements and Conduct Scoping for the Nationwide Public Safety Broadband Network. Our comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508) and § 309 of the Clean Air Act.</p> <p>To assist in the scoping process for this project, we have identified several issues for your attention in the preparation of the Western regional EIS. We are most concerned about the following issues: impacts to water and air, impacts to biological resources, invasive species management, and habitat protection.</p> <p>We appreciate the opportunity to review this NOI and are available to discuss our comments. Please send one hard copy of the Draft PEIS and one CD ROM copy to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please contact me at (415) 972-3545, or contact Scott Sysum, the lead reviewer for this project. Scott can be reached at (415) 972- 3742 or sysum.scott@epa.gov.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/29/2014 | Email Attachment | Ann McPherson      | U.S. Environmental Protection Agency Region IX | Purpose and Need              | <p>US EPA DETAILED COMMENTS ON THE NOTICE OF INTENT TO PREPARE PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENTS AND CONDUCT SCOPING FOR THE NATIONWIDE PUBLIC SAFETY BROADBAND NETWORK, DECEMBER 29, 2014</p> <p>Statement of Purpose and Need</p> <p>The Draft Programmatic Environmental Impact Statement should clearly identify the underlying purpose and need to which the First Responder Network Authority is responding in proposing the alternatives (40 CFR 1502.13). The purpose of the proposed action is typically the specific objectives of the activity, while the need for the proposed action may be to eliminate a broader underlying problem or take advantage of an opportunity.</p> <p>Recommendation:</p> <p>The purpose and need should be a clear, objective statement of the rationale for the proposed project.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.                                                                                                                                                                        |
| 12/29/2014 | Email Attachment | Ann McPherson      | U.S. Environmental Protection Agency Region IX | Alternatives                  | <p>Alternatives Analysis</p> <p>The National Environmental Policy Act requires evaluation of reasonable alternatives, including those that may not be within the jurisdiction of the lead agency (40 CFR Section 1502.14(c)). A robust range of alternatives will include options for avoiding significant environmental impacts. The DPEIS should provide a clear discussion of the reasons for the elimination of alternatives which are not evaluated in detail. Alternative network routes, including buried or aerial options, as well as environmentally preferable routes, should be evaluated. The DPEIS should also evaluate alternative configurations for access roads.</p> <p>The alternatives analysis should describe the approach used to identify the alternative routes and the criteria used to select the different routes.</p> <p>The environmental impacts of the proposed action and alternatives should be presented in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14). The potential environmental impacts of each alternative should be quantified to the greatest extent possible (e.g., acres of forest impacted, tons per year of emissions produced).</p> <p>Recommendations:</p> <p>The DPEIS should describe how each alternative was developed, how it addresses each project objective, and how it will be implemented. The DPEIS should describe the methodology and criteria used for determining the network route and alternative routes. The alternatives analysis should include a discussion of environmentally preferable options for the network, including the use of underground cables versus overhead wires; alternative configurations for access roads; and alternative methods of construction, such as using heavy lift helicopters to transport and set cell towers.</p> <p>The DPEIS should clearly describe the rationale used to determine whether impacts of an alternative are significant or not. Thresholds of significance should be determined by considering the context and intensity of an action and its effects (40 CFR 1508.27).</p> | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.                                                                                                                                                                        |

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| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Water Resources      | <p>Water Resources</p> <p>Geographic Extent of Waters of the United States<br/>The project applicant should coordinate with the U.S. Army Corps of Engineers to determine if the proposed project requires a Section 404 permit under the Clean Water Act. Section 404 regulates the discharge of dredged or fill material into waters of the United States (WUS), including wetlands and other special aquatic sites. The DPEIS should describe all WUS that could be affected by the project alternatives, and include maps that clearly identify all waters within the project area. A jurisdictional delineation will confirm the presence or absence of WUS in the project area and help determine whether or not the proposed project would require a Section 404 permit.</p> <p>Recommendation:<br/>The DPEIS should discuss the potential that WUS could be affected and that consultation with the USACE may be required to determine if there are jurisdictional WUS present at individual project sites.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |
|            |                  |               |                                                |                      | <p>Drainages, Ephemeral Washes, and Floodplains<br/>Natural washes perform a diversity of hydrologic, biochemical, and geochemical functions that directly affect the integrity and functional condition of higher-order waters downstream. Healthy ephemeral waters with characteristic plant communities control rates of sediment deposition and dissipate the energy associated with flood flows. Ephemeral washes also provide habitat for breeding, shelter, foraging, and movement of wildlife. Many plant populations are dependent on these aquatic ecosystems and adapted to their unique conditions. The potential damage that could result from disturbance of flat-bottomed washes includes alterations to the hydrological functions that natural channels provide in arid ecosystems, such as adequate capacity for flood control, energy dissipation, and sediment movement; as well as impacts to valuable habitat for desert species.</p> <p>Recommendations:<br/>The DPEIS should discuss the potential that individual projects may impact aquatic features that are determined not to constitute WUS, and discuss potential mitigation.<br/>The DPEIS should address the potential effects of project discharges, if any, on surface water quality.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                           |
| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Biological Resources | <p>Biological Resources, Habitat and Wildlife</p> <p>The DPEIS should identify all petitioned and listed threatened and endangered species and critical habitat that might occur within individual project areas. The document should identify and quantify which species or critical habitat might be directly, indirectly, or cumulatively affected by each alternative and mitigate impacts to these species. Emphasis should be placed on the protection and recovery of species due to their status or potential status under the federal or state Endangered Species Act. Network line rights of way are anthropogenic disturbances which alter the spatial structure of habitat elements, creating linear patches or line corridors which in turn impact ecological integrity by modifying ecological processes (abiotic &amp; biotic) at various scales. Network line ROWs can result in habitat fragmentation and increased habitat edge effects, affecting individual species with different intensity.</p> <p>Recommendations:<br/>The DPEIS should discuss how the proposed action would comply with ESA requirements, including any necessary ESA Section 7 consultation efforts with the U.S. Fish and Wildlife Service.<br/>EPA recommends that FirstNet coordinate with USFWS field offices and with applicable state biological resource management agencies to ensure that current and consistent surveying, monitoring, and reporting protocols will be applied in protection and mitigation efforts.</p> <p>The DPEIS should describe the potential for habitat fragmentation and obstructions for wildlife movement from the construction of individual projects and other projects in the area.</p> <p>Discuss the need for monitoring, mitigation, and if applicable, translocation management plans for the sensitive biological resources. This could include, but is not limited to, a Bird and Bat Conservation Strategy, a Raven Monitoring, Management, and Control Plan, and Special - Status Plant Impact Avoidance and Mitigation Plan.</p> <p>The DPEIS should include assurances that the design of the aerial lines would be in compliance with current standards and practices that reduce the potential for raptor fatalities and injuries.</p>                                                                                                                                                                                                                                                                                                                          | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |
| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Biological Resources | <p>The EPA is also concerned about the potential impacts of construction, installation, and maintenance activities (grading, filling) on habitat. We encourage the use of alternatives that avoid and protect high value habitat and create or preserve linkages between habitat areas. We are also concerned with management of the ROW, specifically vegetation control, in order to prevent natural forest succession. ROW management is usually practiced to protect the system from windfall, contact with trees and branches, and other potential hazards. Additionally access roads are maintained in order to ensure access for maintenance and upkeep of the system components.</p> <p>Recommendations:<br/>The DPEIS should describe potential impacts from construction, installation, and maintenance activities on habitat and threatened and endangered species.</p> <p>The DPEIS should describe the ROW vegetation management techniques to be used and potential associated environmental impacts, especially if mechanical methods or herbicides are to be used.</p> <p>The DPEIS should indicate the location of important wildlife habitat areas. The DPEIS should describe what measures will be taken to protect important wildlife habitat areas and to preserve linkages between them.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |
|            |                  |               |                                                |                      | <p>Invasive Species</p> <p>Human actions are the primary means of invasive species introductions. The construction of network lines may cause disturbance of ROW soils and vegetation through the movement of people and vehicles along the ROW, access roads, and laydown areas. These activities can contribute to the spread of invasive species. Parts of plants, seeds, and root stocks can contaminate construction equipment and essentially "seed" invasive species wherever the vehicle travels. Invasive species infestations can also occur during periodic buried/aerial line ROW maintenance activities especially if these activities include mowing and clearing of vegetation. Once introduced, invasive species will likely spread and impact adjacent properties with the appropriate habitat.</p> <p>Executive Order 13112, Invasive Species (February 3, 1999), mandates that federal agencies take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. Executive Order 13112 also calls for the restoration of native plants and tree species. If the proposed project will entail new landscaping, the DPEIS should describe how the project will meet the requirements of Executive Order 13112.</p> <p>In addition, we encourage alternative management practices that limit herbicide use, focusing instead on other methods to limit invasive species vegetation and decrease fire risk.</p> <p>Recommendations:<br/>The DPEIS should describe the invasive plant management plan used to monitor and control noxious weeds. Herbicides or pesticides will be used to manage vegetation, the DPEIS should disclose the projected quantities and types of chemicals. The invasive plant management plan should identify methods that can be used to limit the introduction and spread of invasive species during and post-construction. These measures can include marking and avoidance of invasive species, timing construction activities during periods that would minimize their spread, proper cleaning of equipment, and proper disposal of woody material removed from the ROW.</p> <p>Because construction measures may not be completely effective in controlling the introduction and spread of invasives, the DPEIS should describe post-construction activities that will be required such as surveying for invasive species following restoration of the construction site and measures that will be taken if infestations are found.</p> |                                                                                                                                                           |

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| Date Rec'd | Format           | Name          | Organization                                   | Topic          | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Response                                                                                                                                                         |
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| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Air Quality    | <p>Air Quality</p> <p>The DPEIS should provide a discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards, criteria pollutant nonattainment areas, and potential air quality impacts. The DPEIS should describe and estimate air emissions from potential construction and maintenance activities, as well as proposed mitigation measures to minimize those emissions. The EPA recommends an evaluation of the following measures to reduce emissions of criteria air pollutants and hazardous air pollutants (air toxics).</p> <p>Recommendations:</p> <ul style="list-style-type: none"> <li>• Existing Conditions - The DPEIS should provide a detailed discussion of ambient air conditions, NAAQS, and criteria pollutant nonattainment areas in the vicinity of the project.</li> <li>• Quantify Emissions - The DPEIS should estimate emissions of criteria pollutants and green house gasses from the proposed individual projects and discuss the timeframe for release of these emissions over the lifespan of the projects. The DPEIS should describe and estimate emissions from potential construction activities, as well as proposed mitigation measures to minimize these emissions.</li> <li>• Specify Emission Sources - The DPEIS should specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance. This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention.</li> <li>• Construction Emissions Mitigation Plan -The DPEIS should include a draft Construction Emissions Mitigation Plan and ultimately adopt this plan in the Record of Decision. In addition to all applicable local, state, or federal requirements, we recommend the following control measures (Fugitive Dust, Mobile and Stationary Source and Administrative) be included in the Construction Emissions Mitigation Plan in order to reduce impacts associated with emissions of particulate matter and other toxics from construction-related activities:</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.</p> |
|            |                  |               |                                                |                | <ul style="list-style-type: none"> <li>o Fugitive Dust: Source Controls: The DPEIS should identify the need for a Fugitive Dust Control Plan to reduce Particulate Matter 10 and Fine Particulate Matter 2.5 emissions during construction and operations. We recommend that the plan include these general commitments:</li> <li>• Stabilize heavily used unpaved construction roads with a non-toxic soil stabilizer or soil weighting agent that will not result in loss of vegetation, or increase other environmental impacts.</li> <li>• During grading, use water, as necessary, on disturbed areas in construction sites to control visible plumes.</li> <li>• Vehicle Speed</li> <li>• Limit speeds to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.</li> <li>• Limit speeds to 10 miles per hour or less on unpaved areas within construction sites on un-stabilized (and unpaved) roads.</li> <li>• Post visible speed limit signs at construction site entrances.</li> <li>• Inspect and wash construction equipment vehicle tires, as necessary, so they are free of dirt before entering paved roadways, if applicable.</li> <li>• Provide gravel ramps of at least 20 feet in length at tire washing/cleaning stations, and ensure construction vehicles exit construction sites through treated entrance roadways, unless an alternative route has been approved by appropriate lead agencies, if applicable.</li> <li>• Use sandbags or equivalent effective measures to prevent run-off to roadways in construction areas adjacent to paved roadways. Ensure consistency with the project's Storm Water Pollution Prevention Plan, if such a plan is required for the project.</li> <li>• Sweep the first 500 feet of paved roads exiting construction sites, other unpaved roads en route from the construction site, or construction staging areas whenever dirt or runoff from construction activity is visible on paved roads, or at least twice daily (less during periods of precipitation).</li> <li>• Stabilize disturbed soils (after active construction activities are completed) with a non-toxic soil stabilizer, soil weighting agent, or other approved soil stabilizing method.</li> <li>• Cover or treat soil storage piles with appropriate dust suppressant compounds and disturbed areas that remain inactive for longer than 10 days. Provide vehicles (used to transport solid bulk material on public roadways and that have potential to cause visible emissions) with covers. Alternatively, sufficiently wet and load materials onto the trucks in a manner to provide at least one foot of freeboard.</li> <li>• Use wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) where soils are disturbed in construction, access and maintenance routes, and materials stock pile areas. Keep related windbreaks in place until the soil is stabilized or permanently covered with vegetation.</li> </ul> | <p>The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.</p> |
|            |                  |               |                                                |                | <ul style="list-style-type: none"> <li>o Mobile and Stationary Source Controls:</li> <li>• If practicable, lease new, clean equipment meeting the most stringent of applicable Federal 1 or State Standards.2 In general, commit to the best available emissions control technology. Tier 4 engines should be used for project construction equipment to the maximum extent feasible.3</li> <li>• Where Tier 4 engines are not available, use construction diesel engines with a rating of 50 hp or higher that meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines,4 unless such engines are not available.</li> <li>• Where Tier 3 engine is not available for off-road equipment larger than 100 hp, use a Tier 2 engine, or an engine equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides and diesel particulate matter to no more than Tier 2 levels.</li> <li>• Consider using electric vehicles, natural gas, biodiesel, or other alternative fuels during construction and operation phases to reduce the project's criteria and greenhouse gas emissions.</li> <li>• Plan construction scheduling to minimize vehicle trips.</li> <li>• Limit idling of heavy equipment to less than 5 minutes and verify through unscheduled inspections.</li> <li>• Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, prevent tampering, and conduct unscheduled inspections to ensure these measures are followed.</li> <li>o Administrative controls:</li> <li>• Develop a construction traffic and parking management plan that maintains traffic flow and plan construction to minimize vehicle trips.</li> <li>• Identify any sensitive receptors in the project area, such as children, elderly, and the infirm, and specify the means by which impacts to these populations will be minimized (e.g. locate construction equipment and staging zones away from sensitive receptors and building air intakes).</li> <li>• Include provisions for monitoring fugitive dust in the fugitive dust control plan and initiate increased mitigation measures to abate any visible dust plumes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.</p> |
| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Infrastructure | <p>Hardening of Infrastructure</p> <p>We understand that FirstNet will likely utilize existing commercial infrastructure to the maximum extent possible in its deployment of the Public Safety Broadband Network. Most likely, existing cellular towers, transport backhaul and data centers will need to be hardened to meet the stringent requirements of the PSBN. Hardening typically includes back up power supply, incorporating backhaul that is not easily disrupted (microwave or satellite), and stockpiling portable sites (Cell on Light Trucks or Cell on Wheels). Some of the larger cell phone companies have been hardening their infrastructure in disaster prone areas.</p> <p>Recommendation:</p> <p>The DPEIS should discuss the need for hardening sites, the use of portable equipment and the need for redundant or alternative backhaul equipment. FirstNet should commit to using as much commercially available equipment as possible and consider using as much renewable energy sources for backup power as is economically feasible.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <p>The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.</p> |
| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Climate Change | <p>Climate Change</p> <p>Scientific evidence supports the concern that continued increases in greenhouse gas emissions resulting from human activities will contribute to climate change. Global warming is caused by emissions of carbon dioxide and other heat-trapping gases. On December 7, 2009, the EPA determined that emissions of GHGs contribute to air pollution that "endangers public health and welfare" within the meaning of the Clean Air Act. One report indicates that observed changes in temperature, sea level, precipitation regime, fire frequency, and agricultural and ecological systems reveal that parts of the western United States is already experiencing the measurable effects of climate change. 5 The report indicates that climate change could result in the following changes: poor air quality; more severe heat; increased wildfires; shifting vegetation; declining forest productivity; decreased spring snowpack; water shortages; a potential reduction in hydropower; a loss in winter recreation; agricultural damages from heat, pests, pathogens, and weeds; and rising sea levels resulting in shrinking beaches and increased coastal floods.</p> <p>Recommendation:</p> <p>The DPEIS should consider how climate change could potentially influence the proposed project, specifically within sensitive areas, and assess how the projected impacts could be exacerbated by climate change.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <p>The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.</p> |

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| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Waste                           | <p>Hazardous Materials/Hazardous Waste/Solid Waste</p> <p>The DPEIS should address potential direct, indirect and cumulative impacts of hazardous waste from construction and operation of the proposed individual projects and facilities. The document should identify projected hazardous waste types and volumes, and expected storage, disposal, and management plans. It should address the applicability of state and federal hazardous waste requirements. Appropriate mitigation should be evaluated, including measures to minimize the generation of hazardous waste (i.e., hazardous waste minimization). Alternate industrial processes using less toxic materials should be evaluated as mitigation since such processes could reduce the volume or toxicity of hazardous materials requiring management and disposal as hazardous waste.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |
| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Cumulative and Indirect Impacts | <p>Cumulative and Indirect Impacts</p> <p>The cumulative impacts analysis should identify how resources, ecosystems, and communities in the vicinity of the project have already been, or will be, affected by past, present, or future activities in the project area. These resources should be characterized in terms of their response to change and capacity to withstand stresses. Trends data should be used to establish a baseline for the affected resources, to evaluate the significance of historical degradation, and to predict the environmental effects of the project components.</p> <p>For the cumulative impacts assessment, we recommend focusing on resources of concern or resources that are "at risk" and/or are significantly impacted by the proposed project, before mitigation. The EPA supports a regional assessment of the potential cumulative effects of other projects in the area to a range of resources, including aquatic, biological, and cultural resources. These findings should help inform current and future development proposed in the region.</p> <p>The EPA assisted in the preparation of a guidance document for assessing cumulative impacts in California that we find to be very useful. While this guidance was prepared for transportation projects in California, the principles and the 8-step process outlined therein can be applied to other types of projects and offers a systematic way to analyze cumulative impacts for a project. The guidance is available at: <a href="http://www.dot.ca.gov/ser/cumulative_guidance/purpose.htm">http://www.dot.ca.gov/ser/cumulative_guidance/purpose.htm</a>. In accordance with this guidance, the EPA recommends that the DPEIS identify which resources are analyzed, which ones are not, and why. For each resource analyzed, the DPEIS should:</p> <ul style="list-style-type: none"> <li>• Identify the current condition of the resource as a measure of past impacts. For example, the percentage of species habitat lost to date.</li> <li>• Identify the trend in the condition of the resource as a measure of present impacts. For example, the health of the resource is improving, declining, or in stasis.</li> <li>• Identify all on-going, planned, and reasonably foreseeable projects in the study area that may contribute to cumulative impacts.</li> <li>• Identify the future condition of the resource based on an analysis of impacts from reasonably foreseeable projects or actions added to existing conditions and current trends.</li> <li>• Assess the cumulative impacts contribution of the proposed alternatives to the long-term health of the resource, and provide a specific measure for the projected impact from the proposed alternatives.</li> <li>• When cumulative impacts are identified for a resource, mitigation should be proposed.</li> <li>• Disclose the parties that would be responsible for avoiding, minimizing, and mitigating those adverse impacts.</li> <li>• Identify opportunities to avoid and minimize impacts, including working with other entities.</li> </ul> <p>Recommendations:<br/>The DPEIS should consider the cumulative impacts associated with other development projects proposed in the individual project areas and the potential impacts on various resources including: water supply, endangered species, and habitat.</p> | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |
| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Cultural / Historic resources   | <p>Coordination with Tribal Governments</p> <p>Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000), was issued in order to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Indian tribes.</p> <p>Recommendation:<br/>The DPEIS should describe the process and outcome of government-to-government consultation between FirstNet and each of the tribal governments within the individual project areas, issues that were raised (if any), and how those issues were addressed in the selection of the proposed alternative.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |
|            |                  |               |                                                |                                 | <p>National Historic Preservation Act and Executive Order 13007</p> <p>Consultation for tribal cultural resources is required under Section 106 of the National Historic Preservation Act. Historic properties under the NHPA are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register. Section 106 of the NHPA requires a federal agency, upon determining that activities under its control could affect historic properties, consult with the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer. Under NEPA, any impacts to tribal, cultural, or other treaty resources must be discussed and mitigated. Section 106 of the NHPA requires that Federal agencies consider the effects of their actions on cultural resources, following regulation in 36 CFR 800.</p> <p>Executive Order 13007, Indian Sacred Sites (May 24, 1996), requires federal land managing agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian Religious practitioners, and to avoid adversely affecting the physical integrity, accessibility, or use of sacred sites. It is important to note that a sacred site may not meet the National Register criteria for a historic property and that, conversely, a historic property may not meet the criteria for a sacred site.</p> <p>Recommendation:<br/>The DPEIS should address the existence of Indian sacred sites in the individual project areas. It should address Executive Order 13007, distinguish it from Section 106 of the NHPA, and discuss how FirstNet will avoid adversely affecting the physical integrity, accessibility, or use of sacred sites, if they exist. The DPEIS should provide a summary of all coordination with Tribes and with the SHPO/THPO (if any), including identification of NRHP eligible sites, and development of a Cultural Resource Management Plan.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |
| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Environmental Justice           | <p>Environmental Justice and Impacted Communities</p> <p>Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994) and the Interagency Memorandum of Understanding on Environmental Justice (August 4, 2011) direct federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations, allowing those populations a meaningful opportunity to participate in the decision-making process.</p> <p>Guidance by CEQ clarifies the terms low-income and minority population (which includes Native Americans) and describes the factors to consider when evaluating disproportionately high and adverse human health effects.</p> <p>Recommendations:<br/>The DPEIS should discuss the potential need to evaluate environmental justice populations within the geographic scope of the individual projects. If such populations exist, the DPEIS should discuss the potential for disproportionate adverse impacts to minority and low-income populations, and the approaches used to foster public participation by these populations. Assessment of the projects impact on minority and low-income populations should reflect coordination with those affected populations.</p> <p>The DPEIS should discuss the potential need to provide outreach to all communities that could be affected by the individual projects.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |
| 12/29/2014 | Email Attachment | Ann McPherson | U.S. Environmental Protection Agency Region IX | Land Use                        | <p>Coordination with Land Use Planning Activities</p> <p>The DPEIS should discuss how the proposed action would support or conflict with the objectives of federal, state, tribal or local land use plans, policies and controls in the individual project areas. The term "land use plans" includes all types of formally adopted documents for land use planning, conservation, zoning and related regulatory requirements. Proposed plans not yet developed should also be addressed if they have been formally proposed by the appropriate government body in a written form (CEQ's Forty Questions, #23b).</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders. |

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| 12/29/2014 | Email Attachment | Ann McPherson    | U.S. Environmental Protection Agency Region IX | Public Health and Safety      | <p>Public Health and Safety - Valley Fever</p> <p>Coccidioidomycosis, (kok-sid-oy-doh-my-KOH-sis), or Valley Fever, is a fungal infection that is almost always acquired from the environment via the inhalation of fungal spores. It can affect humans, many species of mammals and some reptiles .7 The fungus, Coccidioides, is endemic in the soil of the southwestern United States, Mexico, and parts of Central and South America. Coccidioides can live for long periods of time in soil under harsh environmental conditions including heat, cold, and drought; 8 Coccidioides can be released into the air when soil containing the fungus is disturbed, either by strong winds or activities such as farming or construction. Distribution of the fungus is typically patchy, but in some "hot spots," up to 70% of the human population has been infected. The number of reported Valley Fever cases in the U.S. has risen from less than 5,000 in 2001 to more than 20,000 cases in 2011.9 An estimated 150,000 more cases go undiagnosed every year. The majority of reported cases are located in Arizona and California. 10 The reason for the recent increase in cases, however, is unclear. Dust storms in endemic areas are often followed by outbreaks of coccidioidomycosis. If the dust storms are severe, the fungal spores can be carried outside the endemic area into neighboring counties, where outbreaks follow. According to the Centers for Disease Control and Prevention, workers engaged in soil-disturbing activities in endemic areas should be considered at risk for the disease. 12 Occupational groups at risk include farmers, agricultural workers, construction workers and archaeologists. Some groups of people appear to be at increased risk for disseminated disease and can become seriously ill when infected. People at risk for severe disease include those with weakened immune systems, persons with cancer or who are on chemotherapy, or persons who are HIV-infected. Also at higher risk for serious illness are the elderly, persons of African or Filipino descent, and women in the third trimester of pregnancy. Recommendations: The EPA recommends that the DPEIS discuss potential exposures to the fungus, Coccidioides, and susceptibilities of workers and nearby residents to Valley Fever due to soil-disturbing activities of the project. The Environmental Awareness Program for the workers should include training on the health hazards of Valley Fever, how it is contracted, what symptoms to look for, proper work procedures, how to use personal protective equipment, the need to wash prior to eating, smoking or drinking and at the end of the shift, and the need to inform the supervisor of suspected symptoms of work-related Valley Fever. The training should identify those groups of individuals most at risk and urge individuals to seek prompt medical treatment if Valley Fever symptoms (flu-like illness with cough, fever, chest pain, headache, muscle aches, and tiredness) develop.</p> | The Programmatic Environmental Impact Statements will comply with all requirements under NEPA and other relevant laws, regulations, and Executive Orders.                                                                                                                                                                        |
| 12/29/2014 | Mail             | Diana Rhoades    | Public                                         | Cultural / Historic resources | <p>Dear Ms. Pereira,</p> <p>Tumamoc Hill is a sacred place. It is on the National Register of Historic Places. It is a landmark, it is a University research station, studying plants and the changes in climate since 1903. It is a national archeological district, a burial ground for Native American People. It was an early trading post for the First People. It is rich in natural and cultural history. It should not be a place where the government places large towers or builds huge power lines. I hope you will carefully consider all the implications of FirstNet.</p> <p>All my best</p> <p>Diana Rhoades</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/29/2014 | Email            | Doug Gann, Ph.D. | Archaeology Southwest                          | Cultural / Historic resources | <p>Dear Firstnet</p> <p>I am writing in support of what I understand will be a new installation for our first responders on top of Tumamoc Hill in Tucson Arizona.</p> <p>I would like to offer the suggestion that Firstnet keep any new construction to areas of this hilltop that have already been disturbed by previous construction activities.</p> <p>We have known Tumamoc was an important archaeological site for 100 years, but it has only been in the past 10 years that the evidence has been understood in proper contexts. The ancient homes built on Tumamoc were constructed at the beginning of what we now know of as the ancient southwest culture area. The Cliff Dwellings in Mesa Verde, the stunning buildings of Chaco Canyon, the 5 story adobe Casa Grande, all of these places were built by a people who apparently got their start 4000 years ago, along the Santa Cruz River, where modern Tucson sits today.</p> <p>Though partially disturbed, the village on top of Tumamoc still contains evidence about how this pan-Southwestern culture began. What has not been destroyed should be preserved when ever possible.</p> <p>I think everyone in the archaeological community believes that your project needs to be supported, our community's safety has to come first. However, if new construction can be steered away from archaeologically critical areas, we also believe that we can achieve a win-win scenario here.</p> <p>Best Wishes,</p> <p>Doug Gann, Ph.D.</p> <p>Preservation Archaeologist</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 12/29/2014 | Email            | Scott Sysum      | U.S. Environmental Protection Agency Region IX | NOI                           | <p>Dear Ms. Pereira</p> <p>I have been assigned as the lead reviewer for the U.S. EPA Region 9 for the FirstNet National Public Safety Broadband Network PEIS Project. I have attached a pdf file of our scoping comment letter regarding this project. The signed letter was mailed today to Ms. Amanda Pereira.</p> <p>Thank you for providing us the opportunity to review this interesting project. Please feel free to contact us if you have any questions, seek clarifications or if we can help in any other way.</p> <p>v/r</p> <p>Scott Sysum</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 12/30/2014 | Email Attachment | ph7890@aol.com   | Public                                         | Alternatives                  | <p>The FirstNet Dilemma</p> <p>In order for FirstNet to succeed, it must provide broadband wireless service to public safety users for less than market rates. In addition, the FirstNet infrastructure must be more robust and more resilient than commercial wireless networks. The only way for FirstNet to achieve both of these goals is to leverage excess Nationwide Public Safety Broadband Network (NPSBN) capacity to create a revenue stream that subsidizes public safety user recurring monthly fees to the point that no commercial operator can undercut them.</p> <p>If the recurring monthly fees charged to public safety users by FirstNet is not significantly lower than commercial wireless rates, the commercial networks will likely simply lower their rates for public safety subscribers to undercut and undermine FirstNet. Financially strapped localities will likely choose the less expensive commercial network rather than subscribe to FirstNet, despite the fact that FirstNet will offer priority access to a more robust network. If such a scenario plays out, FirstNet will fail.</p> <p>Rather than becoming a customer of commercial wireless network operators, public safety should leverage the excess capacity in the NPSBN so that commercial operators and other secondary users become FirstNet customers, not vice versa. If Public Safety does not control the network, it will never achieve its goal of unrestricted priority access to broadband wireless, supported by a public safety grade (bulletproof) network infrastructure.</p> <p>One way to address the FirstNet Dilemma is for FirstNet to petition the FCC to issue an Order that would require all new 700MHz broadband wireless subscriber devices be capable of accessing FirstNet spectrum (Band 14). This single regulatory action would create an immediate market for FirstNet spectrum, even in the absence of a deployed network. By creating an environment that ensures that band 14 capable devices become ubiquitous, the FCC Order would increase the value of FirstNet spectrum to potential lessees, enabling FirstNet to generate a revenue stream prior to the deployment of the NPSBN simply by leasing the spectrum until the NPSBN is ready to deploy in a given locale. In addition, the FCC Order would ensure the availability of band 14 devices and substantially lower their cost to public safety users when the NPSBN is deployed.</p> <p>Every day that FirstNet spectrum lays fallow is a lost opportunity to generate revenue that could help fund NPSBN construction, deployment and ongoing operating expenses. Once the NPSBN is deployed, FirstNet (or the designated local network operator) could continue to lease excess NPSBN capacity to secondary users through a public private partnership, thus reducing public safety user recurring user recurring monthly fees to a level far below commercial market rates, whilst encouraging public safety network participation and discouraging potential competitors.</p>              | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |



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| Date Rec'd | Format | Name                           | Organization          | Topic                         | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Response                                                                                                                                                                                                                                                                                                                         |
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| 12/31/2014 | Email  | Patricia A. Gilman, Ph.D., RPA | University of Arizona | Cultural / Historic resources | <p>Ms. Pereira,</p> <p>I am writing in support of the idea that FirstNet use the existing antenna pads on Tumamoc Hill in Tucson. The entire top and sides of the hill are an archaeological site that is very important in the history of Tucson. It has hundreds of rock-ringed houses that are about 2000 years old along with petroglyphs and a very early community building. For an archaeologist like me, it is a very cool site because it has told us about the lives of people living at this time in the Tucson Basin. The site is unique, by the way. There are no others like it, which suggests its importance. Most of the site has not been excavated, and so there is much more we could learn here. But the most important thing is to preserve the site for the future so that others, both the public and archaeologists, can appreciate the lives of these people.</p> <p>Please do the right thing for the history of Tucson and use only the existing antenna pads. That way, everyone gets what they want and need.</p> <p>Thank you for your attention to this.<br/>Patricia A. Gilman, Ph.D., RPA</p> | FirstNet does not yet have a network design, however we will work to avoid adverse impacts to sensitive resources wherever possible. Once specific projects are identified, FirstNet will work with the appropriate federal, state, and local agencies, and federally-recognized Indian tribes, to comply with all requirements. |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Aesthetics / Recreational Use | <p>Dear Amanda,</p> <p>Mike Rosenzweig, my boss at Tumamoc: People and Habitats, asked me to comment on my perspective on Tumamoc Hill. I have been artist-in-residence there since 2011. You can see a more of what I've done there on my blog: <a href="http://TumamocSketchbook.com">http://TumamocSketchbook.com</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Geology                       | <p>What is Tumamoc Hill?</p> <p>It's a highly protected natural wild-lands Sonoran Desert mountain, National Historic Landmark, ecological research preserve, U.S. Archaeological District, and community icon—all of two miles from downtown and surrounded by growing urban Tucson.</p> <p>But there is no single description of Tumamoc Hill that is complete. There are many layers to the place, with different meanings depending on who you are talking to.</p> <p>A geologist will tell you that Tumamoc is an inselberg of volcanic rock remaining from eruptions between 20 – 30 million years ago. And it originally was formed near what is now the Santa Catalina Mountains.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                   | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Cultural / Historic resources | <p>A paleontologist will tell you that the current Sonoran Desert environment came about 8–15 million years ago during a drying trend, when the unique desert plants here evolved from tropical ancestors moving north from Mexico.</p> <p>The Tohono O'odham call it Cemamag! Doag, "Horned Lizard Mountain." The Hill is considered a sacred ancestral site for O'odham, Yaqui, and Hopi Indians.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Infrastructure                | <p>The summit is now a site for a number of communications and homeland security communications towers, yet this role has probably been played for thousands of years. We know that up until historic times, Sentinel Peak, Tumamoc's sister peak was used, for it's broad view of the valley, as a lookout post, especially for marauding Apaches.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Cultural / Historic resources | <p>It has been called many names. Lawrence Clark Powell, famed librarian and writer who lived in Tucson, called Tumamoc "Tucson's Acropolis." It's been called by various names, including "A Mecca for botanists, and "The Jerusalem of desert rats."</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Biological Resources          | <p>The first thing a modern ecologist will say to you is "don't stray off the road." Beginning with the establishment of the Desert Botanical Laboratory in 1903 by the Carnegie Institution of Washington, Tumamoc is the oldest continually monitored ecological research preserve in the world, with data from over 100 years of study. This is the world's first restoration ecology project. The nature here is to look at, to study, to appreciate, but not to exploit—not even to use.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Cultural / Historic resources | <p>To an archeologist, Tumamoc is a mystery that would challenge even Sherlock Holmes. Ruins of cultures living on Tumamoc go back 3,500 years, and at various times in prehistory, the Tumamoc hilltop was probably an important landmark, cultural focal point, and ceremonial ground.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Aesthetics / Recreational Use | <p>To the thousands of people who walk the road daily (only authorized vehicles are allowed) Tumamoc is the best workout in town, a treadmill with a spectacular view. It's a source of healing and health. It's a place where one can stroll among grazing deer five minutes from downtown. Dig a little deeper and many walkers will confide that Tumamoc is a very personal emotional or spiritual sanctuary.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/1/2015   | Email  | Paul Mirocha                   | Public                | Cultural / Historic resources | <p>Urban culture and ecological research can co-exist on Tumamoc Hill. It is a sanctuary for humans as well as other Sonoran Desert life forms, but the boundaries are clear: no one steps off the road without special permission. Scientists have protected the Hill for the last century. Now it's up to the community to take part in stewardship of the Hill as a special place and a cultural value for the next 100 years.</p> <p>At that time, we'll check in again and see how it's going. In the mean time I urge Firstnet to join the other institutions, groups, and governmental entities that are united as part of the stewardship of this valuable site.</p> <p>best regards,<br/>Paul Mirocha</p>                                                                                                                                                                                                                                                                                                                                                                                                              | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/3/2015   | Email  | Marc Severson                  | Public                | Cultural / Historic resources | <p>Dear Ms. Pereira,</p> <p>I am writing to urge you to protect the cultural resources on the top of Tumamoc Hill in Tucson. This historic/prehistoric site has unique constructions that give insight into the prehistory of the Southwest. Further constructions endangers these resources.</p> <p>There are archaeological resources on and around this site that are irreplaceable. Considerable damage has already occurred over the years.</p> <p>I urge you to limit construction on this site to areas that have been previously disturbed and allow no further destruction of these resources.</p> <p>Thank you,<br/>Marc Severson</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |
| 1/6/2015   | Email  | Matt Goode                     | University of Arizona | Biological Resources          | <p>Dear Ms. Pereira,</p> <p>I am a Research Scientist at the University of Arizona and my lab is situated on Tumamoc Hill. I am writing to let you know how important Tumamoc Hill is to me and my students, as well as the community of Tucson. I have been conducting research on reptiles on Tumamoc for the past three years. Besides providing us with an incredible opportunity to better understand how reptiles persist in fragmented habitats, Tumamoc also enables us to provide unprecedented opportunities to educate the general public about scientific research and conservation of natural resources. Your help in keeping Tumamoc Hill healthy and productive is greatly appreciated by a lot of diverse stakeholders who care about Tucson's history and it's future!</p> <p>Thank you so much for your support!<br/>Matt</p>                                                                                                                                                                                                                                                                                 | Thank you for your comment.                                                                                                                                                                                                                                                                                                      |

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## **APPENDIX C**

### **Environmental Laws and Regulations**

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## ENVIRONMENTAL LAWS AND REGULATIONS

The proposed implementation of the Proposed Action must meet the requirements of the National Environmental Policy Act and other applicable federal laws and regulations, Executive Orders, and implementing guidance for the resource areas evaluated in the Programmatic Environmental Impact Statement. Titles are listed alphabetically.

**Table 1: Applicable Laws and Regulations, Executive Orders, and Guidance**

| Title                                                                                                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Laws and Regulations</b>                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| American Indian Religious Freedom Act (AIRFA)<br>(42 USC §1996)                                                   | Protects and preserves for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Alaska Native, and Native Hawaiians, including access to culturally significant sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites.                                                                                                                                                                                                              |
| Archaeological Resources Protection Act of 1979 (ARPA)<br>(16 USC §§ 470aa-470mm; Pub. L. No. 96-95)              | Establishes requirements to protect archaeological resources and sites on public lands and Indian lands, including civil and criminal penalties for the destruction or alteration of cultural resources.                                                                                                                                                                                                                                                                                                                                                                       |
| Bald and Golden Eagle Protection Act<br>(16 USC § 668 et seq.)                                                    | Prohibits the taking, possession, sale, purchase, barter, or offer to sell, purchase, or barter, export, or import of any part of a bald eagle or golden eagle.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Clean Air Act (CAA)<br>(42 USC §§ 7401-7671g)                                                                     | Protects air quality; authorizes the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards for six criteria pollutants that threaten human health and welfare: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO <sub>2</sub> ), ozone (O <sub>3</sub> ), sulfur dioxide (SO <sub>2</sub> ), and particulate matter with a diameter equal to or less than 10 microns (PM <sub>10</sub> ) or less than 2.5 microns (fine particles) (PM <sub>2.5</sub> ). Includes provisions for reducing soil erosion to preserve air quality. |
| Coastal Barrier Improvement Act of 1990 (CBIA)<br>(Pub. L. No. 101-591)                                           | Adds additional areas to the Coastal Barrier Resources System and secondary barriers within large embayments (coastline indentations that form a bay), and establishes a process to transfer interests in land to public or non-profit conservation organizations.                                                                                                                                                                                                                                                                                                             |
| Coastal Barrier Resources Act of 1982 (CBRA)<br>(Pub. L. No. 97-348)                                              | Established the John H Chafee Coastal Barrier Resource System to protect sensitive and vulnerable barrier islands found along the U.S. Atlantic, Gulf, and Great Lakes coastlines, as well as Puerto Rico and the U.S. Virgin Islands.                                                                                                                                                                                                                                                                                                                                         |
| Coastal Zone Management Act (CZMA)<br>(16 USC § 1451 et seq.)                                                     | Enacted to protect the coastal environment from growing demands associated with residential, recreational, commercial and industrial uses. Coastal states with an approved Coastal Zone Management Plan identifying permissible land and water use within the state's coastal zone can review federal actions for federal consistency to determine if the actions are consistent with the state program's enforceable policies.                                                                                                                                                |
| Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA - Superfund Law)<br>(42 USC § 9601) | Authorizes the USEPA to respond to releases, or threatened releases, of hazardous substances that may endanger public health, welfare, or the environment. Requires the USEPA to establish criteria for determining priorities among releases (or threatened releases) of hazardous substances for the purpose of taking remedial action.                                                                                                                                                                                                                                      |

| Title                                                                                                                                                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| Construction, Marking, and Lighting of Antenna Structures of the Federal Communications Commission regulations, Part 17<br>(47 CFR Chapter 1)                    | Governs communications infrastructure under Part 17, which prescribes procedures for antenna structure registration and requires the Federal Aviation Administration (FAA) to conduct an aeronautical study of the navigation airspace to determine appropriate tower marking and lighting requirements for safe airspace. Before the Federal Communications Commission authorizes the construction of new antennae or alteration of existing antennae structures, an FAA determination of “no hazard” may be required. FAA notification is required for new any construction greater than 200 feet above the ground, and near an airport runway (if near an airport runway, taller than 100:1 for a horizontal distance of 20,000 feet away from the nearest runway, 50:1 for a horizontal distance of 10,000 feet away from the nearest runway, and 25:1 for a horizontal distance of 5,000 feet of a heliport). The FAA can vary marking and lighting when requested if aviation safety is not compromised. |
| Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA)<br>(40 CFR §§ 1500-1508) | Provides direction to ensure compliance with procedures to achieve the goals of NEPA. Public officials are able to make decisions based on understanding of environmental consequences and take actions to protect, restore, and enhance the environment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Critical Infrastructure Protection Act of 2001<br>(42 USC § 5195)                                                                                                | Defines critical infrastructure as the assets, systems, and networks (physical or virtual) vital to the U.S., which if incapacitated or destroyed, would have a debilitating effect on security, national economic security, public health or safety, or a combination of these.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Disaster Mitigation Act of 2000 (DMA 2000)<br>(Pub. L. No. 106-390)                                                                                              | Establishes the basis for Federal Environmental Management Agency disaster mitigation planning requirements as a condition of mitigation grant assistance to states, tribes, and local governments. Mitigation planning may be incorporated into a comprehensive master plan identifying hazards, analyzing risks, establishing priorities, and describing specific actions to address those risks.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA)<br>(42 USC §§ 11004-11049)                                                                    | Improves community access to information about chemical hazards and facilitates the development of chemical emergency response plans by states, tribes, and local governments. Establishes the Toxic Release Inventory to inform the public about potentially dangerous chemicals in their community.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Endangered Species Act (ESA) of 1973<br>(16 USC § 1531 et seq.)                                                                                                  | Ensures the protection and recovery of imperiled species and the habitats upon which they depend. Prohibits take, which is defined as harming, up to and including killing, or harassing a listed species. Section 7 of the ESA requires federal agencies to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the threatened or endangered species or result in destruction or adverse modification of critical habitat.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Energy Independence and Security Act of 2007<br>(Pub. L. No. 110-140)                                                                                            | Expands the production of renewable fuels and contains provisions for energy efficiency, smart grid, and carbon dioxide and incentives for plug-in hybrid electric vehicles to assist the electric power industry’s efforts to reduce greenhouse gas emissions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Energy Policy Act of 2005<br>(Pub. L. No. 109-58)                                                                                                                | Provides tax incentives and loan guarantees for energy production of various types.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Farmland Protection Policy Act of 1981 (FPPA)<br>(Pub. L. No. 97-98; 7 USC § 4201)                                                                               | Requires federal agencies to examine the potentially adverse effects to “prime” and “unique” farmland resources before approving any action that would irreversibly convert farmlands to non-farm uses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Title                                                                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| Federal Facility Compliance Act of 1992<br>( <i>Pub. L. No. 102-386</i> )                       | Amends the Solid Waste Disposal Act and expands the enforcement authority of federal and state regulators with respect to solid and hazardous waste management at federal facilities. Requires federal facilities to pay any nondiscriminatory fees or service charges assessed in connection with a federal, state, interstate, or local solid or hazardous waste regulatory program. Waives immunity for federal facilities under solid and hazardous waste laws by allowing states to fine and penalize for violations.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Federal Insecticide, Fungicide, and Rodenticide Act ( <i>7 USC § 136 et seq.</i> )              | Provides for regulation of the distribution, sale, and use of pesticides. Pesticides are generally defined as substances for preventing, destroying, repelling, or mitigating pests; substances for use as a plant regulator, defoliant, or desiccant; and any nitrogen stabilizer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Federal Land Policy and Management Act of 1976<br>( <i>43 USC § 1701 et seq.</i> )              | Directs management of public lands, administered by the Bureau of Land Management, to protect the quality of the land and preserve certain public lands in their natural conditions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Federal Telecommunications Act of 1996                                                          | Establishes general criteria for the siting of telecommunication facilities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Federal Water Pollution Control Act (Clean Water Act [CWA])<br>( <i>33 USC § 1251 et seq.</i> ) | Protects water quality and aims to restore and maintain the chemical, physical, and biological integrity of “waters of the United States.” Section 303(d) requires states and USEPA to identify waters not meeting state, territory, or tribal water quality standards and to develop total maximum daily loads, defined as the maximum amount of a pollutant a waterbody can receive and still meet water quality standards. After determining total maximum daily loads for impaired waters, states are required to identify all point and nonpoint sources (runoff) of pollution in a watershed that are contributing to the impairment and to develop an implementation plan that will allocate reductions to each source in order to meet the state standards. Section 320 establishes the National Estuary Program, which identifies nationally significant estuaries threatened by pollution, and requires federal grants to states, interstate, and regional water pollution control agencies to prepare and implement conservation and management plans. Section 404 addresses prohibition and permitting for dredged materials and fill material into waters of the United States. |
| Fish and Wildlife Conservation Act of 1980<br>( <i>16 USC §§2901-2911</i> )                     | Declares that fish and wildlife are of ecological, educational, aesthetic, cultural, recreational, economic, and scientific value to the nation, and encourages all federal agencies to conserve and promote conservation of non-game fish and wildlife and their habitats.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Fish and Wildlife Coordination Act of 1934<br>( <i>16 USC §§ 661-667e</i> )                     | Mandates that fish and wildlife resources receive adequate and equal consideration in conjunction with other values during the planning of water resources development projects that may conflict with the goal of conserving fish and wildlife resources.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Flood Plain Management Criteria for Flood-prone Areas<br>( <i>44 CFR § 60.3</i> )               | Provides guidance on Federal Emergency Management Agency floodplain management criteria for land management and use.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Intermodal Surface Transportation Efficiency Act of 1991<br>( <i>23 USC § 101 [note]</i> )      | Establishes new U.S. transportation planning and policy for highway construction, highway safety, and mass transit funding. Provides funds for the Bridge Replacement and Rehabilitation Program, Scenic Byways Program, pedestrian and bicycle facilities (such as pedestrian bridges), and designation of high-speed rail corridors.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

| Title                                                                                                                                            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| Landownership Adjustments<br>(36 CFR § 254)                                                                                                      | Sets procedures for conducting exchanges of National Forest System lands and requires consideration of the public interest, including protection of fish and wildlife habitats, cultural resources, watersheds, and wilderness and aesthetic values, as well as enhancement of recreation opportunities and public access.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Magnuson-Stevens Fishery Conservation and Management Act of 1976<br>(16 USC §§ 1801-1882)                                                        | Requires conservation and management of U.S. fishery resources through implementation of fishery management plans and Regional Fishery Management Councils. Fishery management plans enable stakeholders to participate in the administration of fisheries, consider social and economic needs of states, develop underutilized fisheries, and protect essential fish habitats.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Marine Mammal Protection Act of 1972 (MMPA)<br>16 USC § 1361 et seq.                                                                             | Prohibits the taking of marine mammals and enacts moratoriums on imports, exports, and sales of marine mammals and marine mammal parts or products within the United States. Defines “take” as “the act of hunting, killing, capture, and/or harassment of any marine mammal; or, the attempt at such.” Defines “harassment” as “any act of pursuit, torment or annoyance” that has potential to injure or disturb a marine mammal.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Marine Protection, Research, and Sanctuaries Act of 1972<br>(33 USC §§ 1401-1445)                                                                | Establishes the marine sanctuaries program and provides a permitting process for the dumping of materials, including dredged materials, into U.S. ocean water.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Migratory Bird Treaty Act (MBTA)<br>(16 USC §§ 703-712)                                                                                          | Regulates the taking, possession, import, export, transport, sale, purchase, barter, or offer for sale, purchase, or barter, of any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| National Environmental Policy Act (NEPA) (42 USC § 4321 et seq.)                                                                                 | Requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their Proposed Actions and reasonable alternatives to those actions. Established CEQ; CEQ promulgated regulations implementing NEPA, which are binding on all federal agencies, to address the procedural provisions of NEPA and the administration of the NEPA process, including preparation of Environmental Impact Statements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| National Forest Management Act of 1976<br>(Pub. L. No. 94-588)<br>National Forest System Land and Resource Management Planning<br>(36 CFR § 219) | Governs the administration of national forests and removal of trees. Includes requirements for consideration, treatment, and protection of intangible resources such as scenery and aesthetics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| National Historic Preservation Act (NHPA)<br>(formerly 16 USC § 470 et seq., now 54 USC § 100101 et seq.)                                        | Ensures protection of cultural resources and historic properties. Established the Advisory Council on Historic Preservation (ACHP) to promote the preservation, enhancement, and productive use of our nation’s historic resources. Authorizes the Secretary of the Interior to maintain a National Register of Historic Places composed of districts, sites, buildings, structures, and objects significant in American history and culture. Section 106 of the NHPA requires federal agencies to identify the effects of proposed actions on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. Under Section 106, the NHPA requires that federal agencies consult with federally-recognized Indian tribes and Native Hawaiian Organizations that attach traditional religious and cultural significance to eligible or listed historic properties that may be affected by the agency’s actions. |



| Title                                                                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| National Marine Sanctuaries Act<br>(16 USC § 1431 <i>et seq.</i> )                                                        | Authorizes the Secretary of Commerce to designate national marine sanctuaries based on statutory criteria and specifies consultation requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| National Trails System Act of 1968<br>(16 USC § 1241)                                                                     | Authorizes the Secretary of Agriculture to administer and manage national scenic trails for conservation and enjoyment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Native American Graves Protection and Repatriation Act (NAGPRA)<br>(Pub. L. No. 101-601; 104 Stat. 3048)                  | Establishes a process for museums and federal agencies to manage certain Native American cultural items in their possession or inadvertently discovered during a project; establishes the rights of Native American lineal descendants, American Indian tribes, and Native Hawaiian organizations with respect to the treatment, repatriation, and disposition of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony (referred to collectively in the statute as cultural items), with which they can show a relationship of lineal descent or cultural affiliation. |
| North American Wetlands Conservation Act of 1989<br>(Pub. L. No. 101-233)                                                 | Recognizes the aesthetic values of fish, shellfish, and other wildlife, and recognizes that wetlands provide aquatic areas important for recreational and aesthetic purposes. Federal agencies (to the extent possible) should cooperate to restore, protect, and enhance wetlands and other habitats for migratory birds, fish, and wildlife.                                                                                                                                                                                                                                                                       |
| Occupational Safety and Health Act (OSHA) of 1970<br>(Pub. L. No. 91-596)                                                 | Mandates that employers provide a safe place of employment to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education, and assistance.                                                                                                                                                                                                                                                                                                                                                                              |
| Plant Protection Act<br>(7 USC § 7701 <i>et seq.</i> )                                                                    | Establishes a program to control the spread of noxious weeds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Procedures for Abatement of Highway Traffic Noise and Construction Noise<br>(23 CFR § 772)                                | Establishes procedures for conducting noise studies and implementing noise abatement measures, and provides guidelines to plan and design highway projects.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Resource Conservation and Recovery Act (RCRA) of 1976<br>(40 CFR §§ 239-282)                                              | Amends the Solid Waste Disposal Act of 1965 to address how to safely manage and dispose of municipal and industrial waste generated nationwide. Identifies more stringent hazardous waste management standards, and a comprehensive regulatory program for underground storage tanks that store petroleum or certain hazardous materials.                                                                                                                                                                                                                                                                            |
| Rivers and Harbors Act of 1899<br>(33 USC § 403)                                                                          | Addresses projects and activities in navigable waters and harbor and river improvements and prohibits the unauthorized obstruction or alteration of any navigable water of the United States, including altering any port, harbor, or channel.                                                                                                                                                                                                                                                                                                                                                                       |
| Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU)<br>(Pub. L. No. 109-59) | Addresses maintenance and growth challenges of the U.S. transportation system (e.g., improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment). Regulates efforts to address national transportation problems and provides state and local decision makers the flexibility to solve transportation problems at the regional and local levels.                                                                                                                                                                     |
| Safe Drinking Water Act<br>(42 USC §§ 300d-300j-9, as amended by Pub. L. No. 93-523)                                      | Protects public health by regulating the nation's public drinking water and its sources, including protection of surface water and groundwater. Section 1424(e) of the Safe Drinking Water Act authorizes the Sole Source Aquifer Protection Program. Sole source aquifers are the sole or principal source of drinking water for an area, defined as providing 50 percent or more an area's drinking water supply. Any federally funded proposed project with the potential to contaminate a designated sole source aquifer is subject to USEPA review.                                                             |

| <b>Title</b>                                                                                                                                       | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Superfund Amendments and Reauthorization Act of 1986 (SARA)<br>( <i>Pub. L. No. 99-499</i> )                                                       | Amends the Comprehensive Environmental Response, Compensation, and Liability Act as a result of lessons learned from managing the Superfund program. Stresses the importance of permanent remedies and innovative treatment technologies in cleaning up hazardous waste sites, encourages greater citizen participation in cleanup decisions, and increases the size of the trust fund. |
| Toxic Substances Control Act of 1976 (TSCA)<br>( <i>15 USC § 53</i> )                                                                              | Gives the USEPA the authority to require reporting, record-keeping, and testing relating to toxic chemical substances or mixtures.                                                                                                                                                                                                                                                      |
| Wild and Scenic Rivers Act<br>( <i>16 USC §§ 1271–1287</i> )<br>Wild and Scenic Rivers<br>( <i>36 CFR § 297</i> )                                  | Provides for a Wild and Scenic River System by recognizing the remarkable values (scenic, recreational, geologic, fish and wildlife, historic, cultural, or other values) of specific rivers of the United States. The Wild and Scenic Rivers designation includes requirements for the protection of scenic and natural values from the effects of any water resources project.        |
| Wilderness Act of 1964<br>( <i>16 USC § 1131</i> )                                                                                                 | Provides for the preservation of wilderness character and protects and manages the natural conditions of wilderness areas to negate human impacts.                                                                                                                                                                                                                                      |
| <b>Executive Orders</b>                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                         |
| Executive Order 11988<br>Floodplain Management                                                                                                     | Requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. Aspects of EO 11988 have been updated in EO 13690 (see below).                                        |
| Executive Order 12898<br>Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations                       | Ensures that federal agencies avoid taking actions that have a disproportionately high and adverse impact on low-income populations or minority populations. Emphasizes the importance of NEPA's public participation process and provides minority and low-income communities' access to public information and public participation.                                                  |
| Executive Order 13007<br>Indian Sacred Sites                                                                                                       | Directs federal agencies to accommodate access to and avoid adversely affecting American Indian sacred sites.                                                                                                                                                                                                                                                                           |
| Executive Order 13089<br>Coral Reef Protection                                                                                                     | Directs federal agencies to avoid degradation of coral reef ecosystems and implement measures to restore affected ecosystems.                                                                                                                                                                                                                                                           |
| Executive Order 13112<br>Invasive Species                                                                                                          | Directs federal agencies to prevent the introduction of plant, animal, and microorganism invasive species, and control and minimize the economic, ecologic, and human health impacts that invasive species may cause.                                                                                                                                                                   |
| Executive Order 13175<br>Consultation and Coordination with Indian Tribal Governments                                                              | Reaffirms the federal government's commitment to tribal sovereignty, self-determination, and self-government. Its purpose is to ensure that all executive departments and agencies consult with Indian tribes and respect tribal sovereignty as they develop policy on issues that impact Indian communities.                                                                           |
| Executive Order 13340<br>Great Lakes Interagency Task Force and Promotion of a Regional Collaboration of National Significance for the Great Lakes | Specifies 11 federal agency and Cabinet-level departments to provide strategic direction on federal Great Lakes policies, priorities, and programs.                                                                                                                                                                                                                                     |
| Executive Order 13547<br>Stewardship of the Ocean, Our Coasts, and the Great Lakes                                                                 | Provides national policy to ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources.                                                                                                                                                                                                                              |

| <b>Title</b>                                                                                                                                          | <b>Description</b>                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Executive Order 13653<br>Preparing the United States for the Impacts of Climate Change                                                                | Directs federal agencies to take steps that will make it easier for American communities to strengthen their resilience to climate change impacts.                                                                                                                                                                                                     |
| Executive Order 13690<br>Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input | Implements the Federal Flood Risk Management Standard as part of a national policy on resilience and risk reduction, consistent with the President's Climate Action Plan. Amends EO 11988 (see above), and emphasizes consideration by agencies of ecosystem-based alternatives and long-term resilience and risk reduction when managing flood risks. |
| Executive Order 13693<br>Planning for Federal Sustainability in the Next Decade                                                                       | Outlines goals for federal agencies related to climate change, energy, water use, vehicle fleets, construction, and acquisition. Establishes targets for greenhouse gas emissions, water use and efficiency, and clean energy use for federal operations by 2025, relative to various baselines (depending on resource reduction or improvement).      |
| <b>Guidance</b>                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                        |
| Council on Environmental Quality Final NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions                   | Provides guidance on how to incorporate the environmental effects of greenhouse gas emissions and the relationship of climate change in NEPA documentation.                                                                                                                                                                                            |

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## **APPENDIX D**

### **Threatened and Endangered Species**

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**Table 1: Bureau of Land Management Sensitive Plants and Animals in Alaska**

| Scientific Name                         | Common Name                     |
|-----------------------------------------|---------------------------------|
| <b>Birds</b>                            |                                 |
| <i>Gavia adamsii</i>                    | Yellow-billed Loon              |
| <i>Cygnus buccinator</i>                | Trumpeter Swan                  |
| <i>Chen canagica</i>                    | Emperor Goose                   |
| <i>Branta canadensis occidentalis</i>   | Dusky Canada Goose              |
| <i>Aquila chrysaetos</i>                | Golden Eagle                    |
| <i>Numenius tahitiensis</i>             | Bristle-thighed Curlew          |
| <i>Calidris canutus</i>                 | Red Knot                        |
| <i>Calidris pilocnemis tschuktschor</i> | Bering Sea Rock Sandpiper       |
| <i>Brachyramphus brevirostris</i>       | Kittlitz's Murrelet             |
| <i>Brachyramphus marmoratus</i>         | Marbled Murrelet                |
| <i>Asio flammeus</i>                    | Short-eared Owl                 |
| <i>Contopus cooperi</i>                 | Olive-sided Flycatcher          |
| <i>Dendroica striata</i>                | Blackpoll Warbler               |
| <i>Euphagus carolinus</i>               | Rusty Blackbird                 |
| <i>Plectrophenax hyperboreus</i>        | McKay's Bunting                 |
| <b>Mammals</b>                          |                                 |
| <i>Lepus othus</i>                      | Alaskan Hare                    |
| <i>Spermophilus parryi osgoodi</i>      | Osgood's Arctic Ground Squirrel |
| <i>Sorex yukonicus</i>                  | Alaskan Tiny Shrew              |
| <i>Mustela americana kenaiensis</i>     | Kenai Marten                    |
| <b>Fish</b>                             |                                 |
| <i>Lampetra alaskensis</i>              | Alaskan Brook Lamprey           |
| <i>Salvelinus alpinus</i>               | Arctic Char (Kigluaik Mtns)     |
| <b>Insect</b>                           |                                 |
| <i>Acentrella feropagus</i>             | A mayfly                        |
| <i>Rhithrogena ingalik</i>              | Alaska Endemic Mayfly           |
| <i>Alaskaperla ovibovis</i>             | Alaska Sallfly                  |
| <b>Plants</b>                           |                                 |
| <i>Antennaria densifolia</i>            | No common name                  |
| <i>Arnica lonchophylla</i>              | Northern Arnica                 |
| <i>Artemisia globularia ssp. lutea</i>  | No common name                  |
| <i>Artemisia laciniata</i>              | Siberian Wormwood               |
| <i>Artemisia senjavinensis</i>          | Arctic Sage                     |
| <i>Aster pygmaeus (Eurybia pygmaea)</i> | Pygmy Aster                     |
| <i>Botrychium ascendens</i>             | Moonwort                        |
| <i>Carex adelostoma</i>                 | Circumpolar Sedge               |
| <i>Claytonia arctica</i>                | Arctic Springbeauty             |
| <i>Claytonia ogilviensis</i>            | Ogilvie Mts Spring Beauty       |
| <i>Cryptantha shackletteana</i>         | Shacklettes' Catseye            |
| <i>Douglasia alaskana</i>               | Alaska Rock-jasmine             |
| <i>Douglasia arctica</i>                | Mackenzie River Douglasia       |
| <i>Douglasia beringensis</i>            | Arctic Dwarf Primrose           |
| <i>Draba micropetala</i>                | Alpine Whitlow-grass            |
| <i>Draba murrayi</i>                    | Murray's Whitlow-grass          |
| <i>Draba ogilviensis</i>                | No common name                  |
| <i>Draba pauciflora</i>                 | Adam's Whitlow-grass            |
| <i>Erigeron muirii</i>                  | Muir's Fleabane                 |
| <i>Erigeron yukonensis</i>              | No common name                  |
| <i>Eriogonum flavum var. aquilinum</i>  | Yukon Wild-buckwheat            |

| Scientific Name                                 | Common Name               |
|-------------------------------------------------|---------------------------|
| <i>Erysimum asperum</i> var. <i>angustatum</i>  | A wallflower              |
| <i>Gentianopsis detonsa</i> ssp. <i>detonsa</i> | Sheared Gentian           |
| <i>Koeleria asiatica</i>                        | Oriental Junegrass        |
| <i>Lesquerella calderi</i>                      | Calder's Bladderpod       |
| <i>Mertensia drummondii</i>                     | Drummond's Bluebell       |
| <i>Montia bostockii</i>                         | Bostock's Miner's-lettuce |
| <i>Oxytropis arctica</i> var. <i>barnebyana</i> | Barneby's Locoweed        |
| <i>Oxytropis huddelsonii</i>                    | No common name            |
| <i>Oxytropis kobukensis</i>                     | Kobuk Locoweed            |
| <i>Papaver alboroseum</i>                       | Pale Poppy                |
| <i>Papaver gorodkovii</i>                       | No common name            |
| <i>Papaver walpolei</i>                         | Walpole Poppy             |
| <i>Parrya nauruaq</i>                           | No common name            |
| <i>Pedicularis hirsuta</i>                      | No common name            |
| <i>Phacelia mollis</i>                          | Macbride Phacelia         |
| <i>Pleuropogon sabinei</i>                      | Sabine-grass              |
| <i>Poa hartzii</i> ssp. <i>alaskana</i>         | No common name            |
| <i>Poa porsildii</i>                            | No common name            |
| <i>Potentilla stipularis</i>                    | Circumpolar Cinquefoil    |
| <i>Primula tschuktschorum</i>                   | Chukchi Primrose          |
| <i>Puccinellia wrightii</i>                     | No common name            |
| <i>Ranunculus camissonis</i>                    | No common name            |
| <i>Ranunculus glacialis</i> var. <i>1</i>       | No common name            |
| <i>Ranunculus turneri</i>                       | Turner's Butter-cup       |
| <i>Rumex graminifolius</i>                      | No common name            |
| <i>Rumex krausei</i>                            | Cape Krause Sorrel        |
| <i>Smelowskia johnsonii</i>                     | No common name            |
| <i>Smelowskia pyriformis</i>                    | No common name            |
| <i>Trisetum sibiricum</i> ssp. <i>litorale</i>  | Siberian False-oats       |

## REFERENCES

Bureau of Land Management. 2010. BLM-Alaska Revised Sensitive Species List. Accessed: September 2015. Retrieved from:  
[http://www.blm.gov/style/medialib/blm/ak/aktest/ims.Par.47439.File.dat/im\\_ak\\_2010\\_018.pdf](http://www.blm.gov/style/medialib/blm/ak/aktest/ims.Par.47439.File.dat/im_ak_2010_018.pdf)



**Table 2: Threatened and Endangered Plant Species Known to Occur in the Hawaiian Islands**

| Common Name and Scientific Name                                 | Listing Status <sup>a</sup> | Habitat Description                                                                                                            | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-----------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Abutilon eremitopetalum</i>                   | E                           | Dry forests and shrublands in gulches, ~1,100 feet                                                                             |        |      | ✓     |         |      |       |                                                             |
| Ko'olua'ula <i>Abutilon menziesii</i>                           | E                           | Dry forests and shrublands. Found on old lava flows, seasonally dry eroded slopes and along washed out gullies, 656-1,739 feet | ✓      | ✓    | ✓     |         | ✓    |       |                                                             |
| No common name <i>Abutilon sandwicense</i> (CH)                 | E                           | On steep slopes in dry forests, 1,312-1,969 feet                                                                               |        |      |       |         | ✓CH  |       |                                                             |
| Liliwai <i>Acaena exigua</i>                                    | E                           | Montane bogs, 5,250-5,906 feet                                                                                                 |        | ✓    |       |         |      | ✓     |                                                             |
| No common name <i>Achyranthes mutica</i> (CH)                   | E                           | Koa ( <i>Acacia koa</i> ) lowland dry forest, ~3,030 feet                                                                      | ✓CH    |      |       |         |      | ✓     |                                                             |
| Hinahina ewa <i>Achyranthes splendens</i> var. <i>rotundata</i> | E                           | Low elevation, open, dry forest remnants and open thickets, on talus or rocky slopes and on coralline plains                   |        |      | ✓     | ✓       | ✓    |       |                                                             |
| No common name <i>Adenophorus periens</i> (CH)                  | E                           | Epiphyte usually growing on ohia ( <i>Metrosideros polymorpha</i> ) trunks in closed canopy wet forests, 1,540-4,150 feet      | ✓CH    |      | ✓     | ✓CH     | ✓CH  | ✓CH   |                                                             |
| Mahoe <i>Alectryon macrococcus</i> var. <i>auwahiensis</i> (CH) | E                           | Various dry to mesic forest types on well-weather substrate, 1,092-3,969 feet                                                  |        | ✓CH  |       |         |      |       |                                                             |

| Common Name and Scientific Name                                                                                                 | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                         | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|---------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Mahoe <i>Alectryon macrococcus</i> var. <i>macrococcus</i> (CH)                                                                 | E                           | Various dry to mesic forest types, 1,181-3,510 feet                                                                                                         |        | ✓CH  |       | ✓CH     | ✓CH  | ✓CH   |                                                             |
| No common name <i>Amaranthus brownii</i> (CH)                                                                                   | E                           | Shallow soil on rocky outcrops in fully exposed locations, 100-800 feet                                                                                     |        |      |       |         |      |       | Ni CH                                                       |
| ʻAhinahina, Kaʻu silversword<br><i>Argyroxiphium kauense</i> (CH)                                                               | E                           | Bogs and openings in wet ohia forests, or areas of smooth lava within mesic shrubby ohia forests, 5,331-6,234 feet                                          | ✓CH    |      |       |         |      |       |                                                             |
| ʻAhinahina, Haleakala silversword<br><i>Argyroxiphium sandwicense</i> ssp. <i>macrocephalum</i> (CH)                            | T                           | Barren, unstable slopes of recent (<1,000 years) volcanic cinder cones                                                                                      |        | ✓CH  |       |         |      |       |                                                             |
| ʻAhinahina, Mauna Kea <i>Argyroxiphium sandwicense</i> ssp. <i>Sandwicense</i>                                                  | E                           | Dry alpine desert and dry to moist subalpine shrublands and forests. Found on cinder cone slopes, cinder fields, lava flows, in rock gulches, and on cliffs | ✓      |      |       |         |      |       |                                                             |
| No common name <i>Asplenium diellaciniatum</i>                                                                                  | E                           | Fern found in montane, mesic forests at Kawaiiki and Kaluahaulu Ridge, Kauai                                                                                |        |      |       |         |      | ✓     |                                                             |
| No common name <i>Asplenium peruvianum</i> var. <i>insulare</i> (CH) (listed as <i>Asplenium fragile</i> var. <i>insulare</i> ) | E                           | Dark, moist areas, in rock crevices or at the mouths of lava tubes that receive very little light, 5,413-7,218 feet                                         | ✓CH    | ✓CH  |       |         |      |       |                                                             |
| painiu <i>Astelia waialealae</i> (CH)                                                                                           | E                           | Bog san don bog hummocks in ohia montane wet forests, 4,000-5,000 feet                                                                                      |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                         | Listing Status <sup>a</sup> | Habitat Description                                                                                            | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Ko'oko'olau <i>Bidens micrantha</i> ssp. <i>kalealaha</i> (CH)          | E                           | Sheer rock walls at elevations of 5,250-7,545 feet                                                             |        | ✓CH  | ✓CH   |         |      |       |                                                             |
| Ko'oko'olau <i>Bidens wiebkei</i> (CH)                                  | E                           | Moist shrublands and forests dominated by ohia, in gulches and on ridges, 820-3,450 feet                       |        |      |       | ✓CH     |      |       |                                                             |
| No common name <i>Bonamia menziesii</i> (CH)                            | E                           | Dry to mesic forest, rarely in wet forest, 492-2,050 feet                                                      | ✓CH    | ✓CH  | ✓     | ✓       | ✓CH  | ✓CH   |                                                             |
| `Olulu <i>Brighamia insignis</i> (CH)                                   | E                           | Sea cliffs and coastal bluffs, <1,575 feet                                                                     |        |      |       |         |      | ✓CH   | Niihau CH                                                   |
| Pua `ala <i>Brighamia rockii</i> (CH)                                   | E                           | Sea cliffs in coastal dry to mesic forests or shrublands, <1,542 feet                                          |        | ✓CH  | ✓     | ✓CH     |      |       |                                                             |
| Uhiuhi <i>Caesalpinia kawaiensis</i>                                    | E                           | Dry and moist forests, 262-3,018 feet                                                                          | ✓      | ✓    | ✓     |         | ✓    | ✓     |                                                             |
| Maui reedgrass <i>Calamagrostis expansa</i>                             | E                           | Montane ridges above 6,000 feet or on raised hummocks in wet forests and bogs in montane wet ecosystem         | ✓      | ✓    |       |         |      |       |                                                             |
| `Awikiwiki <i>Canavalia molokaiensis</i> (CH)                           | E                           | Moist shrublands and forests on gulch slopes and bottoms, 2,788-3,051 feet                                     |        |      |       | ✓CH     |      |       |                                                             |
| Awikiwiki <i>Canavalia napaliensis</i> (CH)                             | E                           | Dry and moist shrublands and forests in gulches, on ridges, and on gently slopes valley bottoms, 20-1,900 feet |        |      |       |         |      | CH    |                                                             |
| Kamanomano <i>Cenchrus agrimonioides</i> var. <i>agrimonioides</i> (CH) | E                           | Dry, rocky ridges or slopes, or ridges in mesic ohia-koa forest, 1,830-2,700 feet                              | ✓      | ✓CH  | ✓     |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                                  | Listing Status <sup>a</sup> | Habitat Description                                                                                                 | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Kamanomano <i>Cenchrus agrimonioides</i> var. <i>Laysanensis</i> | E                           | Atoll dunes                                                                                                         |        |      |       |         |      |       | L, Ku, M                                                    |
| `Awiwi <i>Centaurium sebaeoides</i> (CH)                         | E                           | Volcanic or clay soils or on cliffs in arid coastal areas, <400 feet                                                |        | ✓CH  | ✓     | ✓CH     | ✓CH  | ✓CH   |                                                             |
| `Akoko <i>Chamaesyce celastroides</i> var. <i>kaenana</i> (CH)   | E                           | Exposed, windswept ridges of moderate to steep slope in wet ohia-uluhe shrublands, 2,300-2,800 feet                 |        |      |       |         | ✓CH  |       |                                                             |
| `Akoko <i>Chamaesyce deppeana</i> (CH)                           | E                           | Moist shrublands on windswept steep slopes, cliffs and ledges, ~1,000 feet                                          |        |      |       |         | ✓CH  |       |                                                             |
| `Akoko <i>Chamaesyce eleanoriae</i> (CH)                         | E                           | Moist areas on narrow ridges crests and outcrops and less commonly on steep rocky slopes and cliffs, 885-3,499 feet |        |      |       |         |      | ✓CH   |                                                             |
| `Akoko <i>Chamaesyce halemanui</i> (CH)                          | E                           | Steep slopes of gulches in mesic koa forests, 2,160-3,600 feet                                                      |        |      |       |         |      | ✓CH   |                                                             |
| `Akoko <i>Chamaesyce herbstii</i> (CH)                           | E                           | Moist koa-ohia forests in gulch bottoms or gulch slopes, 1,750-2,300 feet                                           |        |      |       |         | ✓CH  |       |                                                             |
| `Akoko <i>Chamaesyce kuwaleana</i> (CH)                          | E                           | Arid basaltic cliffs, exposed rocky dry ridges and on sparsely vegetated steep cliffs, 600-1,050 feet               |        |      |       |         | ✓CH  |       |                                                             |
| `Akoko <i>Chamaesyce remyi</i> var. <i>kauaiensis</i> (CH)       | E                           | Wet forest dominated by ohia, 1,900-2,297 feet                                                                      |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                                                                                | Listing Status <sup>a</sup> | Habitat Description                                                                                          | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| `Akoko <i>Chamaesyce remyi</i> var. <i>remyi</i> (CH)                                                                          | E                           | Wet forest dominated by ohia and uluhe, 1,200-4,100 feet                                                     |        |      |       |         |      | ✓CH   |                                                             |
| `Akoko <i>Chamaesyce rockii</i> (CH)                                                                                           | E                           | Rainforests and shrublands, primarily along cloud-swept ridges, <2,720 feet                                  |        |      |       |         | ✓CH  |       |                                                             |
| `Akoko <i>Chamaesyce skottsbergii</i> var. <i>kalaeloana</i> (listed as <i>Euphorbia skottsbergii</i> var. <i>kalaeloana</i> ) | E                           | Ewa Plains                                                                                                   |        |      |       |         | ✓    |       |                                                             |
| Papala <i>Charpentiera densiflora</i> (CH)                                                                                     | E                           | Moist forests, especially in gulch bottoms, 400-2,200 feet                                                   |        |      |       |         |      | ✓CH   |                                                             |
| `Oha wai <i>Clermontia drepanomorpha</i> (CH)                                                                                  | E                           | Wet forests, 3,850-5,150 feet                                                                                | ✓CH    |      |       |         |      |       |                                                             |
| `Oha wai <i>Clermontia lindseyana</i> (CH)                                                                                     | E                           | Montane rainforest, <7,054 feet                                                                              | ✓CH    | ✓CH  |       |         |      |       |                                                             |
| `Oha wai <i>Clermontia oblongifolia</i> ssp. <i>brevipes</i> (CH)                                                              | E                           | Wet forest on slopes, 3,610-3,937 feet                                                                       |        |      |       | ✓CH     |      |       |                                                             |
| `Oha wai <i>Clermontia oblongifolia</i> ssp. <i>mauiensis</i> (CH)                                                             | E                           | Sides of ridges in ohia-dominated montane wet forest, 2,790-2,950 feet                                       |        | ✓CH  | ✓     |         |      |       |                                                             |
| `Oha wai <i>Clermontia peleana</i> ssp. <i>peleana</i> (CH)                                                                    | E                           | Montane wet forests of windward slopes, 1,800-3,800 feet                                                     | ✓CH    |      |       |         |      |       |                                                             |
| `Oha wai <i>Clermontia peleana</i> ssp. <i>singuliflora</i> (CH)                                                               | E                           | Montane wet forests of windward slopes, 1,800-3,800 feet                                                     | ✓CH    | ✓    |       |         |      |       |                                                             |
| `Oha wai <i>Clermontia pyrularia</i> (CH)                                                                                      | E                           | Koa ( <i>Acacia koa</i> ) and ohia dominated montane wet forests and subalpine dry forests, 3,000-7,000 feet | ✓CH    |      |       |         |      |       |                                                             |

| Common Name and Scientific Name                                | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                            | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|----------------------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| `Oha wai <i>Clermontia samuelii</i> ssp. <i>hanaensis</i> (CH) | E                           | Wet forests dominated by ohia and uluhe ( <i>Dicranopteris linearis</i> )                                                                                      |        | ✓CH  |       |         |      |       |                                                             |
| `Oha wai <i>Clermontia samuellii</i> ssp. <i>samuelii</i> (CH) | E                           | Wet forests dominated by ohia and olapa ( <i>Cheirodendron trigynum</i> ), 2,380-7,365 feet                                                                    |        | ✓CH  |       |         |      |       |                                                             |
| Kauila <i>Colubrina oppositifolia</i> (CH)                     | E                           | Dry to moist forest, 787-3,018 feet                                                                                                                            | ✓CH    | ✓CH  |       |         | ✓CH  |       |                                                             |
| Pauoa <i>Ctenitis squamigera</i> (CH)                          | E                           | Understory of lowland mesic forests, 1,247-3,002 feet                                                                                                          |        | ✓CH  | ✓     | ✓CH     | ✓CH  | ✓CH   |                                                             |
| Haha <i>Cyanea acuminata</i> (CH)                              | E                           | Wet forests in gulch bottoms, on gulch slopes, on ridge crests, and on streambanks, 1,000-3,000 feet                                                           |        |      |       |         | ✓CH  |       |                                                             |
| Haha <i>Cyanea asarifolia</i> (CH)                             | E                           | Grows in pockets of soil on sheer rock cliffs in lowland wet forests, ~1,080 feet                                                                              |        |      |       |         |      | ✓CH   |                                                             |
| Haha <i>Cyanea copelandii</i> ssp. <i>copelandii</i>           | E                           | Wet montane forests dominated by <i>Cibotium</i> spp, 2,165-5,249 feet                                                                                         | ✓      |      |       |         |      |       |                                                             |
| Haha <i>Cyanea copelandii</i> ssp. <i>haleakalaensis</i> (CH)  | E                           | Stream banks and wet scree slopes at the base of cliffs and in forest understory in montane wet or mesic forest dominated by ohia and/or koa, 2,018-4,625 feet |        | ✓CH  |       |         |      |       |                                                             |

| Common Name and Scientific Name                             | Listing Status <sup>a</sup> | Habitat Description                                                                                                   | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Haha <i>Cyanea crispa</i> (CH)                              | E                           | Habitats range from steep, open mesic forests to gentle slopes or moist gullies in closed wet forests, 600-2,400 feet |        |      |       |         | ✓CH  |       |                                                             |
| Haha <i>Cyanea dolichopoda</i> (CH)                         | E                           | Ohia lowland wet shrubland on cliff faces, ~2,300 feet                                                                |        |      |       |         |      | ✓CH   |                                                             |
| Haha <i>Cyanea dunbariae</i> (CH)                           | E                           | Moist and wet forests on moderate to steep slopes along streams                                                       |        |      |       | ✓CH     |      |       |                                                             |
| Haha <i>Cyanea eleeleensis</i> (CH)                         | E                           | Wet forests, shaded gulches, ~699 feet                                                                                |        |      |       |         |      | ✓CH   |                                                             |
| Haha <i>Cyanea glabra</i> (CH)                              | E                           | Wet forests dominated by ohia and/or koa on gulch slopes, 3,200-4,400 feet                                            |        | ✓CH  |       |         |      |       |                                                             |
| Haha <i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> (CH)   | E                           | Mesic forest dominated by ohia or ohia and koa, on rocky or steep slopes of stream banks, 1,150-3,100 feet            |        |      |       | ✓CH     | ✓CH  |       |                                                             |
| Haha <i>Cyanea grimesiana</i> ssp. <i>obatae</i> (CH)       | E                           | Steep, moist, shady slopes in medium to wet forests, 1,800 to 2,200 feet                                              |        |      |       |         | ✓CH  |       |                                                             |
| Haha <i>Cyanea hamatiflora</i> ssp. <i>carlsonii</i> (CH)   | E                           | Mesic montane forest dominated by ohia, 4,000-5,700 feet                                                              | ✓CH    |      |       |         |      |       |                                                             |
| Haha <i>Cyanea hamatiflora</i> ssp. <i>hamatiflora</i> (CH) | E                           | Rainforests, 3,937-4,593 feet                                                                                         |        | ✓CH  |       |         |      |       |                                                             |
| Haha <i>Cyanea humboldtiana</i> (CH)                        | E                           | Wet shrubland dominated by ohia and uluhe, 1,800-3,150 feet                                                           |        |      |       |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                                                                 | Listing Status <sup>a</sup> | Habitat Description                                                                                                                        | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Cyanea kauaulaensis</i>                                                       | E                           | Leeward west Maui, on talus or basalt boulder-strewn slopes along perennial streams from 2,400 to 3,000 feet, in the lowland wet ecosystem |        | ✓    |       |         |      |       |                                                             |
| Haha <i>Cyanea kolekoleensis</i> (CH)                                                           | E                           | Lowland wet forest dominated by ohia and uluhe                                                                                             |        |      |       |         |      | ✓CH   |                                                             |
| Haha <i>Cyanea koolauensis</i> (CH)                                                             | E                           | Slopes and ridge crests in wet forest or shrubland dominated by ohia and uluhe, 1,700-2,660 feet                                           |        |      |       |         | ✓CH  |       |                                                             |
| Haha <i>Cyanea kuhihewa</i> (CH)                                                                | E                           | Streambanks in wet forests                                                                                                                 |        |      |       |         |      | ✓CH   |                                                             |
| Haha <i>Cyanea lobata</i> ssp. <i>baldwinii</i> (listed as <i>Cyanea lobata</i> )               | E                           | Steep stream banks, 1,805-3,000 feet                                                                                                       |        |      | ✓     |         |      |       |                                                             |
| Haha <i>Cyanea magnicalyx</i> (listed as <i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> ) (CH) | E                           | Lowland mesic forests in valleys or on rocky or steep slopes of stream banks, 1,150-3,100 feet                                             |        | ✓CH  |       |         |      |       |                                                             |
| Haha <i>Cyanea mannii</i> (CH)                                                                  | E                           | Sides of deep gulches in ohia-dominated mesic to wet forests, 3,300-4,000 feet                                                             |        |      |       | ✓CH     |      |       |                                                             |
| Haha <i>Cyanea mauiensis</i> (listed as <i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> )       | E                           | Unknown, not seen for over 100 years                                                                                                       |        | ✓    |       |         |      |       |                                                             |
| Haha <i>Cyanea mceldowneyi</i> (CH)                                                             | E                           | Montane wet forest with mixed ohia and koa, 3,034-4,200 feet                                                                               |        | ✓CH  |       |         |      |       |                                                             |
| Haha <i>Cyanea munroi</i> (listed as <i>Cyanea grimesiana</i> ssp. <i>grimesiana</i> ) (CH)     | E                           | Wet cliffs                                                                                                                                 |        |      | ✓     | ✓CH     |      |       |                                                             |



| Common Name and Scientific Name                                                    | Listing Status <sup>a</sup> | Habitat Description                                                                                 | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Haha <i>Cyanea pinnatifida</i> (CH)                                                | E                           | Steep, wet, rocky slopes and shady ravines in diverse mesic forests, 1,608-1,706 feet               |        |      |       |         | ✓CH  |       |                                                             |
| `Aku`aku <i>Cyanea platyphylla</i> (CH)                                            | E                           | Lowland and montane wet forests dominated by ohia and koa, 390-3,000 feet                           | ✓CH    |      |       |         |      |       |                                                             |
| Haha <i>Cyanea procera</i> (CH)                                                    | E                           | Wet ohia dominated forest on steep rock walls with thin soil, ~3,480 feet                           |        |      |       | ✓CH     |      |       |                                                             |
| Haha <i>Cyanea recta</i> (CH)                                                      | T                           | Lowland wet or mesic ohia forest or shrubland, usually in gulches or on slopes, 1,300 to 3,070 feet |        |      |       |         |      | ✓CH   |                                                             |
| Haha <i>Cyanea remyi</i> (CH)                                                      | E                           | Lowland wet forests or shrubland, 1,180 to 3,060 feet                                               |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Cyanea rivularis</i> (listed as <i>Delissea rivularis</i> ) (CH) | E                           | Steep slopes in ohia-olapa montane wet or mesic forests, near streams                               |        |      |       |         |      | ✓CH   |                                                             |
| Haha <i>Cyanea salicina</i> (listed as <i>Cyanea recta</i> ) (CH)                  | T                           | Lowland wet or mesic ohia forest or shrubland, usually in gulches or on slopes                      |        |      |       |         |      | ✓CH   |                                                             |
| Haha <i>Cyanea shipmanii</i> (CH)                                                  | E                           | Koa and ohia dominated montane mesic forests, 5,400-6,200                                           | ✓CH    |      |       |         |      |       |                                                             |
| Haha <i>Cyanea st.-johnii</i> (CH)                                                 | E                           | Wet, windswept slopes and ridges in ohia mixed shrubland or ohia-uluhe shrubland, 2,260-2,800 feet  |        |      |       |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                                                                                       | Listing Status <sup>a</sup> | Habitat Description                                                                                                       | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Haha <i>Cyanea stictophylla</i> (CH)                                                                                  | E                           | Koa and ohia dominated lowland mesic and wet forests, 3,500-6,400 feet                                                    | ✓CH    |      |       |         |      |       |                                                             |
| Haha <i>Cyanea superba</i> ssp. <i>regina</i> (CH)                                                                    | E                           | Understory of lowland forests, 1,755-2,297 feet                                                                           |        |      |       |         | ✓CH  |       |                                                             |
| Haha <i>Cyanea superba</i> ssp. <i>superba</i> (CH)                                                                   | E                           | Understory of sloping terrain on well drained, rocky substrate, 1,760-2,200 feet                                          |        |      |       |         | ✓CH  |       |                                                             |
| Haha <i>Cyanea truncata</i> (CH)                                                                                      | E                           | Windward slopes in mesic to wet forests, 800-1,300 feet                                                                   |        |      |       |         | ✓CH  |       |                                                             |
| Haha <i>Cyanea undulata</i> (CH)                                                                                      | E                           | Ohia-uluhe wet forest, often on streambanks or steep-to-vertical slopes, from 2,200-2,600 feet                            |        |      |       |         |      | ✓CH   |                                                             |
| Kupukupu makalii <i>Cyclosorus boydiae</i>                                                                            | E                           | In the lowland wet and montane wet ecosystems; on exposed, rocky, or moss-covered banks of stream courses                 | ✓      | ✓    |       |         | ✓    |       |                                                             |
| No common name <i>Cyperus fauriei</i> (CH)                                                                            | E                           | Lowland dry forest, typically dominated by ohia and lama ( <i>Diospyros</i> spp.), on a'a lava substrates, 380-6,000 feet | ✓CH    |      | ✓     | ✓CH     |      |       |                                                             |
| No common name <i>Cyperus neokunthianus</i>                                                                           | E                           | Lowland wet ecosystem on west Maui                                                                                        |        | ✓    |       |         |      |       |                                                             |
| No common name <i>Cyperus pennatiformis</i> ssp. <i>bryanii</i> (CH) (listed as <i>Mariscus pennatiformis</i> )       | E                           | Coastal sandy substrate at elevations just above sea level                                                                |        |      |       |         |      |       | L CH                                                        |
| No common name <i>Cyperus pennatiformis</i> ssp. <i>pennatiformis</i> (CH) (listed as <i>Mariscus pennatiformis</i> ) | E                           | Open sites in mesic forests and low elevation grasslands , <3,900 feet                                                    |        | ✓CH  |       |         | ✓CH  | ✓CH   |                                                             |

| Common Name and Scientific Name                                                                        | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                         | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|--------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Pu'uka'a <i>Cyperus trachysanthos</i> (CH)                                                             | E                           | Wet sites (mud flats, wet clay soil, or wet steep cliffs) on coastal cliffs or talus slopes, 10-525 feet                                                    |        |      | ✓     | ✓       | ✓CH  | ✓CH   | Niihau                                                      |
| Ha'iwale <i>Cyrtandra crenata</i>                                                                      | E                           | Ravines or gulches in mesic to wet forests, 1,250-2,400 feet                                                                                                |        |      |       |         | ✓    |       |                                                             |
| Mapele <i>Cyrtandra cyaneoides</i> (CH)                                                                | E                           | Steep slopes or cliffs near streams or waterfalls in lowland or montane wet forest or shrubland dominated by ohia or ohia and uluhe                         |        |      |       |         |      | ✓CH   |                                                             |
| Ha'iwale <i>Cyrtandra dentata</i> (CH)                                                                 | E                           | Gulches, slopes or ravines in mesic forest with ohia, ohia ha ( <i>Syzigium sandwicensis</i> ), and kukui ( <i>Aleurites moluccanus</i> ), 1,900-2,360 feet |        |      |       |         | ✓CH  |       |                                                             |
| Ha'iwale <i>Cyrtandra giffardii</i> (CH)                                                               | E                           | Wet montane forest dominated by tree fern ( <i>Cibotium</i> ), 2,400-4,900 feet                                                                             | ✓CH    |      |       |         |      |       |                                                             |
| Ha'iwale <i>Cyrtandra kealiae</i> ssp. <i>kealiae</i> (listed as <i>Cyrtandra limahuliensis</i> ) (CH) | T                           | Ohia-uluhe wet forest, wet cliffs and along drainages                                                                                                       |        |      |       |         |      | ✓CH   |                                                             |
| Haiwale <i>Cyrtandra hematos</i>                                                                       | E                           | Occurs in wet forest from 3,400 to 3,800 feet on eastern Molokai, in the montane wet ecosystem                                                              |        |      |       | ✓       |      |       |                                                             |

| Common Name and Scientific Name                                                         | Listing Status <sup>a</sup> | Habitat Description                                                                                                                       | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-----------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Ha'iwale <i>Cyrtandra munroi</i> (CH)                                                   | E                           | Lowland, diverse, mixed mesic to wet ohia forest, typically on rich, moist to wet, moderately steep talus slopes, 960-3,020 feet          |        | ✓CH  | ✓     |         |      |       |                                                             |
| Ha'iwale <i>Cyrtandra oenobarba</i> (CH)                                                | E                           | Lowland wet forest dominated by ohia                                                                                                      |        |      |       |         |      | ✓CH   |                                                             |
| Ha'iwale <i>Cyrtandra paliku</i> (CH)                                                   | E                           | Vertical, shaded, north-facing basalt rock faces, which are windswept and often mist-shrouded within lowland wet forest dominated by ohia |        |      |       |         |      | ✓CH   |                                                             |
| Ha'iwale <i>Cyrtandra polyantha</i> (CH)                                                | E                           | Ridges in ohia mesic or wet forests, 1,086-2,499 feet                                                                                     |        |      |       |         | ✓CH  |       |                                                             |
| Ha'iwale <i>Cyrtandra subumbellata</i> (CH)                                             | E                           | Moist, forested slopes or gulch bottoms dominated by ohia or ohia and uluhe, 1,500-2,200 feet                                             |        |      |       |         | ✓CH  |       |                                                             |
| Ha'iwale <i>Cyrtandra tintinnabula</i> (CH)                                             | E                           | Lowland wet forest dominated by dense koa, ohia and tree fern, 2,100-3,400 feet                                                           | ✓CH    |      |       |         |      |       |                                                             |
| Ha'iwale <i>Cyrtandra viridiflora</i> (CH)                                              | E                           | Windblown ridgetops in cloud-covered wet forest or shrubland, 2,260-2,800 feet                                                            |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Delissea argutidentata</i> (listed as <i>Delissea undulata</i> ) (CH) | E                           | Dry and mesic forests in open ohia and mamane ( <i>Sophora chrysophylla</i> ) forest, 3,300-5,700 feet                                    | ✓CH    |      |       |         |      |       |                                                             |
| No common name <i>Delissea kauaiensis</i> (listed as <i>Delissea undulata</i> ) (CH)    | E                           | Rainforest. Considered extinct                                                                                                            |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                                          | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                   | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Delissea niihauensis</i> (listed as <i>Delissea undulata</i> )         | E                           | Rainforest. Considered extinct                                                                                                                        |        |      |       |         |      |       | Niihau                                                      |
| No common name <i>Delissea rhytidosperra</i> (CH)                                        | E                           | Diverse lowland mesic forests and koa dominated lowland dry forests that have well drained soils with medium to fine textured subsoil, 394-3,000 feet |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Delissea subcordata</i> (CH)                                           | E                           | Moderate to steep gulch slopes in mixed mesic forests, 531-3,362 feet                                                                                 |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Delissea takeuchii</i> (listed as <i>Delissea subcordata</i> ) (CH)    | E                           | Lowland mesic forests, 1,805- 3,000 feet                                                                                                              |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Delissea undulata</i>                                                  | E                           | Dry and mesic forests in open ohia and mamane ( <i>Sophora chrysophylla</i> ) forest, 3,300-5,700 feet                                                |        | ✓    |       |         |      |       |                                                             |
| No common name <i>Delissea waianaeensis</i> (listed as <i>Delissea subcordata</i> ) (CH) | E                           | Lowland mesic forests, 804-2,493 feet                                                                                                                 |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Deparia kaalaana</i>                                                   | E                           | Lowland wet ecosystem, on rocky stream banks and wet forests                                                                                          | ✓      | ✓    |       |         |      | ✓     |                                                             |
| No common name <i>Diellia erecta</i> (CH)                                                | E                           | Lowland mesic forests dominated by ohia and lama, 700-5,200 feet                                                                                      | ✓CH    | ✓CH  | ✓     | ✓CH     | ✓CH  | ✓CH   |                                                             |
| No common name <i>Diellia falcata</i> (CH)                                               | E                           | Deep shade or open understory in dryland forest, 1,280-2,700 feet                                                                                     |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Diellia mannii</i> (CH)                                                | E                           | Steep, dry, upland forest slopes, 1,640-3,280 feet                                                                                                    |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                    | Listing Status <sup>a</sup> | Habitat Description                                                                                                | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or<br>Oceanic |
|--------------------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|----------------------------------------------------------------|
| No common name <i>Diellia pallida</i> (CH)                         | E                           | Bare soil on steep, rocky, dry slopes of lowland mesic forests, 1,700-2,300 feet                                   |        |      |       |         |      | ✓CH   |                                                                |
| No common name <i>Diellia unisora</i> (CH)                         | E                           | Deep shade or open understory in dryland forest, 1,750-2,500 feet                                                  |        |      |       |         | ✓CH  |       |                                                                |
| No common name <i>Diplazium molokaiense</i> (CH)                   | E                           | Lowland to montane habitats, including montane mesic ohia-koa forest, 2,800-5,500 feet                             |        | ✓CH  | ✓     | ✓CH     | ✓CH  | ✓CH   |                                                                |
| No common name <i>Doryopteris angelica</i> (CH)                    | E                           | Ohia-koa montane mesic forest, 2,000-3,300 feet                                                                    |        |      |       |         |      | ✓CH   |                                                                |
| Palapalai aumakua <i>Dryopteris crinalis</i> var. <i>Podosorus</i> | E                           | Steep to vertical riparian basalt walls within dark seeping drainages in ohia montane wet forest, 4,000-5,100 feet |        |      |       |         |      | ✓CH   |                                                                |
| Hohiu <i>Dryopteris glabra</i> var. <i>pusilla</i>                 | E                           | Montane wet ecosystem on Kauai, in deep shade on rocky, mossy streambanks, in wet forests above 4,000 feet         |        |      |       |         |      | ✓     |                                                                |
| Na`ena`e <i>Dubautia herbstobatae</i> (CH)                         | E                           | Rock outcrops on north-facing ridges in dry shrubland, 1,900-3,000 feet                                            |        |      |       |         | ✓CH  |       |                                                                |
| Na`ena`e <i>Dubautia imbricata</i> ssp. <i>imbricata</i> (CH)      | E                           | Lowland wet ohia forest and bogs, 2,165-3,640 feet                                                                 |        |      |       |         |      | ✓CH   |                                                                |
| Na`ena`e <i>Dubautia kalalauensis</i> (CH)                         | E                           | Ohia wet forests, 4,000-4,050 feet                                                                                 |        |      |       |         |      | ✓CH   |                                                                |
| Na`ena`e <i>Dubautia kenwoodii</i> (CH)                            | E                           | Cliff face in mesic shrubland and forest, ~2,625 feet                                                              |        |      |       |         |      | ✓CH   |                                                                |

| Common Name and Scientific Name                                  | Listing Status <sup>a</sup> | Habitat Description                                                                                                                | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Kaholapehu <i>Dubautia latifolia</i> (CH)                        | E                           | Gentle to steep slopes on well-drained soil in semi-open, diverse montane mesic forest dominated by koa and ohia, 3,200-3,900 feet |        |      |       |         |      | ✓CH   |                                                             |
| Na'ena'e <i>Dubautia pauciflorula</i> (CH)                       | E                           | Stunted mesic forests and uluhe slopes, 2,000-3,300 feet                                                                           |        |      |       |         |      | ✓CH   |                                                             |
| Na'ena'e <i>Dubautia plantaginea</i> ssp. <i>humilis</i> (CH)    | E                           | Wet, barren, steep, rocky, wind-blown cliffs, 870-5,230 feet                                                                       |        | ✓CH  |       |         |      |       |                                                             |
| Na'ena'e <i>Dubautia plantaginea</i> ssp. <i>magnifolia</i> (CH) | E                           | Wet cliff and wet forest and shrubland, 1,542-2,395 feet                                                                           |        |      |       |         |      | ✓CH   |                                                             |
| Na'ena'e <i>Dubautia waialealae</i> (CH)                         | E                           | Bogs in montane wet areas, 3,980-5,249 feet                                                                                        |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Eragrostis fosbergii</i> (CH)                  | E                           | Ridge crests or moderate slopes in native or alien forests, 2,360-2,720 feet                                                       |        |      |       |         | ✓CH  |       |                                                             |
| Nioi <i>Eugenia koolauensis</i> (CH)                             | E                           | Dry gulches and ridges in mesic forests dominated by ohia and/or lama, 350-1,000 feet                                              |        |      |       | ✓CH     | ✓CH  |       |                                                             |
| No common name <i>Euphorbia haeleeleana</i> (CH)                 | E                           | Lowland mixed mesic or dry forests often dominated by ohia, ohia and koa, lama, or kukui, 680-2,200 feet                           |        |      |       |         | ✓CH  | ✓CH   |                                                             |

| Common Name and Scientific Name            | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                   | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|--------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Heau <i>Exocarpos luteolus</i> (CH)        | E                           | Variety of habitats: wet places bordering swamps; open, dry ridges; lowland to montane, ohia-dominated wet forest communities; 2,000-3,500 feet       |        |      |       |         |      | ✓CH   |                                                             |
| Heau <i>Exocarpos menziesii</i>            | E                           | Within the montane dry ecosystem, in Metrosideros shrubland or drier forest areas, and on lava flows with sparse vegetation, from 4,600 to 6,900 feet | ✓      |      | ✓     |         |      |       |                                                             |
| No common name <i>Festuca hawaiiensis</i>  | E                           | Within montane dry ecosystem in dry forests at 6,500 feet elevation                                                                                   | ✓      | ✓    |       |         |      |       |                                                             |
| Mehamehame <i>Flueggea neowawraea</i> (CH) | E                           | Dry to mesic forest, 820-3,280 feet                                                                                                                   | ✓CH    | ✓CH  |       | ✓CH     | ✓CH  | ✓CH   |                                                             |
| No common name <i>Gahnia lanaiensis</i>    | E                           | Shrubby rainforest on flat to gentle ridge crest topography, 3,000-3,360 feet                                                                         |        |      | ✓     |         |      |       |                                                             |
| Nanu <i>Gardenia brighamii</i>             | E                           | Dry forest, in rocky gulches, or on plateau lands with deep soils, or old forested lava flows, 1,000-1,800 feet                                       | ✓      | ✓    | ✓     | ✓       | ✓    |       |                                                             |
| Nanu <i>Gardenia mannii</i> (CH)           | E                           | Moderate to moderately steep gulch slopes in mesic or wet forests where ohia co-dominated with a mixture of native plants, 980-2,460 feet             |        |      |       |         | ✓CH  |       |                                                             |



| Common Name and Scientific Name                 | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                              | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Nanu <i>Gardenia remyi</i>                      | E                           | Within lowland mesic and wet ecosystems, in mesic to wet forest from 190 to 3,000 feet                                                                                                           | ✓      | ✓    |       | ✓       |      | ✓     |                                                             |
| Nohoanu <i>Geranium arboreum</i> (CH)           | E                           | Moist gulches, steep, narrow canyons in shaded, cloudy areas near the upper limit of native forest growth, 5,000-7,000 feet                                                                      |        | ✓CH  |       |         |      |       |                                                             |
| Nohoanu <i>Geranium kauaiense</i> (CH)          | E                           | Montane wet bogs and bog margins dominated by ohia and <i>Rhynchospora</i> , 4,000-4,800 feet                                                                                                    |        |      |       |         |      | ✓CH   |                                                             |
| Nohoanu <i>Geranium multiflorum</i> (CH)        | E                           | Found mostly in wet forests; however, also found in montane grasslands, montane bog edges, fog-swept lava flows, gulch slopes of montane wet forests, and subalpine shrublands, 5,183-7,415 feet |        | ✓CH  |       |         |      |       |                                                             |
| No common name <i>Gouania hillebrandii</i> (CH) | E                           | Lowland dry tropical ridges of weathered lava                                                                                                                                                    |        | ✓CH  | ✓     | ✓       |      |       | Kahoolawe                                                   |
| No common name <i>Gouania meyenii</i> (CH)      | E                           | Rocky ledges, cliff faces, and ridge tops in dry shrubland or ohia lowland mesic forest, 1,900-2,700 feet                                                                                        |        |      |       |         | ✓CH  | ✓CH   |                                                             |
| No common name <i>Gouania vitifolia</i> (CH)    | E                           | Dry to mesic forests, in gulches                                                                                                                                                                 | ✓CH    | ✓CH  |       |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                                        | Listing Status <sup>a</sup> | Habitat Description                                                                                                        | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|------------------------------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Haplostachys haplostachya</i>                        | E                           | Montane shrubland on basaltic plains, often associated with cinder cones and small hills, 5,000-6,000 feet                 | ✓      | ✓    |       |         |      | ✓     |                                                             |
| ʻAwiwi <i>Hedyotis cookiana</i> (CH)                                   | E                           | Streambeds or steep cliffs close to water sources in lowland wet forests, 560-1,200 feet                                   | ✓      |      |       |         |      | ✓CH   |                                                             |
| Kioʻele <i>Hedyotis coriacea</i> (CH)                                  | E                           | Steep, rocky slopes in dry to mesic in aalii ( <i>Dodonaea viscosa</i> ) dominated shrublands or forests, 1,560-7,500 feet | ✓CH    | ✓CH  |       |         | ✓CH  |       |                                                             |
| No common name <i>Hedyotis degeneri</i> var. <i>coprosmifolia</i> (CH) | E                           | Diverse mesic forests, 1,198-1,247 feet                                                                                    |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Hedyotis degeneri</i> var. <i>degeneri</i> (CH)      | E                           | Dry to mesic habitats on and around steep cliffs in montane forests, 1,198-1,247 feet                                      |        |      |       |         | ✓CH  |       |                                                             |
| Pilo <i>Hedyotis mannii</i> (CH)                                       | E                           | Dark, narrow, rocky gulch walls in mesic and wet forests, 490-3,450 feet                                                   |        | ✓CH  | ✓     | ✓       |      |       |                                                             |
| No common name <i>Hedyotis parvula</i> (CH)                            | E                           | On and at the bases of cliff faces, rock outcrops, and ledges in dry habitat, 2,350-2,730 feet                             |        |      |       |         | ✓CH  |       |                                                             |
| Kopa <i>Hedyotis schlechtendahlana</i> var. <i>remyi</i>               | E                           | On or near ridge crests in mesic windswept mixed shrubland, 2,400-3,000 feet                                               |        |      | ✓     |         |      |       |                                                             |

| Common Name and Scientific Name                                            | Listing Status <sup>a</sup> | Habitat Description                                                                                                                             | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|----------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Hedyotis st.-johnii</i> (CH)                             | E                           | Crevice of near-vertical coastal cliff faces, confined to north-facing cliffs within the spray zone below 250 feet                              |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Hesperomannia arborescens</i> (CH)                       | E                           | Slopes or ridges in lowland wet forests or scrub, 1,200-2,500 feet                                                                              |        | ✓    | ✓     | ✓CH     | ✓CH  |       |                                                             |
| No common name <i>Hesperomannia arbuscula</i> (CH)                         | E                           | Slopes and ridges in mesic to wet forests dominated by koa and ohia, 1,200-3,000 feet                                                           |        | ✓CH  |       |         | ✓CH  |       |                                                             |
| No common name <i>Hesperomannia lydgatei</i> (CH)                          | E                           | Ohia wet forests on or near streambanks, 2,165-2,540 feet                                                                                       |        |      |       |         |      | ✓CH   |                                                             |
| Hau kuahiwi <i>Hibiscadelphus distans</i>                                  | E                           | Dry forests and shrublands on bluffs and cliff edges on basaltic bedrock overlain by dry, crumbly red-brown soil (inceptisol), 1,000-1,800 feet |        |      |       |         |      | ✓     |                                                             |
| Hau kuahiwi <i>Hibiscadelphus giffardianus</i> (CH)                        | E                           | Mixed montane mesic forests, 3,900-4,300 feet                                                                                                   | ✓CH    |      |       |         |      |       |                                                             |
| Hau kuahiwi <i>Hibiscadelphus hualalaiensis</i> (CH)                       | E                           | Mixed dry to mesic forests remnants on lava fields, 3,000-3,350 feet                                                                            | ✓CH    |      |       |         |      |       |                                                             |
| Hau kuahiwi <i>Hibiscadelphus woodii</i> (CH)                              | E                           | Basalt talus or cliff walls in ohia montane mesic forest around 3,000 feet                                                                      |        |      |       |         |      | ✓CH   |                                                             |
| Koki'o ke'oke'o <i>Hibiscus arnottianus</i> ssp. <i>immaculatus</i> (CH)   | E                           | Mesic forests, 50-1,600 feet                                                                                                                    |        |      |       | ✓       |      |       |                                                             |
| Ma'o hau hele <i>Hibiscus brackenridgei</i> ssp. <i>brackenridgei</i> (CH) | E                           | Lowland dry forest and plains, 800-1,400 feet                                                                                                   | ✓CH    | ✓CH  | ✓     |         |      |       |                                                             |

| Common Name and Scientific Name                                          | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                       | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|--------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Ma`o hau hele <i>Hibiscus brackenridgei</i> ssp. <i>mokuleianus</i> (CH) | E                           | Lowland dry to mesic forest and shrubland, 394-787 feet                                                                                                                                   |        |      |       | ✓CH     | ✓CH  |       |                                                             |
| Ma`o hau hele <i>Hibiscus brackenridgei</i> ssp. <i>molokaiana</i> (CH)  | E                           | Dry grassland, shrubland and forest                                                                                                                                                       |        |      |       | ✓CH     | ✓CH  |       |                                                             |
| Koki`o `ula`ula <i>Hibiscus clayi</i> (CH)                               | E                           | Lowland dry forest on slopes, 750-1,150 feet                                                                                                                                              |        |      |       |         |      | ✓CH   |                                                             |
| Koki`o ke`oke`o <i>Hibiscus waimeae</i> ssp. <i>hannerae</i> (CH)        | E                           | Lowland wet or mesic forest, 620-1,850 feet                                                                                                                                               |        |      |       |         |      | ✓CH   |                                                             |
| Wawae`iole <i>Huperzia mannii</i> (CH)                                   | E                           | Grows on plants such as ohia, aalii or koa in mesic to wet montane forests, 1,969-5,250 feet                                                                                              | ✓      | ✓    |       |         |      | ✓     |                                                             |
| Wawae`iole <i>Huperzia nutans</i> (CH)                                   | E                           | Grows on the ground or on tree trunks and limbs, in wet forests and shrubland on ridge crests and slopes in ohia-dominated wet and mesic forests, 2,000-3,500 feet                        |        |      |       |         | ✓    | ✓     |                                                             |
| No common name <i>Huperzia stemmermanniae</i>                            | E                           | Within montane wet ecosystem, on rough bark of living trees or fallen logs in <i>Metrosideros polymorpha</i> - <i>Acacia koa</i> forest on the island of Hawaii, from 3,200 to 3,800 feet | ✓      | ✓    |       |         |      |       |                                                             |
| Olua <i>Hypolepis hawaiiensis</i> var. <i>mauiensis</i>                  | E                           | Wet forests within montane wet ecosystem                                                                                                                                                  |        | ✓    |       |         |      |       |                                                             |
| Hilo ischaemum <i>Ischaemum byrone</i> (CH)                              | E                           | Coastal dry shrubland near the ocean among rocks and cliffs, 0-250 feet                                                                                                                   | ✓CH    | ✓CH  |       | ✓CH     | ✓    | ✓CH   |                                                             |

| Common Name and Scientific Name                       | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                                                                                                      | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Aupaka <i>Isodendrion hosakae</i> (CH)                | E                           | Dry shrubland and grassland on cinder cones, 2,953-3,379 feet                                                                                                                                                                                                            | ✓CH    |      |       |         |      |       |                                                             |
| Aupaka <i>Isodendrion laurifolium</i> (CH)            | E                           | Diverse mesic forest, or rarely wet forest, dominated by ohia, koa and ohia, or ohia and lama, 1,620-2,700 feet                                                                                                                                                          |        |      |       |         | ✓CH  | ✓CH   |                                                             |
| Aupaka <i>Isodendrion longifolium</i> (CH)            | T                           | Steep slopes, gulches, and stream banks in mixed mesic or wet ohia forest, 1,350-2,500 feet                                                                                                                                                                              |        |      |       |         | ✓CH  | ✓CH   |                                                             |
| Wahine noho kula <i>Isodendrion pyriformis</i> (CH)   | E                           | Bare rocky hills and wooded ravines in dry shrublands, 1,191-3,162 feet                                                                                                                                                                                                  | ✓      | ✓CH  | ✓     | ✓CH     | ✓CH  |       | Niihau                                                      |
| Ohe <i>Joinvillea ascendens</i> ssp. <i>Ascendens</i> | E                           | Wet to mesic lowland and montane forests                                                                                                                                                                                                                                 | ✓      | ✓    |       | ✓       | ✓    | ✓     |                                                             |
| Kamapuaa <i>Kadua fluviatilis</i>                     | E                           | On Kauai, within lowland mesic ecosystem, in mixed native shrubland and <i>Metrosideros</i> forest from 750 to 2,200 feet and in open shrubland with sparse tree cover; on Oahu, occurs along rocky streambanks in wet <i>Metrosideros</i> forest from 820 to 1,990 feet |        |      |       |         | ✓    | ✓     |                                                             |

| Common Name and Scientific Name                                   | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                      | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Kadua haupuensis</i>                            | E                           | Limited historical information, but recently discovered from one occurrence along cliffs in an isolated area of southern Kauai, from 980 to 1,640 feet, within a lowland mesic ecosystem |        |      |       |         |      | ✓     |                                                             |
| Kohe malama malama o Kanaloa<br><i>Kanaloa kahoolawensis</i> (CH) | E                           | Steep rocky talus slopes in mixed coastal shrubland, 150-200 feet                                                                                                                        |        |      |       |         |      |       | Kahoolawe<br>CH                                             |
| No common name <i>Keysseria erici</i> (CH)                        | E                           | Ohia mixed bogs, 4,000-5,120 feet                                                                                                                                                        |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Keysseria helenae</i> (CH)                      | E                           | Ohia or mixed sedge and grass bogs, 3,900-5,120 feet                                                                                                                                     |        |      |       |         |      | ✓CH   |                                                             |
| Koki`o <i>Kokia cookei</i>                                        | E                           | Dryland forest on the western (leeward) end of Molokai, ~660 feet                                                                                                                        |        |      |       | ✓       |      |       |                                                             |
| Hau hele `ula; koki`o <i>Kokia drynarioides</i> (CH)              | E                           | Native dry forests on rough lava with a thin, extremely well-drained soil, 1,493-6,283 feet                                                                                              | ✓CH    |      |       |         |      |       |                                                             |
| Koki`o <i>Kokia kauaiensis</i> (CH)                               | E                           | Diverse mesic forest, 1,960-2,600 feet                                                                                                                                                   |        |      |       |         |      | ✓CH   |                                                             |
| Kamakahala <i>Labordia cyrtandrae</i> (CH)                        | E                           | Shady gulches, slopes, and glens in mesic to wet forests and shrublands dominated by ohia, uluhe lau nui ( <i>Diplopterygium pinnatum</i> ), and/or koa, 695-4,044 feet                  |        |      |       |         | ✓CH  |       |                                                             |
| Kamakahala <i>Labordia helleri</i> (CH)                           | E                           | Ohia-koa-uluhe mesic to wet forest, 1,200-3,900 feet                                                                                                                                     |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                         | Listing Status <sup>a</sup> | Habitat Description                                                                                                 | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Labordia lorenciana</i>                               | E                           | Forests in montane mesic ecosystem at 3,800 feet                                                                    |        |      |       |         |      | ✓     |                                                             |
| Kamakahala <i>Labordia lydgatei</i> (CH)                                | E                           | Wet forests on ridge slopes dominated by ohia and uluhe, ~1,300 feet                                                |        |      |       |         |      | ✓CH   |                                                             |
| Kamakahala <i>Labordia pumila</i> (CH)                                  | E                           | Ohia mixed sedge and grass bogs in montane wet ecosystems, 3,478-5,100 feet                                         |        |      |       |         |      | ✓CH   |                                                             |
| Kamakahala <i>Labordia tinifolia</i> var. <i>lanaiensis</i>             | E                           | Lowland mesic forest associated with uluhe and naupaka kuahiwi ( <i>Scaevola chamissoiniana</i> ), 2,330-3,350 feet |        |      | ✓     |         |      |       |                                                             |
| Kamakahala <i>Labordia tinifolia</i> var. <i>wahiawaensis</i> (CH)      | E                           | Along streams in lowland wet forests dominated by ohia, often in association with olapa or uluhe                    |        |      |       |         |      | ✓CH   |                                                             |
| Kamakahala <i>Labordia triflora</i> (CH)                                | E                           | Gulch slopes in mixed mesic ohia forest, 625-3,755 feet                                                             |        |      |       | ✓CH     |      |       |                                                             |
| Anaunau <i>Lepidium arbuscula</i> (CH)                                  | E                           | Exposed ridge tops and cliff faces in mesic communities, 755-3,000 feet                                             |        |      |       |         | ✓CH  |       |                                                             |
| Anaunau <i>Lepidium orbiculare</i>                                      | E                           | Mesic forests in the lowland mesic ecosystem                                                                        |        |      |       |         |      | ✓     |                                                             |
| Nehe <i>Lipochaeta lobata</i> var. <i>leptophylla</i> (CH)              | E                           | Dry coastal habitats and shrubland, 1500-2,500 feet                                                                 |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Lobelia gaudichaudii</i> ssp. <i>koolauensis</i> (CH) | E                           | Moderate to steep slopes in ohia or ohia-uluhe lowland wet shrublands, 2,100-2,400 feet                             |        |      |       |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                 | Listing Status <sup>a</sup> | Habitat Description                                                                                                                  | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Lobelia monostachya</i> (CH)  | E                           | Steep, sparsely vegetated cliffs in mesic shrubland, 144-2,014 feet                                                                  |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Lobelia niihauensis</i> (CH)  | E                           | Exposed mesic to dry cliffs, 330-2,720 feet                                                                                          |        |      |       |         | ✓CH  | ✓CH   | Niihau                                                      |
| No common name <i>Lobelia oahuensis</i> (CH)    | E                           | Summit cliffs in cloud-swept wet forests or in areas of low shrub cover frequently exposed to heavy wind and rain, 2,800-3,000 feet  |        |      |       |         | ✓CH  |       |                                                             |
| Lehua makanoe <i>Lysimachia daphnoides</i> (CH) | E                           | Ohia mixed bogs on hummocks, 3,960-4,440 feet                                                                                        |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Lysimachia filifolia</i> (CH) | E                           | Mossy banks at the base of cliff faces, within the spray zone of waterfalls, or along streams in lowland wet forests, 800-2,200 feet |        |      |       |         | ✓CH  | ✓CH   |                                                             |
| No common name <i>Lysimachia iniki</i> (CH)     | E                           | Wet, mossy, or rocky cliffs in wet cliff communities, ~2,400 feet                                                                    |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Lysimachia lydgatei</i> (CH)  | E                           | Stunted native vegetation on the sides of steep ridges and slopes in mesic shrubland, 2,700-3,200 feet                               |        | ✓CH  |       |         |      |       |                                                             |
| No common name <i>Lysimachia maxima</i> (CH)    | E                           | Ohia-uluhe montane wet forest, ~3,200 feet                                                                                           |        |      |       | ✓CH     |      |       |                                                             |
| No common name <i>Lysimachia pendens</i> (CH)   | E                           | Wet, mossy, or rocky cliffs in wet cliff ecosystem, ~2,400 feet                                                                      |        |      |       |         |      | ✓CH   |                                                             |



| Common Name and Scientific Name                                                                      | Listing Status <sup>a</sup> | Habitat Description                                                                                                       | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Lysimachia scopulensis</i> (CH)                                                    | E                           | Cliffs in lowland diverse mesic forest pockets, 2,950-3,200 feet                                                          |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Lysimachia venosa</i> (CH)                                                         | E                           | Ohia dominated wet forest areas in wet cliff ecosystem, 3,000-5,700 feet                                                  |        |      |       |         |      | ✓CH   |                                                             |
| ʻIhi <i>Marsilea villosa</i> (CH)                                                                    | E                           | Open areas that flood periodically, such as shallow depressions and floodplains with clay soils, <500 feet                |        |      |       | ✓       | ✓CH  |       | Niihau                                                      |
| Nehe <i>Melanthera fauriei</i> (CH) (listed as <i>Lipochaeta fauriei</i> )                           | E                           | Moderate shade to full sun, often on the sides of steep gulches in diverse lowland mesic forests, 1,570-2,950 feet        |        |      |       |         |      | ✓CH   |                                                             |
| Nehe <i>Melanthera kamolensis</i> (CH) (listed as <i>Lipochaeta kamolensis</i> )                     | E                           | Lowland dry forest or shrubland, 131-1,969 feet                                                                           |        | ✓CH  |       |         |      |       |                                                             |
| Nehe <i>Melanthera micrantha</i> ssp. <i>exigua</i> (CH) (listed as <i>Lipochaeta micrantha</i> )    | E                           | Diverse mesic forest, 980-1,310 feet                                                                                      |        |      |       |         |      | ✓CH   |                                                             |
| Nehe <i>Melanthera micrantha</i> ssp. <i>micrantha</i> (CH) (listed as <i>Lipochaeta micrantha</i> ) | E                           | Diverse mesic forest, 980-1,310 feet                                                                                      |        |      |       |         |      | ✓CH   |                                                             |
| Nehe <i>Melanthera tenuifolia</i> (CH) (listed as <i>Lipochaeta tenuifolia</i> )                     | E                           | Ridgetops and cliff faces in open areas and protected pockets of diverse mesic forest dominated by ohia, 1,200-3,000 feet |        |      |       |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                                                       | Listing Status <sup>a</sup> | Habitat Description                                                                                                  | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|---------------------------------------------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Nehe <i>Melanthera venosa</i> (listed as <i>Lipochaeta venosa</i> )                   | E                           | Dry and windy montane dry shrubland dominated by exotic grasses, associated with well drained volcanic cinder or ash | ✓      |      |       |         |      |       |                                                             |
| Nehe <i>Melanthera waimeaensis</i> (CH)<br>(listed as <i>Lipochaeta waimeaensis</i> ) | E                           | Shrub-covered gulch in diverse lowland mesic forest, 1,150-1,300 feet                                                |        |      |       |         | ✓CH  |       |                                                             |
| Alani <i>Melicope adscendens</i> (CH)                                                 | E                           | Dry, open forest, 3,280-4,000 feet                                                                                   |        | ✓CH  |       |         |      |       |                                                             |
| Alani <i>Melicope balloui</i> (CH)                                                    | E                           | Koa and ohia dominated montane wet forests, 2,500-5,000 feet                                                         |        | ✓CH  |       |         |      |       |                                                             |
| Alani <i>Melicope degeneri</i> (CH)                                                   | E                           | Ohia-olapa-uluhe montane wet forest, 3,000-3,800 feet                                                                |        |      |       |         |      | ✓CH   |                                                             |
| Alani <i>Melicope haupuensis</i> (CH)                                                 | E                           | Moist talus slopes in ohia dominated lowland mesic forests, 1,230-2,690 feet                                         |        |      |       |         |      | ✓CH   |                                                             |
| Alani <i>Melicope knudsenii</i> (CH)                                                  | E                           | Forested flats or talus slopes in lowland dry to mesic forests, 1,500-3,300 feet                                     |        | ✓CH  |       |         |      | ✓CH   |                                                             |
| Alani <i>Melicope lydgatei</i> (CH)                                                   | E                           | Open ridges in mesic forests and occasionally in wet forests, 1,350-1,800 feet                                       |        |      |       |         | ✓CH  |       |                                                             |
| Alani <i>Melicope mucronulata</i> (CH)                                                | E                           | Dryland forest on leeward side, 2,200-2,850 feet                                                                     |        | ✓CH  |       | ✓CH     |      |       |                                                             |
| Alani <i>Melicope munroi</i>                                                          | E                           | Slopes in lowland wet shrublands, 2,600-3,350 feet                                                                   |        |      | ✓     | ✓       |      |       |                                                             |

| Common Name and Scientific Name                                   | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                 | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| <i>Alani Melicope ovalis</i> (CH)                                 | E                           | Ohia and koa forest, especially on stable banks of watercourses, 2,800-4,700 feet                                                                                   |        | ✓CH  |       |         |      |       |                                                             |
| <i>Alani Melicope pallida</i> (CH)                                | E                           | Steep rock faces in drier regions of lowland mesic forest, 1,600-3,000 feet                                                                                         |        |      |       |         | ✓CH  | ✓CH   |                                                             |
| <i>Alani Melicope paniculata</i> (CH)                             | E                           | Lowland wet forests dominated by ohia, 1,200-2,680 feet                                                                                                             |        |      |       |         |      | ✓CH   |                                                             |
| <i>Alani Melicope puberula</i> (CH)                               | E                           | Lowland wet and montane forests and bogs, 2,080-4,100 feet                                                                                                          |        |      |       |         |      | ✓CH   |                                                             |
| <i>Alani Melicope quadrangularis</i>                              | E                           | Diverse lowland mesic to wet forests                                                                                                                                |        |      |       |         |      | ✓     |                                                             |
| <i>Alani Melicope reflexa</i> (CH)                                | E                           | Wet ohia-dominated forests, 2,490-3,900 feet                                                                                                                        |        |      |       | ✓CH     |      |       |                                                             |
| <i>Alani Melicope saint-johnii</i> (CH)                           | E                           | Mesic forested ridges, 1,640-2,800 feet                                                                                                                             |        |      |       |         | ✓CH  |       |                                                             |
| <i>Alani Melicope zahlbruckneri</i> (CH)                          | E                           | Koa and ohia dominated montane mesic forest, 3,920-4,265 feet                                                                                                       | ✓CH    |      |       |         |      |       |                                                             |
| No common name <i>Microlepidia strigosa</i> var. <i>mauiensis</i> | E                           | Mesic to wet forest from 1,400 to 6,000 feet, in the lowland mesic (Oahu), montane mesic (island of Hawaii), and montane wet (Maui and island of Hawaii) ecosystems | ✓      | ✓    |       |         |      | ✓     |                                                             |

| Common Name and Scientific Name                    | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                                                                                                                                                                                          | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|----------------------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Munroidendron racemosum</i> (CH) | E                           | Steep exposed cliffs or on ridge slopes in coastal to lowland mesic forests, few populations in mesic hala ( <i>Pandanus tectorius</i> ) forest                                                                                                                                                                                                              |        |      |       |         |      | ✓CH   |                                                             |
| Kolea <i>Myrsine fosbergii</i>                     | E                           | In Oahu, <i>Metrosideros</i> –mixed native shrubland, from 2,200 to 2,800 feet; in Kauai, <i>Metrosideros-Diospyros</i> (ohia-lama) lowland mesic forest and <i>Metrosideros Cheirodendron</i> (ohia-olapa) montane wet forest, often on watercourses or stream banks, from 900 to 4,300 feet; in the lowland mesic, lowland wet, and montane wet ecosystems |        |      |       |         | ✓    | ✓     |                                                             |
| Kolea <i>Myrsine juddii</i> (CH)                   | E                           | Wet forests dominated by ohia or ohia and uluhe, 1,900-2,820 feet                                                                                                                                                                                                                                                                                            |        |      |       |         | ✓CH  |       |                                                             |
| Kolea <i>Myrsine knudsenii</i> (CH)                | E                           | Koa-ohia-uluhe forest, 3,200-3,900 feet                                                                                                                                                                                                                                                                                                                      |        |      |       |         |      | ✓CH   |                                                             |
| Kolea <i>Myrsine linearifolia</i> (CH)             | T                           | Mesic to wet ohia forests sometimes co-dominant with uluhe or olapa, 1,920-4,200 feet                                                                                                                                                                                                                                                                        |        |      |       |         |      | ✓CH   |                                                             |
| Kolea <i>Myrsine mezii</i> (CH)                    | E                           | Montane mesic to wet koa-ohia forest, 3,380-3,480 feet                                                                                                                                                                                                                                                                                                       |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                   | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                     | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Neraudia angulata</i> var. <i>angulata</i> (CH) | E                           | Slopes, ledges, or gulches in diverse mesic forest, 1,200-2,700 feet                                                                                                    |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Neraudia angulata</i> var. <i>dentata</i> (CH)  | E                           | Slopes, ledges, or gulches in diverse mesic forest, 1,200-2,700 feet                                                                                                    |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Neraudia ovata</i> (CH)                         | E                           | Open ohia and mamane ( <i>Sophora chrysophylla</i> ) lowland and montane dry forests, 380-5,000 feet                                                                    | ✓CH    |      |       |         |      |       |                                                             |
| No common name <i>Neraudia sericea</i> (CH)                       | E                           | Lowland dry to mesic ohia-aalii-pukiawe ( <i>Styphelia tameiameia</i> ) shrubland or forest, 2,200-4,500 feet                                                           |        | ✓CH  | ✓     | ✓CH     |      |       | Kahoolawe                                                   |
| ʻAiea <i>Nothocestrum breviflorum</i> (CH)                        | E                           | Lowland and montane dry forest and montane mesic forest dominated by ohia, koa, and/or lama, on aʻa lava substrate, 260-6,000 feet                                      | ✓CH    |      |       |         |      |       |                                                             |
| <i>Aiea Nothocestrum latifolium</i>                               | E                           | Dry to mesic forest in the dry cliff (Kauai, Oahu, Lanai, and Maui), lowland dry (Oahu, Lanai, and Maui), and lowland mesic (Oahu, Molokai, Lanai, and Maui) ecosystems |        | ✓    | ✓     | ✓       | ✓    | ✓     |                                                             |
| ʻAiea <i>Nothocestrum peltatum</i> (CH)                           | E                           | Rich soils in steep slopes in montane mesic forests dominated by koa or ohia and koa, 3,000-4,000 feet                                                                  |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                      | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|----------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Kulu'i <i>Nototrichium humile</i> (CH)                               | E                           | Cliff faces, gulches, or steep slopes in remnants of open dry forests often dominated by aulu ( <i>Sapindus</i> ) or lama, 200-2,300 feet                                          |        | ✓CH  |       |         | ✓CH  |       |                                                             |
| Holei <i>Ochrosia haleakalae</i>                                     | E                           | Dry to mesic forest, wet forest, and often lava, from 2,300 to 4,000 feet, in the dry cliff (Maui), lowland mesic (Maui and island of Hawaii), and montane mesic (Maui) ecosystems | ✓      | ✓    |       |         |      |       |                                                             |
| Holei <i>Ochrosia kilaueaensis</i>                                   | E                           | Montane mesic forest, 2,200-4,000 feet                                                                                                                                             | ✓      |      |       |         |      |       |                                                             |
| Carter's panic grass <i>Panicum fauriei</i> var. <i>carteri</i> (CH) | E                           | Basalt substrate of windward coastal cliffs within the salt spray zone                                                                                                             |        | ✓    | ✓     | ✓       | ✓CH  |       |                                                             |
| Lau'ehu <i>Panicum niihauense</i> (CH)                               | E                           | Dry coastal habitats, calcareous sand dunes and rocky knolls, 30-50 feet                                                                                                           |        |      |       |         |      | ✓CH   | Niihau                                                      |
| Makou <i>Peucedanum sandwicense</i> (CH)                             | T                           | Cliff habitats up to 3,000 feet                                                                                                                                                    |        | ✓CH  |       | ✓CH     | ✓CH  | ✓CH   |                                                             |
| No common name <i>Phyllostegia brevidens</i>                         | E                           | Wet forest on the islands of Maui and Hawaii from 2,900 to 3,200 feet, in the lowland wet (Maui), montane wet (Hawaii), and wet cliff (Maui) ecosystems                            | ✓      | ✓    |       |         |      |       |                                                             |

| Common Name and Scientific Name                                                            | Listing Status <sup>a</sup> | Habitat Description                                                                                                     | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|--------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Ulihi <i>Phyllostegia glabra</i> var. <i>lanaiensis</i>                                    | E                           | Lowland mesic to wet forest in gulch bottoms and sides, often in quite steep areas                                      |        |      | ✓     |         |      |       |                                                             |
| No common name <i>Phyllostegia haliakalae</i> (listed as <i>Phyllostegia mollis</i> ) (CH) | E                           | Steep slopes and gulches in diverse mesic to wet forests, 1,500-6,000 feet                                              |        | ✓CH  |       | ✓       | ✓CH  |       |                                                             |
| No common name <i>Phyllostegia helleri</i>                                                 | E                           | On ridges or spurs from 2,800 to 4,000 feet in diverse forest in the lowland wet, montane wet, and wet cliff ecosystems |        |      |       |         |      | ✓     |                                                             |
| No common name <i>Phyllostegia hirsuta</i> (CH)                                            | E                           | Steep, shaded slopes in mesic to wet forests dominated by ohia or ohia and uluhe, 1,970-3,610 feet                      |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Phyllostegia hispida</i>                                                 | E                           | Wet ohia-dominated forest, dependent on disturbed habitat such as landslides and riparian areas 3,650-4,200 feet        |        |      |       | ✓       |      |       |                                                             |
| No common name <i>Phyllostegia kaalaensis</i> (CH)                                         | E                           | Gulch slopes and bottom and on almost vertical rock faces in mesic forest or aulu forest, 1,227-2,611 feet              |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Phyllostegia knudsenii</i> (CH)                                          | E                           | Ohia lowland mesic forest, ~2,840 feet                                                                                  |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Phyllostegia mannii</i> (CH)                                             | E                           | Shaded sites in sometimes foggy and windswept, wet, open, ohia-dominated forests, 3,300-5,000 feet                      |        | ✓CH  |       | ✓CH     |      |       |                                                             |

| Common Name and Scientific Name                                                   | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                             | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-----------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Phyllostegia mollis</i>                                         | E                           | Steep slopes and gulches in diverse mesic to wet forests, 1,500-6,000 feet                                                                                      |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Phyllostegia parviflora</i> var. <i>glabriuscula</i>            | E                           | Moderate to steep slopes in diverse wet forest, 1,640-2,700 feet                                                                                                | ✓      |      |       |         |      |       |                                                             |
| No common name <i>Phyllostegia parviflora</i> var. <i>lydgatei</i> (CH)           | E                           | Mesic forests on gulch slopes, restricted to north-facing slopes                                                                                                |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Phyllostegia parviflora</i> var. <i>parviflora</i> (CH)         | E                           | Wet submontane forest dominated by ohia, restricted to streambanks and below waterfalls                                                                         |        | ✓    |       |         | ✓CH  |       |                                                             |
| No common name <i>Phyllostegia pilosa</i> (listed as <i>Phyllostegia mollis</i> ) | E                           | Steep slopes and gulches in diverse mesic to wet forests, 1,500-6,000 feet                                                                                      |        | ✓CH  |       | ✓CH     |      |       |                                                             |
| Kiponapona <i>Phyllostegia racemosa</i> (CH)                                      | E                           | Epiphyte on disturbed koa, ohia, and tree fern dominated montane mesic or wet forests, 4,650-6,070 feet                                                         | ✓CH    |      |       |         |      |       |                                                             |
| No common name <i>Phyllostegia renovans</i> (CH)                                  | E                           | Ohia dominated wet forests, often near streams, 2,700-3,700 feet                                                                                                |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Phyllostegia stachyoides</i>                                    | E                           | Mesic to wet forest from 3,600 to 4,600 feet, in the montane wet (island of Hawaii, Maui, and Molokai) and montane mesic (island of Hawaii and Maui) ecosystems | ✓      | ✓    |       | ✓       |      |       |                                                             |
| No common name <i>Phyllostegia velutina</i> (CH)                                  | E                           | Ohia and koa dominated montane mesic and wet forests, 4,900-6,000 feet                                                                                          | ✓CH    |      |       |         |      |       |                                                             |



| Common Name and Scientific Name                                     | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                          | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|---------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Phyllostegia waimeae</i> (CH)                     | E                           | Well-drained soils in clearings or along the banks of streams of diverse montane mesic to wet forests, 3,000-3,900 feet                                                      |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Phyllostegia warshaueri</i> (CH)                  | E                           | Wet forests on old volcanic substrates, grows in ohia and hapuu montane wet forest where koa or olapa may codominate, 2,395-3,773 feet                                       | ✓CH    |      |       |         |      |       |                                                             |
| No common name <i>Phyllostegia wawrana</i> (CH)                     | E                           | Ohia-dominated forest with either olapa or uluhe as codominant                                                                                                               |        |      |       |         |      | ✓CH   |                                                             |
| Hoawa <i>Pittosporum napaliense</i> (CH)                            | E                           | <i>Pandanus</i> and lowland mesic forest, 400-2,100 feet                                                                                                                     |        |      |       |         |      | ✓CH   |                                                             |
| Laukahi kuahiwi <i>Plantago hawaiiensis</i> (CH)                    | E                           | Variable, either in montane wet sedgeland with mixed sedges and grasses, or in montane mesic forest with stunted koa and ohia often growing in lava cracks, 5,900-8,040 feet | ✓CH    |      |       |         |      |       |                                                             |
| Laukahi kuahiwi <i>Plantago princeps</i> var. <i>anomala</i> (CH)   | E                           | Steep slopes, rock walls, or at bases of waterfalls, 1,580-3,600 feet                                                                                                        |        |      |       |         |      | ✓CH   |                                                             |
| Laukahi kuahiwi <i>Plantago princeps</i> var. <i>laxiflora</i> (CH) | E                           | Steep slopes, rock walls, or at bases of waterfalls, 1,580-3,600 feet                                                                                                        | ✓      | ✓CH  |       | ✓CH     |      |       |                                                             |

| Common Name and Scientific Name                                          | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                  | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|--------------------------------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Laukahi kuahiwi <i>Plantago princeps</i> var. <i>longibracteata</i> (CH) | E                           | Steep slopes, rock walls, or at bases of waterfalls, 1,580-3,600 feet                                                                                                |        |      |       |         | ✓CH  | ✓CH   |                                                             |
| Laukahi kuahiwi <i>Plantago princeps</i> var. <i>princeps</i> (CH)       | E                           | Steep slopes, rock walls, or at bases of waterfalls, 1,580-3,600 feet                                                                                                |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Platanthera holochila</i> (CH)                         | E                           | Ohia-uluhe montane wet forest or ohia mixed montane bog, 3,450-6,120 feet                                                                                            |        | ✓CH  |       | ✓       | ✓CH  | ✓CH   |                                                             |
| Pilo kea lau lii <i>Platydesma rostrata</i> (CH)                         | E                           | Lowland mesic, lowland wet, wet cliff, montane mesic, and montane wet ecosystems in forest dominated by koa and ohia, 2,500-4,000 feet                               |        |      |       |         |      | ✓CH   |                                                             |
| Hala pepe <i>Pleomele hawaiiensis</i> (CH)                               | E                           | Open a'a lava in diverse lowland dry forests, 1,000-2,700 feet                                                                                                       | ✓CH    |      |       |         |      |       |                                                             |
| No common name <i>Poa mannii</i> (CH)                                    | E                           | Cliffs and rock faces in lowland and montane mesic forests, 1,510-3,700 feet                                                                                         |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Poa sandvicensis</i> (CH)                              | E                           | Wet, shaded, gentle to usually steep slopes, ridges and rock ledges in semi-open to closed, mesic to wet, diverse montane forest dominated by ohia, 3,400-4,100 feet |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Poa siphonoglossa</i> (CH)                             | E                           | Shady banks near ridge crests in predominantly native mesic ohia forest, 3,300-3,900                                                                                 |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name             | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                                  | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|---------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Po'e <i>Portulaca sclerocarpa</i> (CH)      | E                           | Montane dry shrubland, often on bare cinder, near steam vents, and in open ohia woodlands, 1,030-1,630 feet                                                                                          | ✓CH    |      | ✓CH   |         |      |       |                                                             |
| Ihi <i>Portulaca villosa</i>                | E                           | Dry, rocky, clay, lava, or coralline reef sites, from sea level to 1,600 feet, in the coastal and lowland dry ecosystems                                                                             | ✓      | ✓    | ✓     | ✓       | ✓    | ✓     | ✓                                                           |
| Loulu <i>Pritchardia affinis</i>            | E                           | Coastal mesic forest, often near or in brackish water, <2,000 feet                                                                                                                                   | ✓      |      |       |         |      |       |                                                             |
| Wahane <i>Pritchardia aylmer-robinsonii</i> | E                           | Rugged, steep talus slopes                                                                                                                                                                           |        |      |       |         |      |       | Niihau                                                      |
| Baker's loulu <i>Pritchardia bakeri</i>     | E                           | Lowland mesic ecosystem in the Koolau Mountains on Oahu, from 1,500 to 2,100 feet, in disturbed, windswept, and mostly exposed shrubby or grassy areas, and sometimes on steep slopes in these areas |        |      |       |         | ✓    |       |                                                             |
| Loulu <i>Pritchardia hardyi</i>             | E                           | Lowland wet ohia-uluhe forest and shrubland and on windswept windward ridges and headwater drainages, 1,800-3,400 feet                                                                               |        |      |       |         |      | ✓CH   |                                                             |
| Loulu <i>Pritchardia kaalae</i>             | E                           | Steep slopes and gulches in mesic forest and shrubland, 1,500-3,100 feet                                                                                                                             |        |      |       |         | ✓    |       |                                                             |

| Common Name and Scientific Name                                      | Listing Status <sup>a</sup> | Habitat Description                                                                               | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|----------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Loulu <i>Pritchardia munroi</i>                                      | E                           | Remnant dry to mesic forest, ~2,000 feet                                                          |        |      |       | ✓       |      |       |                                                             |
| Loulu <i>Pritchardia napaliensis</i>                                 | E                           | Wide variety of habitats from lowland dry to mesic forests to montane wet forests, 500-3,800 feet |        |      |       |         |      | ✓     |                                                             |
| Loulu <i>Pritchardia remota</i> (CH)                                 | E                           | Valleys and at the base of basaltic cliffs, 50-500 feet                                           |        |      |       |         |      |       | Nihoa CH                                                    |
| Loulu <i>Pritchardia schattaueri</i>                                 | E                           | Ohia dominated lowland mesic forest, 1,970-2,600 feet                                             | ✓      |      |       |         |      |       |                                                             |
| Loulu <i>Pritchardia viscosa</i>                                     | E                           | Ohia-uluhe lowland wet forest, 1,640-2,300 feet                                                   |        |      |       |         |      | ✓     |                                                             |
| Enaena <i>Pseudognaphalium sandwicensium</i> var. <i>molokaiense</i> | E                           | Strand vegetation in dry consolidated dunes, in the coastal ecosystem                             |        | ✓    | ✓     | ✓       | ✓    |       |                                                             |
| Kopiko <i>Psychotria grandiflora</i> (CH)                            | E                           | Koa-ohia mesic to wet forests, 3,400-4,100 feet                                                   |        |      |       |         |      | ✓CH   |                                                             |
| Kopiko <i>Psychotria hobyi</i> (CH)                                  | E                           | Lowland koa-ohia mesic forest, 1,700-2,700 feet                                                   |        |      |       |         |      | ✓CH   |                                                             |
| Kaulu <i>Pteralyxia kauaiensis</i> (CH)                              | E                           | Slopes and ridges in diverse mesic to sometimes wet forests, 810-1,990 feet                       |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Pteris lidgatei</i> (CH)                           | E                           | Lowland wet ohia forest, generally on streambanks near waterfalls, 1,750-3,000 feet               |        | ✓CH  |       | ✓CH     | ✓CH  |       |                                                             |

| Common Name and Scientific Name               | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                                                                         | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-----------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Makou <i>Ranunculus hawaiiensis</i>           | E                           | Mesic forest on grassy slopes and scree, and in open pastures, from 6,000 to 6,700 feet, in the montane mesic (island of Hawaii), montane dry (island of Hawaii), and subalpine (island of Hawaii and Maui) ecosystems                      | ✓      | ✓    |       |         |      |       |                                                             |
| Makou <i>Ranunculus mauiensis</i>             | E                           | Open sites in mesic to wet forest and along streams, from 3,500 to 5,600 feet, in the montane wet (Kauai, Oahu, Molokai, and Maui), montane mesic (Kauai, Molokai, Maui, and island of Hawaii), and wet cliff (Molokai and Maui) ecosystems | ✓      | ✓    |       | ✓       | ✓    | ✓     |                                                             |
| No common name <i>Remya kauaiensis</i> (CH)   | E                           | Steep, north or northeast facing slopes in mesic forests or remnants, 2,800-4,100 feet                                                                                                                                                      |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Remya mauiensis</i> (CH)    | E                           | Steep, north or northeast facing slopes in mixed forest or remnants, 2,790-4,100 feet                                                                                                                                                       |        | ✓CH  |       |         |      |       |                                                             |
| No common name <i>Remya montgomeryi</i> (CH)  | E                           | Steep, north or northeast facing slopes in mesic forest or remnants, 2,800-4,100 feet                                                                                                                                                       |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Sanicula mariversa</i> (CH) | E                           | Well-drained dry slopes, 2,500-2,800 feet                                                                                                                                                                                                   |        |      |       |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                              | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                     | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|--------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Sanicula purpurea</i><br>(CH)              | E                           | Open ohia mixed montane bogs, or occasionally ohia mixed montane wet shrubland, 2,300-5,570 feet                                                                                        |        | ✓CH  |       |         | ✓CH  |       |                                                             |
| No common name <i>Sanicula sandwicensis</i>                  | E                           | Shrubland and woodland from 6,500 to 8,500 feet, in the montane mesic (island of Hawaii and Maui), montane dry (island of Hawaii), and subalpine (island of Hawaii and Maui) ecosystems | ✓      | ✓    |       |         |      |       |                                                             |
| ʻIliahi <i>Santalum freycinetianum</i> var. <i>lanaiense</i> | E                           | Diverse, including lowland dry forest on well-drained barren soils to mesic forest on shallow soils                                                                                     |        | ✓    | ✓     |         |      |       |                                                             |
| Iliahi <i>Santalum involutum</i>                             | E                           | Mesic and wet forest on, from 400 to 2,500 feet, in the lowland mesic and lowland wet ecosystems                                                                                        |        |      |       |         |      | ✓     |                                                             |
| Dwarf naupaka <i>Scaevola coriacea</i>                       | E                           | Hot, dry coastal sites on low, consolidated sand dunes near sea level                                                                                                                   | ✓      | ✓    | ✓     | ✓       | ✓    | ✓     | Niihau                                                      |
| No common name <i>Schiedea adamantis</i>                     | E                           | Volcanic cone of consolidated ash                                                                                                                                                       |        |      |       |         | ✓    |       |                                                             |
| No common name <i>Schiedea apokremnos</i><br>(CH)            | E                           | Crevice of near-vertical coastal cliff faces with sparse, dry coastal shrubland, 200-1,100 feet                                                                                         |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Schiedea attenuata</i><br>(CH)             | E                           | Diverse mesic forest pockets and vertical cliffs, 2,297-2,625 feet                                                                                                                      |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                                           | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-------------------------------------------------------------------------------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Schiedea diffusa</i> ssp. <i>diffusa</i>                                | E                           | Wet forest from 3,000 to 5,300 feet on Molokai, and to 6,700 feet on Maui, in the lowland wet (Maui) and montane wet (Maui and Molokai) ecosystems |        | ✓    |       | ✓       |      |       |                                                             |
| No common name <i>Schiedea haleakalensis</i> (CH)                                         | E                           | In rock cracks on sheer cliffs adjacent to barren lava and subalpine shrubland and grassland, 5,910-8,010 feet                                     |        | ✓CH  |       |         |      |       |                                                             |
| No common name <i>Schiedea helleri</i> (CH)                                               | E                           | Steep cliffs in closed ohia-uluhe montane wet forest, ~3,500 feet                                                                                  |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Schiedea hookeri</i> (CH)                                               | E                           | Diverse mesic or dry lowland forest, often with ohia or lama dominant, 1,200-2,950 feet                                                            |        | ✓    |       |         | ✓CH  |       |                                                             |
| No common name <i>Schiedea kaalae</i> (CH)                                                | E                           | Steep slopes and shaded site sin diverse mesic forests, 700-2,600 feet                                                                             |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Schiedea kauaiensis</i> (CH)                                            | E                           | Diverse mesic to wet forest on steep slopes                                                                                                        |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Schiedea kealiae</i> (CH)                                               | E                           | Steep slopes and cliff faces in dry remnant wiliwili ( <i>Erythrina sandwicensis</i> ) or aulu forest, 200-1,000 feet                              |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Schiedea laui</i>                                                       | E                           | Montane wet forest along streams                                                                                                                   |        |      |       | ✓CH     |      |       |                                                             |
| Kuawawaenohu <i>Schiedea lychnoides</i> (listed as <i>Alsinidendron lychnoides</i> ) (CH) | E                           | Montane wet forest dominated by ohia or by ohia and uluhe, 3,600-4,330 feet                                                                        |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                                        | Listing Status <sup>a</sup> | Habitat Description                                                                                                                      | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|----------------------------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Schiedea lydgatei</i> (CH)                                           | E                           | Along ridges and on cattle trails in dry to mesic grasslands, shrublands, and forests, 2,000-2,100 feet                                  |        |      |       | ✓CH     |      |       |                                                             |
| No common name <i>Schiedea membranacea</i> (CH)                                        | E                           | Cliffs and cliff bases in a variety of mesic to wet habitats, 1,700-3,800 feet                                                           |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Schiedea nuttallii</i> (CH)                                          | E                           | Diverse lowland mesic forest, often ohia dominant, 1,360-2,590 feet                                                                      |        | ✓    |       | ✓       | ✓CH  |       |                                                             |
| No common name <i>Schiedea obovata</i> (listed as <i>Alsinidendron obovatum</i> ) (CH) | E                           | Ridges and slopes in lowland diverse mesic forest dominated by ohia and koa, 1,850-2,500 feet                                            |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Schiedea perlmanni</i> (listed as <i>Schiedea nuttallii</i> ) (CH)   | E                           | Diverse lowland mesic forest, often ohia dominant, 1,360-2,590 feet                                                                      |        |      |       |         |      | ✓CH   |                                                             |
| Maolioli <i>Schiedea pubescens</i>                                                     | E                           | Mesic to wet <i>etrosideros</i> forest from 2,000 to 4,000 feet in the lowland wet, montane wet, montane mesic, and wet cliff ecosystems |        | ✓    | ✓     | ✓       |      |       |                                                             |
| No common name <i>Schiedea sarmentosa</i> (CH)                                         | E                           | Steep slopes in ohia-aalii lowland dry or mesic shrubland, 2,000-2,600 feet                                                              |        |      |       | ✓CH     |      |       |                                                             |



| Common Name and Scientific Name                                                                               | Listing Status <sup>a</sup> | Habitat Description                                                                                                                   | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|---------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Schiedea spergulina</i> var. <i>leiopoda</i> (listed as <i>Schiedea spergulina</i> ) (CH)   | E                           | Bare rock outcrops or sparsely vegetated portions of rocky cliff faces or cliff bases in diverse lowland mesic forest, 590-3,000 feet |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Schiedea spergulina</i> var. <i>spergulina</i> (listed as <i>Schiedea spergulina</i> ) (CH) | T                           | Bare rock outcrops or sparsely vegetated portions of rocky cliff faces or cliff bases in diverse lowland mesic forest, 590-3,000 feet |        |      |       |         |      | ✓CH   |                                                             |
| Laulihilihi <i>Schiedea stellarioides</i> (CH)                                                                | E                           | Steep Slopes in closed koa-ohia lowland to montane mesic forest, 2,000-3,680 feet                                                     |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Schiedea trinervis</i> (listed as <i>Alsinidendron trinerve</i> ) (CH)                      | E                           | Slopes in wet forest or wetter portions of diverse mesic forest dominated by ohia and kawau ( <i>Ilex anomala</i> ), 3,000-4,000 feet |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Schiedea verticillata</i> (CH)                                                              | E                           | Soils pockets and cracks on coastal cliff faces, 100-800 feet                                                                         |        |      |       |         |      |       | Ni                                                          |
| No common name <i>Schiedea viscosa</i> (listed as <i>Alsinidendron viscosum</i> ) (CH)                        | E                           | Steep slopes in koa-ohia lowland mesic or wet forest, 2,700-3,510 feet                                                                |        |      |       |         |      | ✓CH   |                                                             |
| ʻŌhai <i>Sesbania tomentosa</i> (CH)                                                                          | E                           | Sandy beaches, dunes, soil pockets on lava, and along pond margins in coastal dry shrublands or grasslands, or in open ohia forests   | ✓CH    | ✓CH  | ✓     | ✓CH     | ✓CH  | ✓CH   | Kahoolawe, Niihau, Ne                                       |

| Common Name and Scientific Name               | Listing Status <sup>a</sup> | Habitat Description                                                                                                                                                                                                                                               | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|-----------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| `Anunu <i>Sicyos alba</i> (CH)                | E                           | Ohia and hapuu dominated montane wet forests, 3,200-3,720 feet                                                                                                                                                                                                    | ✓CH    |      |       |         |      |       |                                                             |
| Anunu <i>Sicyos lanceoloideus</i>             | E                           | Ridges or spurs in mesic forest from 1,800 to 2,700 feet, in the dry cliff (Oahu), lowland mesic (Oahu, Kauai), and montane mesic (Kauai) ecosystems                                                                                                              |        |      |       |         | ✓    | ✓     |                                                             |
| Anunu <i>Sicyos macrophyllus</i>              | E                           | Wet <i>Metrosideros polymorpha</i> forest and <i>Sophora chrysophylla</i> - <i>Myoporum sandwicense</i> (mamane-naio) forest, from 4,000 to 6,600 feet in the montane mesic (island of Hawaii), montane wet (Maui), and montane dry (island of Hawaii) ecosystems | ✓      | ✓    |       |         |      |       |                                                             |
| No common name <i>Silene alexandri</i> (CH)   | E                           | Along cattle trail in remnant dry forest and shrubland, 2,00-2,500 feet                                                                                                                                                                                           |        |      |       | ✓CH     |      |       |                                                             |
| No common name <i>Silene hawaiiensis</i> (CH) | T                           | Montane and subalpine dry shrubland on weathered lava, lava flows, and cinder substrates, 3,000-8,500 feet                                                                                                                                                        | ✓CH    |      |       |         |      |       |                                                             |
| No common name <i>Silene lanceolata</i> (CH)  | E                           | Dry to mesic shrubland and grassland, may grow on a'a lave, cliff faces, or ledges                                                                                                                                                                                | ✓CH    |      | ✓     | ✓CH     | ✓CH  | ✓     |                                                             |

| Common Name and Scientific Name                                                                                  | Listing Status <sup>a</sup> | Habitat Description                                                                                                               | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Silene perlmanii</i> (CH)                                                                      | E                           | Cliff faces in diverse mesic forest, ~2,600 feet                                                                                  |        |      |       |         | ✓CH  |       |                                                             |
| Popolo ku mai <i>Solanum incompletum</i> (CH)                                                                    | E                           | Dry and mesic shrublands and forests on ridges and in gulches, may be found on cinder cones or older lava flows, 1,000-6,700 feet | ✓CH    | ✓    | ✓     | ✓       |      | ✓     |                                                             |
| Popolo <i>Solanum nelsonii</i>                                                                                   | E                           | Coral rubble or sand in coastal sites up to 490 feet in the coastal ecosystem                                                     | ✓      | ✓    |       | ✓       |      |       | ✓                                                           |
| Popolo `aiakeakua <i>Solanum sandwicense</i> (CH)                                                                | E                           | Open, sunny areas in diverse lowland to montane mesic forests, 2,500-4,000 feet                                                   |        |      |       |         | ✓CH  | ✓CH   |                                                             |
| No common name <i>Spermolepis hawaiiensis</i> (CH)                                                               | E                           | Various, including ohia forest, aalii lowland dry shrubland, cultivated fields, and pastures, 1,000-2,000 feet                    | ✓CH    | ✓CH  | ✓     | ✓CH     | ✓CH  | ✓CH   |                                                             |
| No common name <i>Stenogyne angustifolia</i> (listed as <i>Stenogyne angustifolia</i> var. <i>angustifolia</i> ) | E                           | Montane shrubland on basaltic plains, often associated with cinder cones and small hills, 5,000-6,000 feet                        | ✓      | ✓    |       | ✓       |      |       |                                                             |
| No common name <i>Stenogyne bifida</i> (CH)                                                                      | E                           | Steep ridges in ohia dominated montane mesic to wet forests, 1,1450-4,000 feet                                                    |        |      |       | ✓CH     |      |       |                                                             |
| No common name <i>Stenogyne campanulata</i> (CH)                                                                 | E                           | Rock face of nearly vertical, north-facing cliffs, ~3,560 feet                                                                    |        |      |       |         |      | ✓CH   |                                                             |

| Common Name and Scientific Name                                                                                      | Listing Status <sup>a</sup> | Habitat Description                                                                       | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|----------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Stenogyne kaalae</i> ssp. <i>Sherffii</i>                                                          | E                           | Diverse forest from 1,500 to 1,600 feet in the lowland wet ecosystem                      |        |      |       |         | ✓    |       |                                                             |
| No common name <i>Stenogyne kanehoana</i> (CH)                                                                       | E                           | Lowland mesic forest, 1,834-3,831 feet                                                    |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Stenogyne kealiae</i> (CH)                                                                         | E                           | Ohia, ohia-koa, and ohia-uluhe forests and shrublands, 3,550-4,100 feet                   |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Tetramolopium arenarium</i> ssp. <i>arenarium</i> (listed as <i>Tetramolopium arenarium</i> )      | E                           | Lowland and montane dry shrublands dominated by aalii, 2,600-5,500 feet                   | ✓      | ✓    |       |         |      |       |                                                             |
| No common name <i>Tetramolopium arenarium</i> ssp. <i>laxum</i> (listed as <i>Tetramolopium arenarium</i> )          | E                           | Lowland and montane dry shrublands dominated by aalii, 2,600-5,500 feet                   |        | ✓    |       |         |      |       |                                                             |
| No common name <i>Tetramolopium arenarium</i> var. <i>arenarium</i> (listed as <i>Tetramolopium arenarium</i> )      | E                           | Lowland and montane dry shrublands dominated by aalii, 2,600-5,500 feet                   | ✓      | ✓    |       |         |      |       |                                                             |
| No common name <i>Tetramolopium arenarium</i> var. <i>confertum</i> (listed as <i>Tetramolopium arenarium</i> )      | E                           | Lowland and montane dry shrublands dominated by aalii, 2,600-5,500 feet                   | ✓      |      |       |         |      |       |                                                             |
| No common name <i>Tetramolopium capillare</i> (CH)                                                                   | E                           | Dryland forest and shrubland                                                              |        | ✓CH  |       |         |      |       |                                                             |
| No common name <i>Tetramolopium filiforme</i> var. <i>filiforme</i> (listed as <i>Tetramolopium filiforme</i> ) (CH) | E                           | Dry to mesic, on exposed rocky ridges and sparsely vegetated cliffs, often rooted in rock |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Tetramolopium filiforme</i> var. <i>polyphyllum</i> (listed as <i>T. filiforme</i> ) (CH)          | E                           | Dry to mesic, on exposed rocky ridges and sparsely vegetated cliffs, often rooted in rock |        |      |       |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                                                                                     | Listing Status <sup>a</sup> | Habitat Description                                                                                                          | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|---------------------------------------------------------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| No common name <i>Tetramolopium lepidotum</i> ssp. <i>lepidotum</i> (CH)                                            | E                           | Grassy ridgetop slopes, or west-facing cliffs, mesic forest, 1,200-3,000 feet                                                |        |      | ✓     |         | ✓CH  |       |                                                             |
| No common name <i>Tetramolopium remyi</i> (CH)                                                                      | E                           | Dry shrublands on ridgetops                                                                                                  |        | ✓CH  | ✓CH   |         |      |       |                                                             |
| No common name <i>Tetramolopium rockii</i> var. <i>calcisabulorum</i> (listed as <i>Tetramolopium rockii</i> ) (CH) | T                           | Hardened calcareous sand dunes or ash-covered basalt in the coastal spray zone or dry shrublands and grasslands, 30-650 feet |        |      |       | ✓CH     |      |       |                                                             |
| No common name <i>Tetramolopium rockii</i> var. <i>rockii</i> (listed as <i>Tetramolopium rockii</i> ) (CH)         | T                           | Hardened calcareous sand dunes or ash-covered basalt in the coastal spray zone or dry shrublands and grasslands, 30-650 feet |        |      |       | ✓CH     |      |       |                                                             |
| No common name <i>Tetraplasandra bisattenuata</i> (CH)                                                              | E                           | Uluhe covered slopes with patches of mesic forest, 1,800-2,100 feet                                                          |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Tetraplasandra flynnii</i> (CH)                                                                   | E                           | Ohia montane mesic to wet forests, 2,600-4,000 feet                                                                          |        |      |       |         |      | ✓CH   |                                                             |
| ‘Ohe‘ohe <i>Tetraplasandra gymnocarpa</i> (CH)                                                                      | E                           | Windswept summit ridges or in gullies in wet or sometimes mesic forests, 820-2,790 feet                                      |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Trematolobelia singularis</i> (CH)                                                                | E                           | Steep, windswept cliff faces or slopes in ohia-uluhe montane wet shrubland, 2,300-3,150 feet                                 |        |      |       |         | ✓CH  |       |                                                             |

| Common Name and Scientific Name                                            | Listing Status <sup>a</sup> | Habitat Description                                                                                                    | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|----------------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Opuhe <i>Urera kaalae</i> (CH)                                             | E                           | Slopes and in gulches in diverse mesic forest dominated by papala kepau ( <i>Pisonia umbellifera</i> ), 980-2,700 feet |        |      |       |         | ✓CH  |       |                                                             |
| Hawaiian vetch <i>Vicia menziesii</i>                                      | E                           | Wet to mesic forest, 5,150-5,643 feet                                                                                  | ✓      |      |       |         |      |       |                                                             |
| No common name <i>Vigna o-wahuensis</i> (CH)                               | E                           | Lowland dry to mesic grassland and shrubland, 30-4,500 feet                                                            | ✓CH    | ✓CH  | ✓     | ✓       | ✓CH  |       | Kahoolawe, Niihau                                           |
| ‘olopu; pamakani <i>Viola chamissoniana</i> ssp. <i>chamissoniana</i> (CH) | E                           | Dry cliffs in mesic shrubland, 2,300-3,040 feet                                                                        |        |      |       |         | ✓CH  |       |                                                             |
| No common name <i>Viola helenae</i> (CH)                                   | E                           | Wet forests and shrublands in gulch bottoms, gulch slopes, and on exposed ridge tops                                   |        |      |       |         |      | ✓CH   |                                                             |
| Nani wai‘ale‘ale <i>Viola kauaensis</i> var. <i>wahiawaensis</i> (CH)      | E                           | Open bog surrounded by low scrub of ohia and uluhe, or wet shrubland dominated by uluhe 2,100-2,840                    |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Viola lanaiensis</i>                                     | E                           | Moderate to steep slopes from lower gulches to ridgetops in mesic to wet forest, 2,200-3,200 feet                      |        |      | ✓     |         |      |       |                                                             |
| No common name <i>Viola oahuensis</i> (CH)                                 | E                           | Exposed, windswept ridges of moderate to steep slope in wet ohia-uluhe shrublands, 2,300-2,800 feet                    |        |      |       |         | ✓CH  |       |                                                             |
| Akia <i>Wikstroemia skottsbergiana</i>                                     | E                           | Wet forest in the lowland ecosystem                                                                                    |        |      |       |         |      | ✓     |                                                             |

| Common Name and Scientific Name                              | Listing Status <sup>a</sup> | Habitat Description                                                                      | Hawaii | Maui | Lanai | Molokai | Oahu | Kauai | N.W. Islands, <sup>b</sup><br>Kahoolawe, Niihau, or Oceanic |
|--------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------|--------|------|-------|---------|------|-------|-------------------------------------------------------------|
| Iliou <i>Wilkesia hobdyi</i> (CH)                            | E                           | Degraded cliff sites and very dry ridges surrounded by shrubby vegetation, 90-1,312 feet |        |      |       |         |      | ✓CH   |                                                             |
| No common name <i>Xylosma crenatum</i> (CH)                  | E                           | Diverse koa-ohia montane mesic forest sometimes along streambanks, 3,200-3,500 feet      |        |      |       |         |      | ✓CH   |                                                             |
| A`e <i>Zanthoxylum dipetalum</i> var. <i>tomentosum</i> (CH) | E                           | Degraded ohia-dominated montane mesic forest, often on a`a lava, 3,000-3,400 feet        | ✓CH    |      |       |         |      |       |                                                             |
| A`e <i>Zanthoxylum hawaiiense</i> (CH)                       | E                           | Lowland dry and mesic forests and montane dry forests, 1,800-5,710 feet                  | ✓CH    | ✓CH  | ✓     | ✓CH     |      | ✓CH   |                                                             |

<sup>a</sup> Listing status: CH = critical habitat designated; E = endangered; T = threatened

<sup>b</sup> N.W. Hawaiian Islands = Frigate (F); Kure (Ku); Laysan (L); Midway (M); Necker (Ne); Nihoa (Ni)

## REFERENCES

- Center for Plant Conservation. *National Collection Plant Profiles*. Accessed: November 2015.  
Retrieved from: <http://saveplants.org/national-collection/> (updated October 24, 2016)
- Hawaii Department of Land and Natural Resources. 2015. *Division of Forestry and Wildlife Species Endangered Species Fact Sheets*
- International Union for Conservation of Nature. 2015. *IUCN Red List of Threatened Species Version 2015.2*. Species accounts. Accessed: August 2015. Retrieved from: <http://www.iucnredlist.org/>
- Palmer, Daniel. 2008. *Hawaii's Ferns and Allies*. University of Hawaii Press; 1st edition. 328 pp.
- U.S. Fish and Wildlife Service. 1994. *Recovery Plan for the Wahiawa Plant Cluster*.
- \_\_\_\_\_. 1995. *Lana'i Plant Cluster Recovery Plan*.
- \_\_\_\_\_. 1995. *Recovery Plan for the Kaua'i Plant Cluster*.
- \_\_\_\_\_. 1996. *Recovery Plan for the Molokai Plant Cluster*.
- \_\_\_\_\_. 1997. *Recovery Plan for the Maui Plant Cluster*.
- \_\_\_\_\_. 1998. *Recovery Plan for the Oahu Plants*.
- \_\_\_\_\_. 1998. *Kauai II Addendum to the Recovery Plan for the Kauai Plant Cluster*.
- \_\_\_\_\_. 1998. *Big Island II Addendum to the Recovery plan for the Big Island Plant Cluster*.
- \_\_\_\_\_. 1998. *Molokai II Addendum to the Recovery Plan for the Molokai Plant Cluster*.
- \_\_\_\_\_. 1999. *Recovery Plan for the Multi-Island Plants*.
- \_\_\_\_\_. 2002. *Addendum to the Recovery Plan for the Multi-Island Plants*.
- \_\_\_\_\_. 2010. *Determination of Endangered Status for 48 Species on Kauai and Designation of Critical Habitat; Final Rule*.
- \_\_\_\_\_. 2013. *Determination of Endangered Status for 38 Species on Molokai, Lanai, and Maui; Final Rule*.
- \_\_\_\_\_. 2016. *Final Rule: Endangered and Threatened Wildlife and Plants; Endangered Status for 49 Species from the Hawaiian Islands*. 50 CFR § 17, Docket No. FWS-R1-ES-2015-0125; 4500030113. September 30, 2016.



## **APPENDIX E**

### **Environmental Justice Demographic Data**

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## **ENVIRONMENTAL JUSTICE DEMOGRAPHIC DATA**

The tables below provide demographic data characteristics for all block groups in Alaska, Hawaii, American Samoa, Guam, Northern Mariana Islands, Puerto Rico, and the United States (U.S.) Virgin Islands.

**Table 1: Block Group Demographic Data, Alaska**

| Block Group  | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|--------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|              | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 1    | 24%                         | 20%                       | 8%                               | 41%   | 1%                                        | 4%                    | 2%             | 82%                              | 18%                    | 14.4%                                        | \$50,000                |
| BG2, CT 1    | 22%                         | 3%                        | 32%                              | 38%   | 1%                                        | 1%                    | 3%             | 88%                              | 12%                    | 16.4%                                        | \$60,357                |
| BG3, CT 1    | 23%                         | 12%                       | 25%                              | 33%   | 1%                                        | 2%                    | 4%             | 89%                              | 11%                    | 18.7%                                        | \$71,250                |
| BG1, CT 1    | 26%                         | 6%                        | 49%                              | 5%    | 5%                                        | 2%                    | 8%             | 96%                              | 4%                     | 11.8%                                        | \$46,250                |
| BG1, CT 2    | 27%                         | 9%                        | 3%                               | 50%   | 2%                                        | 5%                    | 4%             | 92%                              | 8%                     | 8.7%                                         | \$92,639                |
| BG2, CT 2    | 41%                         | 5%                        | 6%                               | 30%   | 1%                                        | 9%                    | 9%             | 84%                              | 16%                    | 8.6%                                         | \$86,641                |
| BG1, CT 1.01 | 76%                         | 0%                        | 12%                              | 1%    | 0%                                        | 1%                    | 10%            | 98%                              | 2%                     | 7.1%                                         | \$120,795               |
| BG2, CT 1.01 | 85%                         | 0%                        | 10%                              | 0%    | 0%                                        | 1%                    | 4%             | 97%                              | 3%                     | 2.6%                                         | \$96,938                |
| BG3, CT 1.01 | 90%                         | 0%                        | 3%                               | 1%    | 0%                                        | 3%                    | 3%             | 94%                              | 6%                     | 5.5%                                         | \$111,696               |
| BG1, CT 1.02 | 93%                         | 0%                        | 7%                               | 0%    | 0%                                        | 0%                    | 0%             | 84%                              | 16%                    | 0.3%                                         | \$103,958               |
| BG2, CT 1.02 | 79%                         | 0%                        | 8%                               | 0%    | 0%                                        | 4%                    | 9%             | 93%                              | 7%                     | 5.0%                                         | \$52,569                |
| BG3, CT 1.02 | 86%                         | 0%                        | 6%                               | 0%    | 0%                                        | 0%                    | 8%             | 96%                              | 4%                     | 0.0%                                         | \$101,350               |
| BG4, CT 1.02 | 70%                         | 0%                        | 13%                              | 4%    | 0%                                        | 0%                    | 12%            | 91%                              | 9%                     | 1.8%                                         | \$69,886                |
| BG1, CT 2.01 | 80%                         | 5%                        | 4%                               | 8%    | 0%                                        | 2%                    | 2%             | 97%                              | 3%                     | 2.0%                                         | \$82,300                |
| BG2, CT 2.01 | 70%                         | 2%                        | 3%                               | 7%    | 3%                                        | 0%                    | 15%            | 92%                              | 8%                     | 2.7%                                         | \$68,636                |
| BG1, CT 2.02 | 78%                         | 0%                        | 0%                               | 3%    | 0%                                        | 4%                    | 15%            | 91%                              | 9%                     | 30.2%                                        | \$44,115                |
| BG2, CT 2.02 | 89%                         | 0%                        | 0%                               | 4%    | 1%                                        | 3%                    | 2%             | 89%                              | 11%                    | 4.7%                                         | \$91,324                |
| BG3, CT 2.02 | 64%                         | 1%                        | 26%                              | 0%    | 0%                                        | 1%                    | 9%             | 94%                              | 6%                     | 4.6%                                         | \$112,790               |
| BG4, CT 2.02 | 90%                         | 0%                        | 7%                               | 3%    | 0%                                        | 0%                    | 1%             | 95%                              | 5%                     | 0.9%                                         | \$77,348                |
| BG1, CT 2.03 | 90%                         | 0%                        | 7%                               | 1%    | 0%                                        | 0%                    | 3%             | 97%                              | 3%                     | 1.8%                                         | \$109,470               |
| BG2, CT 2.03 | 88%                         | 0%                        | 2%                               | 5%    | 0%                                        | 0%                    | 6%             | 83%                              | 17%                    | 0.0%                                         | \$146,750               |
| BG3, CT 2.03 | 80%                         | 12%                       | 0%                               | 3%    | 0%                                        | 1%                    | 3%             | 87%                              | 13%                    | 3.2%                                         | \$101,792               |
| BG4, CT 2.03 | 90%                         | 1%                        | 0%                               | 3%    | 0%                                        | 0%                    | 6%             | 96%                              | 4%                     | 0.0%                                         | \$102,763               |
| BG5, CT 2.03 | 88%                         | 5%                        | 3%                               | 4%    | 0%                                        | 0%                    | 0%             | 97%                              | 3%                     | 1.3%                                         | \$93,679                |
| BG1, CT 2.04 | 90%                         | 0%                        | 3%                               | 2%    | 0%                                        | 0%                    | 5%             | 99%                              | 1%                     | 7.1%                                         | \$122,123               |
| BG2, CT 2.04 | 80%                         | 2%                        | 5%                               | 2%    | 0%                                        | 2%                    | 9%             | 95%                              | 5%                     | 0.1%                                         | \$137,159               |
| BG1, CT 3    | 66%                         | 18%                       | 1%                               | 2%    | 1%                                        | 3%                    | 9%             | 87%                              | 13%                    | 5.4%                                         | \$54,919                |
| BG1, CT 4    | 74%                         | 14%                       | 0%                               | 4%    | 0%                                        | 4%                    | 5%             | 89%                              | 11%                    | 6.4%                                         | \$61,528                |
| BG1, CT 5    | 58%                         | 22%                       | 5%                               | 3%    | 0%                                        | 5%                    | 7%             | 70%                              | 30%                    | 5.8%                                         | \$66,346                |

| Block Group  | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|--------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|              | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG2, CT 5    | 31%                         | 8%                        | 20%                              | 20%   | 1%                                        | 9%                    | 11%            | 89%                              | 11%                    | 7.7%                                         | \$41,053                |
| BG1, CT 6    | 63%                         | 0%                        | 34%                              | 0%    | 0%                                        | 0%                    | 2%             | 100%                             | 0%                     | 84.5%                                        | ND                      |
| BG2, CT 6    | 30%                         | 7%                        | 2%                               | 3%    | 2%                                        | 0%                    | 56%            | 86%                              | 14%                    | 28.7%                                        | \$34,868                |
| BG3, CT 6    | 45%                         | 6%                        | 25%                              | 0%    | 0%                                        | 5%                    | 19%            | 95%                              | 5%                     | 21.5%                                        | \$39,500                |
| BG4, CT 6    | 24%                         | 9%                        | 12%                              | 21%   | 9%                                        | 11%                   | 15%            | 83%                              | 17%                    | 49.3%                                        | \$43,674                |
| BG5, CT 6    | 23%                         | 7%                        | 8%                               | 21%   | 23%                                       | 3%                    | 15%            | 96%                              | 4%                     | 32.7%                                        | \$43,380                |
| BG6, CT 6    | 61%                         | 0%                        | 0%                               | 19%   | 20%                                       | 0%                    | 0%             | 96%                              | 4%                     | 30.3%                                        | \$29,952                |
| BG7, CT 6    | 42%                         | 18%                       | 15%                              | 19%   | 0%                                        | 0%                    | 7%             | 88%                              | 12%                    | 20.3%                                        | \$42,898                |
| BG8, CT 6    | 2%                          | 29%                       | 2%                               | 17%   | 2%                                        | 3%                    | 46%            | 84%                              | 16%                    | 6.1%                                         | \$35,870                |
| BG1, CT 7.01 | 34%                         | 10%                       | 23%                              | 7%    | 7%                                        | 7%                    | 12%            | 86%                              | 14%                    | 1.2%                                         | \$77,405                |
| BG2, CT 7.01 | 60%                         | 18%                       | 3%                               | 1%    | 11%                                       | 0%                    | 7%             | 89%                              | 11%                    | 12.2%                                        | \$56,458                |
| BG3, CT 7.01 | 41%                         | 12%                       | 28%                              | 1%    | 0%                                        | 2%                    | 17%            | 65%                              | 35%                    | 16.0%                                        | \$39,028                |
| BG4, CT 7.01 | 39%                         | 11%                       | 0%                               | 1%    | 0%                                        | 0%                    | 48%            | 100%                             | 0%                     | 0.0%                                         | \$63,906                |
| BG1, CT 7.02 | 61%                         | 15%                       | 1%                               | 9%    | 13%                                       | 0%                    | 1%             | 92%                              | 8%                     | 12.5%                                        | \$40,341                |
| BG2, CT 7.02 | 45%                         | 22%                       | 6%                               | 10%   | 1%                                        | 0%                    | 16%            | 92%                              | 8%                     | 5.2%                                         | \$82,692                |
| BG3, CT 7.02 | 67%                         | 12%                       | 5%                               | 7%    | 4%                                        | 1%                    | 5%             | 92%                              | 8%                     | 8.9%                                         | \$85,217                |
| BG1, CT 7.03 | 57%                         | 7%                        | 25%                              | 7%    | 0%                                        | 0%                    | 5%             | 98%                              | 2%                     | 16.1%                                        | \$19,087                |
| BG2, CT 7.03 | 50%                         | 18%                       | 9%                               | 6%    | 1%                                        | 0%                    | 18%            | 96%                              | 4%                     | 31.0%                                        | \$54,595                |
| BG3, CT 7.03 | 32%                         | 9%                        | 5%                               | 42%   | 0%                                        | 4%                    | 8%             | 85%                              | 15%                    | 5.4%                                         | \$57,600                |
| BG4, CT 7.03 | 46%                         | 0%                        | 0%                               | 46%   | 0%                                        | 1%                    | 8%             | 99%                              | 1%                     | 10.9%                                        | \$50,357                |
| BG5, CT 7.03 | 41%                         | 14%                       | 5%                               | 11%   | 24%                                       | 0%                    | 5%             | 94%                              | 6%                     | 6.0%                                         | \$85,344                |
| BG1, CT 8.01 | 55%                         | 9%                        | 6%                               | 1%    | 24%                                       | 4%                    | 0%             | 88%                              | 12%                    | 11.3%                                        | \$61,231                |
| BG2, CT 8.01 | 59%                         | 13%                       | 0%                               | 2%    | 0%                                        | 0%                    | 26%            | 88%                              | 12%                    | 0.0%                                         | \$93,100                |
| BG3, CT 8.01 | 29%                         | 6%                        | 28%                              | 6%    | 2%                                        | 12%                   | 17%            | 64%                              | 36%                    | 7.5%                                         | \$51,892                |
| BG4, CT 8.01 | 28%                         | 1%                        | 19%                              | 27%   | 0%                                        | 11%                   | 13%            | 76%                              | 24%                    | 18.8%                                        | \$55,357                |
| BG5, CT 8.01 | 35%                         | 19%                       | 2%                               | 39%   | 0%                                        | 0%                    | 5%             | 83%                              | 17%                    | 31.0%                                        | \$60,139                |
| BG6, CT 8.01 | 16%                         | 3%                        | 15%                              | 64%   | 0%                                        | 1%                    | 1%             | 96%                              | 4%                     | 22.6%                                        | \$47,602                |
| BG7, CT 8.01 | 27%                         | 6%                        | 5%                               | 26%   | 21%                                       | 0%                    | 15%            | 94%                              | 6%                     | 18.1%                                        | \$38,058                |
| BG1, CT 8.02 | 60%                         | 0%                        | 25%                              | 3%    | 0%                                        | 10%                   | 2%             | 75%                              | 25%                    | 57.2%                                        | \$24,283                |
| BG2, CT 8.02 | 25%                         | 20%                       | 4%                               | 20%   | 5%                                        | 1%                    | 25%            | 95%                              | 5%                     | 15.4%                                        | \$49,757                |
| BG3, CT 8.02 | 48%                         | 14%                       | 0%                               | 14%   | 9%                                        | 0%                    | 16%            | 88%                              | 12%                    | 23.9%                                        | \$63,438                |

| Block Group  | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|--------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|              | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG4, CT 8.02 | 71%                         | 7%                        | 14%                              | 3%    | 0%                                        | 0%                    | 6%             | 99%                              | 1%                     | 17.6%                                        | \$78,000                |
| BG5, CT 8.02 | 63%                         | 10%                       | 7%                               | 4%    | 0%                                        | 5%                    | 11%            | 93%                              | 7%                     | 18.8%                                        | \$32,788                |
| BG1, CT 9.01 | 37%                         | 9%                        | 18%                              | 7%    | 4%                                        | 4%                    | 21%            | 81%                              | 19%                    | 30.9%                                        | \$26,600                |
| BG2, CT 9.01 | 27%                         | 11%                       | 23%                              | 11%   | 9%                                        | 0%                    | 20%            | 88%                              | 12%                    | 17.8%                                        | \$45,865                |
| BG3, CT 9.01 | 35%                         | 17%                       | 22%                              | 12%   | 0%                                        | 0%                    | 14%            | 95%                              | 5%                     | 11.1%                                        | \$47,955                |
| BG1, CT 9.02 | 36%                         | 22%                       | 11%                              | 2%    | 11%                                       | 0%                    | 18%            | 76%                              | 24%                    | 34.1%                                        | \$43,664                |
| BG2, CT 9.02 | 47%                         | 9%                        | 6%                               | 26%   | 7%                                        | 0%                    | 5%             | 99%                              | 1%                     | 10.5%                                        | \$40,172                |
| BG3, CT 9.02 | 87%                         | 0%                        | 3%                               | 0%    | 0%                                        | 0%                    | 10%            | 100%                             | 0%                     | 4.0%                                         | \$78,182                |
| BG1, CT 10   | 68%                         | 2%                        | 18%                              | 0%    | 6%                                        | 2%                    | 5%             | 94%                              | 6%                     | 8.3%                                         | \$55,921                |
| BG2, CT 10   | 67%                         | 10%                       | 12%                              | 1%    | 2%                                        | 3%                    | 5%             | 88%                              | 12%                    | 23.8%                                        | \$30,986                |
| BG3, CT 10   | 23%                         | 18%                       | 43%                              | 0%    | 0%                                        | 0%                    | 16%            | 92%                              | 8%                     | 26.9%                                        | \$22,473                |
| BG4, CT 10   | 64%                         | 10%                       | 18%                              | 6%    | 0%                                        | 3%                    | 0%             | 95%                              | 5%                     | 10.0%                                        | \$56,797                |
| BG1, CT 11   | 70%                         | 2%                        | 6%                               | 10%   | 0%                                        | 0%                    | 12%            | 93%                              | 7%                     | 17.1%                                        | \$40,972                |
| BG2, CT 11   | 65%                         | 12%                       | 11%                              | 2%    | 2%                                        | 0%                    | 8%             | 97%                              | 3%                     | 10.5%                                        | \$29,327                |
| BG1, CT 12   | 91%                         | 0%                        | 2%                               | 8%    | 0%                                        | 0%                    | 0%             | 97%                              | 3%                     | 1.5%                                         | \$66,786                |
| BG2, CT 12   | 84%                         | 4%                        | 8%                               | 0%    | 0%                                        | 0%                    | 4%             | 95%                              | 5%                     | 7.9%                                         | \$70,703                |
| BG3, CT 12   | 67%                         | 0%                        | 23%                              | 0%    | 0%                                        | 0%                    | 10%            | 94%                              | 6%                     | 0.0%                                         | \$109,911               |
| BG4, CT 12   | 86%                         | 3%                        | 3%                               | 7%    | 0%                                        | 1%                    | 0%             | 99%                              | 1%                     | 1.7%                                         | \$89,256                |
| BG5, CT 12   | 82%                         | 2%                        | 0%                               | 0%    | 0%                                        | 11%                   | 5%             | 88%                              | 12%                    | 1.2%                                         | \$89,297                |
| BG1, CT 13   | 81%                         | 1%                        | 8%                               | 0%    | 0%                                        | 0%                    | 10%            | 86%                              | 14%                    | 1.2%                                         | \$118,807               |
| BG2, CT 13   | 93%                         | 0%                        | 1%                               | 1%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 1.3%                                         | \$92,159                |
| BG3, CT 13   | 91%                         | 0%                        | 2%                               | 5%    | 0%                                        | 0%                    | 2%             | 94%                              | 6%                     | 5.8%                                         | \$112,893               |
| BG1, CT 14   | 93%                         | 0%                        | 5%                               | 2%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 0.0%                                         | \$58,693                |
| BG2, CT 14   | 88%                         | 0%                        | 2%                               | 4%    | 0%                                        | 0%                    | 6%             | 98%                              | 2%                     | 3.2%                                         | \$79,154                |
| BG3, CT 14   | 50%                         | 8%                        | 9%                               | 10%   | 9%                                        | 0%                    | 14%            | 92%                              | 8%                     | 14.4%                                        | \$76,338                |
| BG4, CT 14   | 63%                         | 11%                       | 1%                               | 11%   | 0%                                        | 0%                    | 13%            | 89%                              | 11%                    | 6.4%                                         | \$51,771                |
| BG5, CT 14   | 54%                         | 35%                       | 7%                               | 3%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 35.0%                                        | \$31,806                |
| BG6, CT 14   | 39%                         | 6%                        | 14%                              | 27%   | 0%                                        | 3%                    | 11%            | 90%                              | 10%                    | 25.6%                                        | \$29,484                |
| BG1, CT 15   | 93%                         | 0%                        | 1%                               | 1%    | 0%                                        | 0%                    | 5%             | 92%                              | 8%                     | 0.0%                                         | \$87,098                |
| BG2, CT 15   | 85%                         | 0%                        | 4%                               | 0%    | 0%                                        | 0%                    | 11%            | 99%                              | 1%                     | 10.9%                                        | \$126,397               |
| BG3, CT 15   | 72%                         | 2%                        | 2%                               | 17%   | 0%                                        | 0%                    | 7%             | 98%                              | 2%                     | 4.9%                                         | \$53,452                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG4, CT 15    | 80%                         | 0%                        | 2%                               | 8%    | 0%                                        | 0%                    | 10%            | 98%                              | 2%                     | 2.9%                                         | \$115,524               |
| BG5, CT 15    | 38%                         | 14%                       | 3%                               | 9%    | 0%                                        | 0%                    | 36%            | 93%                              | 7%                     | 41.2%                                        | \$21,354                |
| BG1, CT 16.01 | 66%                         | 12%                       | 8%                               | 3%    | 0%                                        | 3%                    | 8%             | 87%                              | 13%                    | 4.1%                                         | \$59,276                |
| BG2, CT 16.01 | 37%                         | 9%                        | 4%                               | 13%   | 3%                                        | 6%                    | 29%            | 86%                              | 14%                    | 2.1%                                         | \$95,083                |
| BG3, CT 16.01 | 78%                         | 0%                        | 8%                               | 1%    | 4%                                        | 0%                    | 9%             | 99%                              | 1%                     | 1.8%                                         | \$86,750                |
| BG1, CT 16.02 | 71%                         | 3%                        | 12%                              | 2%    | 1%                                        | 0%                    | 12%            | 93%                              | 7%                     | 24.3%                                        | \$49,875                |
| BG2, CT 16.02 | 70%                         | 0%                        | 11%                              | 2%    | 8%                                        | 0%                    | 8%             | 88%                              | 12%                    | 0.0%                                         | \$90,417                |
| BG3, CT 16.02 | 63%                         | 7%                        | 16%                              | 5%    | 3%                                        | 0%                    | 7%             | 97%                              | 3%                     | 6.9%                                         | \$62,472                |
| BG4, CT 16.02 | 64%                         | 16%                       | 13%                              | 2%    | 0%                                        | 0%                    | 4%             | 97%                              | 3%                     | 3.2%                                         | \$83,831                |
| BG1, CT 17.01 | 51%                         | 15%                       | 9%                               | 12%   | 0%                                        | 1%                    | 13%            | 99%                              | 1%                     | 2.5%                                         | \$43,634                |
| BG2, CT 17.01 | 53%                         | 9%                        | 7%                               | 2%    | 25%                                       | 0%                    | 3%             | 100%                             | 0%                     | 6.9%                                         | \$91,797                |
| BG3, CT 17.01 | 65%                         | 3%                        | 9%                               | 3%    | 0%                                        | 0%                    | 20%            | 90%                              | 10%                    | 3.3%                                         | \$107,400               |
| BG4, CT 17.01 | 56%                         | 17%                       | 20%                              | 0%    | 0%                                        | 0%                    | 7%             | 95%                              | 5%                     | 12.6%                                        | \$84,803                |
| BG5, CT 17.01 | 37%                         | 42%                       | 0%                               | 8%    | 0%                                        | 2%                    | 12%            | 95%                              | 5%                     | 2.1%                                         | \$66,375                |
| BG1, CT 17.02 | 61%                         | 7%                        | 9%                               | 6%    | 0%                                        | 0%                    | 17%            | 88%                              | 12%                    | 21.1%                                        | \$55,474                |
| BG2, CT 17.02 | 88%                         | 1%                        | 1%                               | 0%    | 4%                                        | 0%                    | 5%             | 100%                             | 0%                     | 13.6%                                        | \$94,177                |
| BG3, CT 17.02 | 71%                         | 15%                       | 3%                               | 4%    | 0%                                        | 0%                    | 7%             | 90%                              | 10%                    | 1.9%                                         | \$131,875               |
| BG4, CT 17.02 | 60%                         | 8%                        | 2%                               | 3%    | 16%                                       | 0%                    | 13%            | 92%                              | 8%                     | 7.0%                                         | \$85,833                |
| BG5, CT 17.02 | 79%                         | 0%                        | 19%                              | 0%    | 0%                                        | 0%                    | 2%             | 96%                              | 4%                     | 0.0%                                         | \$66,094                |
| BG1, CT 17.31 | 28%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 68%            | 89%                              | 11%                    | 3.1%                                         | \$61,479                |
| BG2, CT 17.31 | 75%                         | 11%                       | 8%                               | 1%    | 0%                                        | 0%                    | 5%             | 98%                              | 2%                     | 3.4%                                         | \$87,577                |
| BG3, CT 17.31 | 58%                         | 2%                        | 13%                              | 9%    | 0%                                        | 2%                    | 16%            | 97%                              | 3%                     | 15.9%                                        | \$74,107                |
| BG4, CT 17.31 | 74%                         | 3%                        | 9%                               | 1%    | 0%                                        | 3%                    | 11%            | 89%                              | 11%                    | 6.2%                                         | \$81,912                |
| BG5, CT 17.31 | 59%                         | 13%                       | 0%                               | 13%   | 0%                                        | 0%                    | 16%            | 100%                             | 0%                     | 32.5%                                        | \$73,750                |
| BG1, CT 17.32 | 68%                         | 3%                        | 18%                              | 1%    | 0%                                        | 2%                    | 7%             | 99%                              | 1%                     | 0.0%                                         | \$106,905               |
| BG2, CT 17.32 | 62%                         | 7%                        | 7%                               | 7%    | 12%                                       | 0%                    | 5%             | 97%                              | 3%                     | 17.5%                                        | \$86,136                |
| BG3, CT 17.32 | 70%                         | 12%                       | 13%                              | 1%    | 0%                                        | 0%                    | 3%             | 98%                              | 2%                     | 0.0%                                         | \$110,781               |
| BG4, CT 17.32 | 72%                         | 3%                        | 7%                               | 10%   | 0%                                        | 3%                    | 5%             | 88%                              | 12%                    | 2.5%                                         | \$87,212                |
| BG1, CT 18.01 | 73%                         | 3%                        | 4%                               | 13%   | 0%                                        | 0%                    | 7%             | 100%                             | 0%                     | 0.5%                                         | \$89,056                |
| BG2, CT 18.01 | 49%                         | 17%                       | 15%                              | 9%    | 0%                                        | 1%                    | 10%            | 96%                              | 4%                     | 2.2%                                         | \$60,474                |
| BG3, CT 18.01 | 76%                         | 4%                        | 4%                               | 6%    | 2%                                        | 1%                    | 6%             | 90%                              | 10%                    | 11.3%                                        | \$67,560                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 18.02 | 72%                         | 2%                        | 8%                               | 0%    | 1%                                        | 4%                    | 14%            | 78%                              | 22%                    | 30.1%                                        | \$38,438                |
| BG2, CT 18.02 | 48%                         | 4%                        | 7%                               | 29%   | 0%                                        | 4%                    | 8%             | 94%                              | 6%                     | 31.3%                                        | \$41,458                |
| BG3, CT 18.02 | 58%                         | 20%                       | 0%                               | 6%    | 0%                                        | 14%                   | 2%             | 82%                              | 18%                    | 6.6%                                         | \$56,319                |
| BG4, CT 18.02 | 54%                         | 5%                        | 5%                               | 19%   | 3%                                        | 7%                    | 6%             | 88%                              | 12%                    | 6.8%                                         | \$75,802                |
| BG1, CT 19    | 28%                         | 4%                        | 22%                              | 29%   | 10%                                       | 4%                    | 5%             | 92%                              | 8%                     | 20.9%                                        | \$37,550                |
| BG2, CT 19    | 45%                         | 4%                        | 5%                               | 29%   | 11%                                       | 0%                    | 6%             | 96%                              | 4%                     | 18.4%                                        | \$38,158                |
| BG3, CT 19    | 78%                         | 0%                        | 0%                               | 15%   | 0%                                        | 7%                    | 0%             | 93%                              | 7%                     | 0.0%                                         | \$67,143                |
| BG4, CT 19    | 15%                         | 5%                        | 11%                              | 39%   | 10%                                       | 0%                    | 21%            | 90%                              | 10%                    | 20.5%                                        | \$62,000                |
| BG5, CT 19    | 55%                         | 6%                        | 16%                              | 3%    | 9%                                        | 3%                    | 8%             | 92%                              | 8%                     | 24.2%                                        | \$45,398                |
| BG1, CT 20    | 68%                         | 17%                       | 1%                               | 14%   | 0%                                        | 0%                    | 0%             | 66%                              | 34%                    | 17.6%                                        | \$38,664                |
| BG2, CT 20    | 47%                         | 0%                        | 3%                               | 0%    | 26%                                       | 2%                    | 22%            | 79%                              | 21%                    | 17.4%                                        | \$27,399                |
| BG3, CT 20    | 40%                         | 6%                        | 4%                               | 36%   | 0%                                        | 11%                   | 4%             | 78%                              | 22%                    | 11.9%                                        | \$39,167                |
| BG4, CT 20    | 63%                         | 2%                        | 4%                               | 13%   | 0%                                        | 0%                    | 18%            | 89%                              | 11%                    | 9.1%                                         | \$46,417                |
| BG1, CT 21    | 83%                         | 5%                        | 0%                               | 4%    | 0%                                        | 0%                    | 9%             | 94%                              | 6%                     | 1.8%                                         | \$77,961                |
| BG2, CT 21    | 48%                         | 3%                        | 6%                               | 12%   | 1%                                        | 0%                    | 29%            | 100%                             | 0%                     | 1.5%                                         | \$41,154                |
| BG3, CT 21    | 62%                         | 2%                        | 0%                               | 0%    | 27%                                       | 0%                    | 8%             | 98%                              | 2%                     | 8.8%                                         | \$75,118                |
| BG4, CT 21    | 80%                         | 1%                        | 2%                               | 13%   | 0%                                        | 0%                    | 4%             | 100%                             | 0%                     | 5.0%                                         | \$60,368                |
| BG5, CT 21    | 61%                         | 4%                        | 13%                              | 3%    | 11%                                       | 6%                    | 3%             | 90%                              | 10%                    | 5.1%                                         | \$53,295                |
| BG1, CT 22.01 | 87%                         | 3%                        | 4%                               | 1%    | 0%                                        | 1%                    | 5%             | 99%                              | 1%                     | 4.3%                                         | \$83,095                |
| BG2, CT 22.01 | 53%                         | 0%                        | 10%                              | 27%   | 0%                                        | 0%                    | 10%            | 97%                              | 3%                     | 5.0%                                         | \$74,375                |
| BG3, CT 22.01 | 74%                         | 6%                        | 2%                               | 7%    | 0%                                        | 2%                    | 11%            | 89%                              | 11%                    | 7.6%                                         | \$91,750                |
| BG4, CT 22.01 | 80%                         | 0%                        | 9%                               | 3%    | 0%                                        | 2%                    | 6%             | 90%                              | 10%                    | 12.4%                                        | \$57,204                |
| BG1, CT 22.02 | 65%                         | 5%                        | 9%                               | 10%   | 0%                                        | 0%                    | 10%            | 93%                              | 7%                     | 9.7%                                         | \$61,250                |
| BG2, CT 22.02 | 57%                         | 6%                        | 19%                              | 9%    | 0%                                        | 0%                    | 10%            | 63%                              | 37%                    | 36.6%                                        | \$39,735                |
| BG3, CT 22.02 | 80%                         | 0%                        | 7%                               | 6%    | 0%                                        | 0%                    | 6%             | 99%                              | 1%                     | 1.5%                                         | \$89,375                |
| BG4, CT 22.02 | 56%                         | 0%                        | 4%                               | 22%   | 0%                                        | 13%                   | 5%             | 87%                              | 13%                    | 22.4%                                        | \$55,781                |
| BG1, CT 23.01 | 87%                         | 3%                        | 1%                               | 1%    | 0%                                        | 0%                    | 8%             | 95%                              | 5%                     | 2.4%                                         | \$130,144               |
| BG2, CT 23.01 | 91%                         | 1%                        | 0%                               | 6%    | 0%                                        | 0%                    | 1%             | 98%                              | 2%                     | 19.4%                                        | \$101,484               |
| BG3, CT 23.01 | 49%                         | 0%                        | 20%                              | 10%   | 0%                                        | 2%                    | 20%            | 94%                              | 6%                     | 1.9%                                         | \$104,246               |
| BG4, CT 23.01 | 86%                         | 0%                        | 3%                               | 0%    | 0%                                        | 11%                   | 0%             | 84%                              | 16%                    | 3.4%                                         | \$114,519               |
| BG1, CT 23.02 | 88%                         | 2%                        | 5%                               | 1%    | 0%                                        | 0%                    | 3%             | 96%                              | 4%                     | 7.6%                                         | \$78,333                |



| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG2, CT 23.02 | 56%                         | 0%                        | 21%                              | 6%    | 7%                                        | 0%                    | 9%             | 99%                              | 1%                     | 4.6%                                         | \$92,772                |
| BG3, CT 23.02 | 78%                         | 0%                        | 19%                              | 0%    | 0%                                        | 0%                    | 2%             | 98%                              | 2%                     | 7.6%                                         | \$120,875               |
| BG4, CT 23.02 | 79%                         | 0%                        | 7%                               | 0%    | 0%                                        | 0%                    | 14%            | 90%                              | 10%                    | 4.0%                                         | \$53,790                |
| BG5, CT 23.02 | 82%                         | 0%                        | 15%                              | 1%    | 0%                                        | 1%                    | 0%             | 94%                              | 6%                     | 7.3%                                         | \$78,750                |
| BG1, CT 23.03 | 46%                         | 28%                       | 10%                              | 0%    | 0%                                        | 0%                    | 15%            | 100%                             | 0%                     | 38.0%                                        | \$49,779                |
| BG2, CT 23.03 | 75%                         | 2%                        | 11%                              | 4%    | 0%                                        | 0%                    | 7%             | 91%                              | 9%                     | 0.0%                                         | \$102,396               |
| BG3, CT 23.03 | 70%                         | 0%                        | 11%                              | 11%   | 0%                                        | 4%                    | 3%             | 92%                              | 8%                     | 1.8%                                         | \$97,044                |
| BG4, CT 23.03 | 54%                         | 2%                        | 9%                               | 20%   | 5%                                        | 1%                    | 10%            | 91%                              | 9%                     | 13.5%                                        | \$77,250                |
| BG5, CT 23.03 | 63%                         | 10%                       | 3%                               | 17%   | 2%                                        | 1%                    | 5%             | 89%                              | 11%                    | 0.0%                                         | \$61,579                |
| BG6, CT 23.03 | 68%                         | 6%                        | 4%                               | 0%    | 0%                                        | 0%                    | 22%            | 100%                             | 0%                     | 41.2%                                        | \$33,839                |
| BG1, CT 24    | 88%                         | 0%                        | 3%                               | 5%    | 2%                                        | 0%                    | 2%             | 98%                              | 2%                     | 20.7%                                        | \$63,355                |
| BG2, CT 24    | 71%                         | 3%                        | 5%                               | 3%    | 0%                                        | 0%                    | 18%            | 98%                              | 2%                     | 8.7%                                         | \$62,891                |
| BG3, CT 24    | 66%                         | 4%                        | 14%                              | 2%    | 1%                                        | 2%                    | 11%            | 80%                              | 20%                    | 5.9%                                         | \$107,283               |
| BG1, CT 25.01 | 70%                         | 2%                        | 9%                               | 9%    | 7%                                        | 3%                    | 1%             | 92%                              | 8%                     | 0.0%                                         | \$99,259                |
| BG2, CT 25.01 | 66%                         | 4%                        | 1%                               | 14%   | 0%                                        | 1%                    | 13%            | 91%                              | 9%                     | 24.6%                                        | \$33,571                |
| BG3, CT 25.01 | 61%                         | 9%                        | 7%                               | 1%    | 2%                                        | 1%                    | 19%            | 87%                              | 13%                    | 11.3%                                        | \$57,614                |
| BG4, CT 25.01 | 62%                         | 14%                       | 1%                               | 5%    | 0%                                        | 11%                   | 7%             | 86%                              | 14%                    | 5.0%                                         | \$85,278                |
| BG5, CT 25.01 | 67%                         | 1%                        | 8%                               | 18%   | 0%                                        | 0%                    | 6%             | 97%                              | 3%                     | 1.7%                                         | \$93,906                |
| BG1, CT 25.02 | 70%                         | 2%                        | 7%                               | 16%   | 0%                                        | 3%                    | 2%             | 96%                              | 4%                     | 2.3%                                         | \$55,625                |
| BG2, CT 25.02 | 53%                         | 3%                        | 5%                               | 14%   | 8%                                        | 0%                    | 17%            | 79%                              | 21%                    | 4.1%                                         | \$75,280                |
| BG3, CT 25.02 | 73%                         | 3%                        | 2%                               | 1%    | 1%                                        | 0%                    | 20%            | 96%                              | 4%                     | 14.5%                                        | \$57,168                |
| BG4, CT 25.02 | 76%                         | 9%                        | 2%                               | 1%    | 0%                                        | 0%                    | 12%            | 99%                              | 1%                     | 2.6%                                         | \$89,477                |
| BG1, CT 26.01 | 60%                         | 3%                        | 13%                              | 7%    | 0%                                        | 11%                   | 6%             | 88%                              | 12%                    | 7.1%                                         | \$72,992                |
| BG2, CT 26.01 | 62%                         | 5%                        | 14%                              | 7%    | 0%                                        | 0%                    | 12%            | 94%                              | 6%                     | 3.6%                                         | \$77,679                |
| BG3, CT 26.01 | 24%                         | 11%                       | 12%                              | 33%   | 0%                                        | 1%                    | 19%            | 86%                              | 14%                    | 1.3%                                         | \$91,250                |
| BG1, CT 26.02 | 53%                         | 8%                        | 3%                               | 18%   | 0%                                        | 1%                    | 17%            | 94%                              | 6%                     | 7.8%                                         | \$90,000                |
| BG2, CT 26.02 | 69%                         | 7%                        | 3%                               | 5%    | 2%                                        | 0%                    | 15%            | 100%                             | 0%                     | 8.7%                                         | \$76,964                |
| BG3, CT 26.02 | 73%                         | 1%                        | 4%                               | 11%   | 0%                                        | 1%                    | 10%            | 91%                              | 9%                     | 6.8%                                         | \$103,500               |
| BG1, CT 26.03 | 55%                         | 1%                        | 8%                               | 5%    | 7%                                        | 0%                    | 24%            | 98%                              | 2%                     | 3.0%                                         | \$93,706                |
| BG2, CT 26.03 | 86%                         | 1%                        | 3%                               | 4%    | 0%                                        | 5%                    | 1%             | 94%                              | 6%                     | 6.3%                                         | \$104,324               |
| BG3, CT 26.03 | 77%                         | 2%                        | 4%                               | 11%   | 0%                                        | 0%                    | 6%             | 84%                              | 16%                    | 1.8%                                         | \$123,839               |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 27.02 | 59%                         | 0%                        | 7%                               | 23%   | 1%                                        | 0%                    | 10%            | 97%                              | 3%                     | 0.7%                                         | \$108,989               |
| BG2, CT 27.02 | 80%                         | 2%                        | 1%                               | 8%    | 1%                                        | 0%                    | 8%             | 96%                              | 4%                     | 3.5%                                         | \$85,685                |
| BG3, CT 27.02 | 88%                         | 2%                        | 3%                               | 3%    | 0%                                        | 0%                    | 4%             | 94%                              | 6%                     | 1.3%                                         | \$73,235                |
| BG4, CT 27.02 | 80%                         | 0%                        | 0%                               | 15%   | 0%                                        | 3%                    | 3%             | 85%                              | 15%                    | 0.0%                                         | \$142,422               |
| BG5, CT 27.02 | 79%                         | 1%                        | 2%                               | 4%    | 0%                                        | 1%                    | 14%            | 94%                              | 6%                     | 0.9%                                         | \$78,915                |
| BG1, CT 27.11 | 82%                         | 3%                        | 5%                               | 10%   | 0%                                        | 0%                    | 0%             | 99%                              | 1%                     | 2.2%                                         | \$93,750                |
| BG2, CT 27.11 | 65%                         | 4%                        | 22%                              | 0%    | 3%                                        | 0%                    | 6%             | 100%                             | 0%                     | 0.0%                                         | \$80,417                |
| BG3, CT 27.11 | 95%                         | 0%                        | 2%                               | 3%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 3.0%                                         | \$77,240                |
| BG4, CT 27.11 | 81%                         | 1%                        | 5%                               | 13%   | 0%                                        | 0%                    | 0%             | 92%                              | 8%                     | 1.0%                                         | \$111,379               |
| BG1, CT 27.12 | 57%                         | 9%                        | 8%                               | 6%    | 3%                                        | 0%                    | 17%            | 90%                              | 10%                    | 4.5%                                         | \$52,813                |
| BG2, CT 27.12 | 55%                         | 0%                        | 8%                               | 35%   | 0%                                        | 0%                    | 2%             | 78%                              | 22%                    | 12.9%                                        | \$53,361                |
| BG3, CT 27.12 | 57%                         | 11%                       | 7%                               | 14%   | 0%                                        | 4%                    | 7%             | 91%                              | 9%                     | 7.4%                                         | \$58,843                |
| BG4, CT 27.12 | 68%                         | 3%                        | 4%                               | 17%   | 0%                                        | 1%                    | 7%             | 96%                              | 4%                     | 1.0%                                         | \$115,268               |
| BG5, CT 27.12 | 71%                         | 12%                       | 3%                               | 7%    | 1%                                        | 0%                    | 7%             | 87%                              | 13%                    | 3.6%                                         | \$80,052                |
| BG1, CT 28.11 | 45%                         | 2%                        | 32%                              | 0%    | 3%                                        | 0%                    | 19%            | 94%                              | 6%                     | 8.1%                                         | \$56,176                |
| BG2, CT 28.11 | 49%                         | 2%                        | 9%                               | 21%   | 0%                                        | 5%                    | 14%            | 91%                              | 9%                     | 5.5%                                         | \$76,699                |
| BG3, CT 28.11 | 62%                         | 6%                        | 8%                               | 2%    | 0%                                        | 3%                    | 19%            | 90%                              | 10%                    | 6.6%                                         | \$44,510                |
| BG4, CT 28.11 | 62%                         | 0%                        | 3%                               | 28%   | 0%                                        | 1%                    | 7%             | 94%                              | 6%                     | 2.9%                                         | \$78,750                |
| BG1, CT 28.12 | 84%                         | 0%                        | 8%                               | 5%    | 0%                                        | 0%                    | 3%             | 97%                              | 3%                     | 1.4%                                         | \$119,250               |
| BG2, CT 28.12 | 75%                         | 18%                       | 1%                               | 3%    | 0%                                        | 0%                    | 4%             | 93%                              | 7%                     | 5.0%                                         | \$138,000               |
| BG3, CT 28.12 | 95%                         | 0%                        | 2%                               | 0%    | 0%                                        | 0%                    | 2%             | 100%                             | 0%                     | 0.0%                                         | \$155,030               |
| BG1, CT 28.13 | 96%                         | 0%                        | 1%                               | 2%    | 0%                                        | 0%                    | 2%             | 95%                              | 5%                     | 1.3%                                         | \$141,438               |
| BG2, CT 28.13 | 85%                         | 0%                        | 4%                               | 3%    | 0%                                        | 2%                    | 6%             | 98%                              | 2%                     | 2.8%                                         | \$165,625               |
| BG3, CT 28.13 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 3.8%                                         | \$155,054               |
| BG1, CT 28.21 | 82%                         | 0%                        | 0%                               | 6%    | 0%                                        | 3%                    | 9%             | 94%                              | 6%                     | 3.5%                                         | \$168,654               |
| BG2, CT 28.21 | 90%                         | 2%                        | 1%                               | 0%    | 5%                                        | 0%                    | 2%             | 99%                              | 1%                     | 4.6%                                         | \$161,094               |
| BG3, CT 28.21 | 81%                         | 8%                        | 2%                               | 5%    | 0%                                        | 0%                    | 4%             | 97%                              | 3%                     | 0.7%                                         | \$144,000               |
| BG1, CT 28.22 | 90%                         | 2%                        | 5%                               | 0%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 0.0%                                         | \$147,321               |
| BG2, CT 28.22 | 82%                         | 0%                        | 4%                               | 0%    | 0%                                        | 3%                    | 11%            | 92%                              | 8%                     | 0.0%                                         | \$142,727               |
| BG3, CT 28.22 | 95%                         | 0%                        | 3%                               | 1%    | 0%                                        | 0%                    | 0%             | 99%                              | 1%                     | 5.0%                                         | \$110,221               |
| BG1, CT 28.23 | 95%                         | 1%                        | 2%                               | 0%    | 0%                                        | 0%                    | 1%             | 95%                              | 5%                     | 4.0%                                         | \$112,604               |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG2, CT 28.23 | 83%                         | 3%                        | 2%                               | 3%    | 0%                                        | 1%                    | 8%             | 97%                              | 3%                     | 0.8%                                         | \$183,793               |
| BG1, CT 29    | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 0.0%                                         | \$72,500                |
| BG2, CT 29    | 79%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 21%            | 83%                              | 17%                    | 2.3%                                         | \$84,554                |
| BG3, CT 29    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 88%                              | 12%                    | 9.6%                                         | \$82,667                |
| BG4, CT 29    | 75%                         | 0%                        | 0%                               | 25%   | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 8.9%                                         | \$67,188                |
| BG1, CT 1     | 3%                          | 0%                        | 96%                              | 0%    | 0%                                        | 0%                    | 1%             | 100%                             | 0%                     | 21.9%                                        | \$44,200                |
| BG2, CT 1     | 1%                          | 0%                        | 94%                              | 0%    | 0%                                        | 0%                    | 4%             | 100%                             | 0%                     | 31.6%                                        | \$43,583                |
| BG3, CT 1     | 3%                          | 0%                        | 94%                              | 0%    | 0%                                        | 0%                    | 2%             | 98%                              | 2%                     | 31.6%                                        | \$38,182                |
| BG4, CT 1     | 3%                          | 0%                        | 92%                              | 0%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 30.5%                                        | \$34,808                |
| BG5, CT 1     | 3%                          | 0%                        | 96%                              | 0%    | 0%                                        | 0%                    | 1%             | 100%                             | 0%                     | 26.4%                                        | \$36,792                |
| BG6, CT 1     | 2%                          | 0%                        | 96%                              | 0%    | 0%                                        | 0%                    | 1%             | 100%                             | 0%                     | 35.2%                                        | \$29,659                |
| BG1, CT 2     | 12%                         | 2%                        | 81%                              | 0%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 15.9%                                        | \$61,285                |
| BG2, CT 2     | 37%                         | 2%                        | 42%                              | 3%    | 2%                                        | 0%                    | 14%            | 94%                              | 6%                     | 7.7%                                         | \$92,991                |
| BG3, CT 2     | 44%                         | 0%                        | 51%                              | 4%    | 0%                                        | 0%                    | 2%             | 90%                              | 10%                    | 3.1%                                         | \$92,434                |
| BG4, CT 2     | 30%                         | 0%                        | 55%                              | 6%    | 0%                                        | 0%                    | 9%             | 100%                             | 0%                     | 16.4%                                        | \$64,350                |
| BG1, CT 3     | 14%                         | 0%                        | 74%                              | 4%    | 0%                                        | 0%                    | 8%             | 99%                              | 1%                     | 23.3%                                        | \$45,500                |
| BG2, CT 3     | 12%                         | 0%                        | 80%                              | 0%    | 0%                                        | 0%                    | 8%             | 99%                              | 1%                     | 34.6%                                        | \$37,750                |
| BG1, CT 1     | 56%                         | 0%                        | 31%                              | 0%    | 0%                                        | 1%                    | 12%            | 95%                              | 5%                     | 7.9%                                         | \$79,531                |
| BG2, CT 1     | 75%                         | 0%                        | 0%                               | 0%    | 0%                                        | 25%                   | 0%             | 75%                              | 25%                    | ND                                           | ND                      |
| BG1, CT 1     | 92%                         | 2%                        | 3%                               | 0%    | 0%                                        | 0%                    | 4%             | 98%                              | 2%                     | 2.5%                                         | \$70,893                |
| BG2, CT 1     | 90%                         | 0%                        | 4%                               | 4%    | 0%                                        | 0%                    | 1%             | 97%                              | 3%                     | 12.4%                                        | \$72,917                |
| BG1, CT 1     | 6%                          | 0%                        | 87%                              | 0%    | 0%                                        | 0%                    | 7%             | 100%                             | 0%                     | 23.6%                                        | \$47,083                |
| BG2, CT 1     | 8%                          | 0%                        | 84%                              | 2%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 19.3%                                        | \$36,375                |
| BG3, CT 1     | 4%                          | 0%                        | 87%                              | 0%    | 2%                                        | 2%                    | 4%             | 96%                              | 4%                     | 23.8%                                        | \$43,333                |
| BG1, CT 2     | 42%                         | 0%                        | 38%                              | 2%    | 0%                                        | 1%                    | 17%            | 96%                              | 4%                     | 3.7%                                         | \$71,250                |
| BG2, CT 2     | 16%                         | 0%                        | 73%                              | 0%    | 0%                                        | 2%                    | 9%             | 98%                              | 2%                     | 32.5%                                        | \$51,875                |
| BG3, CT 2     | 33%                         | 2%                        | 44%                              | 0%    | 0%                                        | 0%                    | 20%            | 94%                              | 6%                     | 12.3%                                        | \$93,750                |
| BG1, CT 1     | 61%                         | 6%                        | 28%                              | 1%    | 0%                                        | 0%                    | 4%             | 94%                              | 6%                     | 15.7%                                        | \$27,971                |
| BG2, CT 1     | 91%                         | 0%                        | 9%                               | 0%    | 0%                                        | 0%                    | 1%             | 94%                              | 6%                     | 12.9%                                        | \$38,447                |
| BG1, CT 2     | 72%                         | 9%                        | 7%                               | 7%    | 1%                                        | 0%                    | 4%             | 98%                              | 2%                     | 16.8%                                        | \$42,500                |
| BG2, CT 2     | 69%                         | 7%                        | 13%                              | 1%    | 0%                                        | 1%                    | 10%            | 99%                              | 1%                     | 13.9%                                        | \$58,036                |

| Block Group | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|             | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 3   | 64%                         | 6%                        | 20%                              | 0%    | 0%                                        | 0%                    | 9%             | 96%                              | 4%                     | 21.8%                                        | \$47,857                |
| BG2, CT 3   | 41%                         | 23%                       | 11%                              | 8%    | 0%                                        | 6%                    | 11%            | 92%                              | 8%                     | 8.8%                                         | \$63,750                |
| BG3, CT 3   | 43%                         | 19%                       | 18%                              | 9%    | 0%                                        | 2%                    | 10%            | 98%                              | 2%                     | 21.1%                                        | \$42,813                |
| BG4, CT 3   | 65%                         | 14%                       | 8%                               | 3%    | 1%                                        | 0%                    | 8%             | 93%                              | 7%                     | 17.4%                                        | \$41,667                |
| BG1, CT 4   | 76%                         | 1%                        | 9%                               | 2%    | 0%                                        | 1%                    | 11%            | 87%                              | 13%                    | 1.7%                                         | \$75,417                |
| BG2, CT 4   | 38%                         | 1%                        | 28%                              | 18%   | 0%                                        | 2%                    | 12%            | 98%                              | 2%                     | 10.5%                                        | \$56,591                |
| BG3, CT 4   | 54%                         | 1%                        | 16%                              | 11%   | 2%                                        | 0%                    | 16%            | 96%                              | 4%                     | 24.0%                                        | \$52,847                |
| BG4, CT 4   | 84%                         | 4%                        | 8%                               | 2%    | 0%                                        | 0%                    | 2%             | 93%                              | 7%                     | 6.9%                                         | \$62,737                |
| BG1, CT 5   | 83%                         | 0%                        | 2%                               | 3%    | 3%                                        | 5%                    | 5%             | 85%                              | 15%                    | 6.0%                                         | \$69,375                |
| BG2, CT 5   | 66%                         | 5%                        | 14%                              | 3%    | 0%                                        | 0%                    | 12%            | 82%                              | 18%                    | 6.8%                                         | \$52,946                |
| BG1, CT 6   | 66%                         | 2%                        | 16%                              | 0%    | 0%                                        | 0%                    | 16%            | 95%                              | 5%                     | 13.8%                                        | \$72,578                |
| BG2, CT 6   | 73%                         | 3%                        | 11%                              | 3%    | 0%                                        | 0%                    | 10%            | 98%                              | 2%                     | 10.4%                                        | \$82,688                |
| BG3, CT 6   | 67%                         | 0%                        | 23%                              | 0%    | 0%                                        | 0%                    | 10%            | 90%                              | 10%                    | 1.6%                                         | \$100,824               |
| BG4, CT 6   | 78%                         | 1%                        | 14%                              | 6%    | 0%                                        | 0%                    | 1%             | 100%                             | 0%                     | 18.3%                                        | \$53,125                |
| BG1, CT 7   | 81%                         | 11%                       | 2%                               | 3%    | 0%                                        | 0%                    | 2%             | 92%                              | 8%                     | 2.6%                                         | \$72,366                |
| BG2, CT 7   | 52%                         | 12%                       | 22%                              | 7%    | 0%                                        | 0%                    | 8%             | 92%                              | 8%                     | 24.2%                                        | \$46,875                |
| BG3, CT 7   | 68%                         | 12%                       | 5%                               | 2%    | 6%                                        | 0%                    | 6%             | 77%                              | 23%                    | 10.2%                                        | \$69,118                |
| BG1, CT 8   | 58%                         | 2%                        | 4%                               | 2%    | 0%                                        | 5%                    | 29%            | 83%                              | 17%                    | 3.8%                                         | \$41,544                |
| BG2, CT 8   | 57%                         | 12%                       | 8%                               | 12%   | 0%                                        | 1%                    | 10%            | 90%                              | 10%                    | 15.4%                                        | \$48,795                |
| BG3, CT 8   | 88%                         | 0%                        | 2%                               | 0%    | 0%                                        | 0%                    | 10%            | 97%                              | 3%                     | 2.8%                                         | \$95,536                |
| BG4, CT 8   | 66%                         | 3%                        | 9%                               | 5%    | 1%                                        | 0%                    | 15%            | 100%                             | 0%                     | 0.0%                                         | \$110,750               |
| BG1, CT 9   | 76%                         | 0%                        | 14%                              | 1%    | 0%                                        | 4%                    | 4%             | 90%                              | 10%                    | 0.8%                                         | \$104,583               |
| BG2, CT 9   | 89%                         | 1%                        | 3%                               | 1%    | 2%                                        | 0%                    | 4%             | 87%                              | 13%                    | 6.3%                                         | \$74,154                |
| BG1, CT 10  | 84%                         | 0%                        | 5%                               | 2%    | 0%                                        | 0%                    | 9%             | 94%                              | 6%                     | 6.2%                                         | \$66,438                |
| BG2, CT 10  | 75%                         | 0%                        | 9%                               | 0%    | 0%                                        | 0%                    | 16%            | 100%                             | 0%                     | 28.8%                                        | \$48,674                |
| BG1, CT 11  | 70%                         | 16%                       | 1%                               | 2%    | 2%                                        | 3%                    | 5%             | 84%                              | 16%                    | 15.2%                                        | \$54,479                |
| BG1, CT 12  | 82%                         | 0%                        | 5%                               | 3%    | 0%                                        | 0%                    | 10%            | 98%                              | 2%                     | 2.5%                                         | \$69,667                |
| BG2, CT 12  | 85%                         | 0%                        | 15%                              | 0%    | 0%                                        | 0%                    | 0%             | 95%                              | 5%                     | 0.0%                                         | \$93,068                |
| BG3, CT 12  | 83%                         | 0%                        | 7%                               | 1%    | 0%                                        | 1%                    | 9%             | 93%                              | 7%                     | 4.1%                                         | \$67,969                |
| BG1, CT 13  | 86%                         | 0%                        | 7%                               | 7%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 11.1%                                        | \$65,563                |
| BG2, CT 13  | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 100%                             | 0%                     | 9.5%                                         | \$99,554                |

| Block Group | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|             | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG3, CT 13  | 88%                         | 0%                        | 5%                               | 2%    | 0%                                        | 1%                    | 4%             | 98%                              | 2%                     | 1.2%                                         | \$92,067                |
| BG4, CT 13  | 93%                         | 0%                        | 4%                               | 3%    | 0%                                        | 0%                    | 0%             | 97%                              | 3%                     | 10.9%                                        | \$71,277                |
| BG5, CT 13  | 71%                         | 4%                        | 11%                              | 4%    | 0%                                        | 0%                    | 9%             | 96%                              | 4%                     | 31.6%                                        | \$58,780                |
| BG1, CT 14  | 87%                         | 0%                        | 2%                               | 0%    | 0%                                        | 0%                    | 11%            | 93%                              | 7%                     | 5.8%                                         | \$88,984                |
| BG2, CT 14  | 97%                         | 0%                        | 3%                               | 0%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 0.0%                                         | \$75,942                |
| BG3, CT 14  | 93%                         | 0%                        | 3%                               | 0%    | 0%                                        | 0%                    | 3%             | 98%                              | 2%                     | 6.7%                                         | \$79,009                |
| BG4, CT 14  | 75%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 23%            | 83%                              | 17%                    | 7.0%                                         | \$34,250                |
| BG5, CT 14  | 89%                         | 0%                        | 0%                               | 2%    | 0%                                        | 0%                    | 9%             | 97%                              | 3%                     | 5.4%                                         | \$84,313                |
| BG1, CT 15  | 84%                         | 0%                        | 3%                               | 1%    | 0%                                        | 0%                    | 13%            | 91%                              | 9%                     | 3.7%                                         | \$82,031                |
| BG2, CT 15  | 81%                         | 4%                        | 8%                               | 0%    | 0%                                        | 0%                    | 7%             | 100%                             | 0%                     | 3.8%                                         | \$74,638                |
| BG3, CT 15  | 96%                         | 0%                        | 0%                               | 2%    | 0%                                        | 0%                    | 2%             | 100%                             | 0%                     | 17.6%                                        | \$77,012                |
| BG4, CT 15  | 92%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 100%                             | 0%                     | 0.6%                                         | \$78,702                |
| BG5, CT 15  | 80%                         | 1%                        | 11%                              | 3%    | 0%                                        | 0%                    | 5%             | 95%                              | 5%                     | 1.7%                                         | \$100,000               |
| BG6, CT 15  | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 7.9%                                         | \$50,430                |
| BG1, CT 16  | 62%                         | 8%                        | 20%                              | 0%    | 0%                                        | 1%                    | 9%             | 95%                              | 5%                     | 8.0%                                         | \$43,304                |
| BG2, CT 16  | 74%                         | 2%                        | 9%                               | 3%    | 0%                                        | 0%                    | 12%            | 99%                              | 1%                     | 15.1%                                        | \$65,966                |
| BG3, CT 16  | 80%                         | 4%                        | 2%                               | 6%    | 0%                                        | 0%                    | 8%             | 89%                              | 11%                    | 7.1%                                         | \$52,727                |
| BG4, CT 16  | 90%                         | 10%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 98%                              | 2%                     | 6.8%                                         | \$79,500                |
| BG1, CT 17  | 97%                         | 0%                        | 3%                               | 0%    | 0%                                        | 0%                    | 0%             | 97%                              | 3%                     | 17.6%                                        | \$77,721                |
| BG2, CT 17  | 84%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 16%            | 100%                             | 0%                     | 4.4%                                         | \$57,667                |
| BG1, CT 18  | No population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG2, CT 18  | 76%                         | 14%                       | 2%                               | 0%    | 0%                                        | 0%                    | 8%             | 87%                              | 13%                    | 1.6%                                         | \$71,650                |
| BG1, CT 19  | 87%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 13%            | 100%                             | 0%                     | 4.2%                                         | \$78,315                |
| BG2, CT 19  | 92%                         | 0%                        | 1%                               | 0%    | 0%                                        | 4%                    | 2%             | 90%                              | 10%                    | 2.0%                                         | \$90,938                |
| BG3, CT 19  | 84%                         | 0%                        | 6%                               | 7%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 3.4%                                         | \$71,816                |
| BG4, CT 19  | 94%                         | 0%                        | 2%                               | 0%    | 0%                                        | 0%                    | 4%             | 99%                              | 1%                     | 4.9%                                         | \$93,705                |
| BG5, CT 19  | 89%                         | 1%                        | 5%                               | 1%    | 1%                                        | 0%                    | 4%             | 99%                              | 1%                     | 23.3%                                        | \$40,814                |
| BG1, CT 1   | 80%                         | 0%                        | 4%                               | 0%    | 0%                                        | 0%                    | 15%            | 100%                             | 0%                     | 8.8%                                         | \$47,422                |
| BG2, CT 1   | 78%                         | 0%                        | 10%                              | 1%    | 0%                                        | 1%                    | 11%            | 99%                              | 1%                     | 5.9%                                         | \$60,313                |
| BG3, CT 1   | 86%                         | 1%                        | 9%                               | 1%    | 0%                                        | 0%                    | 3%             | 99%                              | 1%                     | 9.9%                                         | \$41,327                |
| BG1, CT 2   | 19%                         | 0%                        | 46%                              | 0%    | 0%                                        | 0%                    | 35%            | 97%                              | 3%                     | 3.6%                                         | \$51,250                |

| Block Group | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|             | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 3   | 85%                         | 0%                        | 5%                               | 2%    | 0%                                        | 1%                    | 7%             | 97%                              | 3%                     | 10.4%                                        | \$51,731                |
| BG2, CT 3   | 37%                         | 1%                        | 44%                              | 0%    | 0%                                        | 1%                    | 17%            | 97%                              | 3%                     | 16.1%                                        | \$47,969                |
| BG3, CT 3   | 29%                         | 0%                        | 62%                              | 2%    | 1%                                        | 0%                    | 6%             | 99%                              | 1%                     | 20.8%                                        | \$33,750                |
| BG1, CT 1   | 93%                         | 0%                        | 1%                               | 1%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 4.8%                                         | \$99,688                |
| BG2, CT 1   | 89%                         | 1%                        | 1%                               | 1%    | 0%                                        | 0%                    | 8%             | 95%                              | 5%                     | 1.4%                                         | \$86,420                |
| BG3, CT 1   | 83%                         | 0%                        | 4%                               | 0%    | 0%                                        | 0%                    | 13%            | 98%                              | 2%                     | 0.8%                                         | \$88,287                |
| BG4, CT 1   | 87%                         | 0%                        | 1%                               | 2%    | 0%                                        | 4%                    | 7%             | 94%                              | 6%                     | 4.5%                                         | \$115,347               |
| BG1, CT 2   | 62%                         | 0%                        | 6%                               | 9%    | 0%                                        | 1%                    | 21%            | 96%                              | 4%                     | 0.1%                                         | \$103,487               |
| BG2, CT 2   | 62%                         | 0%                        | 18%                              | 12%   | 0%                                        | 0%                    | 8%             | 95%                              | 5%                     | 0.0%                                         | \$87,341                |
| BG3, CT 2   | 69%                         | 0%                        | 9%                               | 1%    | 0%                                        | 9%                    | 12%            | 84%                              | 16%                    | 0.0%                                         | \$71,958                |
| BG4, CT 2   | 87%                         | 2%                        | 9%                               | 2%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 5.6%                                         | \$107,120               |
| BG5, CT 2   | 66%                         | 0%                        | 17%                              | 8%    | 0%                                        | 0%                    | 9%             | 83%                              | 17%                    | 10.8%                                        | \$66,771                |
| BG1, CT 3   | 57%                         | 0%                        | 20%                              | 12%   | 3%                                        | 0%                    | 8%             | 93%                              | 7%                     | 14.9%                                        | \$74,489                |
| BG2, CT 3   | 63%                         | 4%                        | 14%                              | 2%    | 6%                                        | 0%                    | 11%            | 98%                              | 2%                     | 0.0%                                         | \$59,444                |
| BG3, CT 3   | 56%                         | 5%                        | 4%                               | 0%    | 9%                                        | 0%                    | 26%            | 92%                              | 8%                     | 8.4%                                         | \$66,250                |
| BG4, CT 3   | 82%                         | 2%                        | 5%                               | 8%    | 0%                                        | 0%                    | 2%             | 99%                              | 1%                     | 0.6%                                         | \$96,378                |
| BG1, CT 4   | 43%                         | 0%                        | 30%                              | 20%   | 0%                                        | 0%                    | 7%             | 95%                              | 5%                     | 7.2%                                         | \$45,905                |
| BG2, CT 4   | 51%                         | 7%                        | 20%                              | 2%    | 3%                                        | 0%                    | 18%            | 92%                              | 8%                     | 4.9%                                         | \$77,054                |
| BG3, CT 4   | 30%                         | 1%                        | 14%                              | 37%   | 0%                                        | 0%                    | 18%            | 99%                              | 1%                     | 15.0%                                        | \$77,639                |
| BG4, CT 4   | 79%                         | 0%                        | 11%                              | 5%    | 0%                                        | 1%                    | 4%             | 100%                             | 0%                     | 2.1%                                         | \$76,220                |
| BG1, CT 5   | 80%                         | 0%                        | 15%                              | 0%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 1.4%                                         | \$103,214               |
| BG2, CT 5   | 79%                         | 0%                        | 7%                               | 3%    | 0%                                        | 0%                    | 10%            | 93%                              | 7%                     | 10.2%                                        | \$71,786                |
| BG3, CT 5   | 65%                         | 1%                        | 16%                              | 9%    | 0%                                        | 3%                    | 6%             | 91%                              | 9%                     | 7.0%                                         | \$53,368                |
| BG1, CT 6   | 88%                         | 0%                        | 4%                               | 0%    | 2%                                        | 0%                    | 6%             | 94%                              | 6%                     | 3.9%                                         | \$97,115                |
| BG2, CT 6   | 65%                         | 5%                        | 11%                              | 4%    | 1%                                        | 1%                    | 13%            | 97%                              | 3%                     | 11.2%                                        | \$76,667                |
| BG3, CT 6   | 68%                         | 1%                        | 17%                              | 4%    | 0%                                        | 2%                    | 8%             | 96%                              | 4%                     | 9.6%                                         | \$62,721                |
| BG1, CT 1   | 39%                         | 0%                        | 54%                              | 0%    | 1%                                        | 0%                    | 5%             | 100%                             | 0%                     | 20.9%                                        | \$25,938                |
| BG1, CT 2   | 89%                         | 1%                        | 7%                               | 0%    | 0%                                        | 0%                    | 3%             | 92%                              | 8%                     | 4.2%                                         | \$72,986                |
| BG2, CT 2   | 83%                         | 0%                        | 5%                               | 0%    | 0%                                        | 0%                    | 13%            | 100%                             | 0%                     | 2.2%                                         | \$67,316                |
| BG3, CT 2   | 91%                         | 0%                        | 5%                               | 1%    | 0%                                        | 1%                    | 3%             | 91%                              | 9%                     | 6.2%                                         | \$72,833                |
| BG4, CT 2   | 78%                         | 2%                        | 12%                              | 0%    | 1%                                        | 1%                    | 6%             | 97%                              | 3%                     | 13.3%                                        | \$70,625                |

| Block Group | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|             | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 3   | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 5%             | 97%                              | 3%                     | 9.9%                                         | \$74,508                |
| BG1, CT 4   | 94%                         | 0%                        | 1%                               | 1%    | 0%                                        | 0%                    | 4%             | 100%                             | 0%                     | 9.2%                                         | \$61,536                |
| BG2, CT 4   | 94%                         | 0%                        | 2%                               | 0%    | 0%                                        | 0%                    | 4%             | 98%                              | 2%                     | 8.4%                                         | \$76,011                |
| BG3, CT 4   | 93%                         | 0%                        | 2%                               | 4%    | 0%                                        | 0%                    | 1%             | 100%                             | 0%                     | 15.8%                                        | \$57,287                |
| BG1, CT 5   | 88%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 11%            | 99%                              | 1%                     | 4.5%                                         | \$69,750                |
| BG2, CT 5   | 65%                         | 0%                        | 6%                               | 0%    | 0%                                        | 12%                   | 16%            | 82%                              | 18%                    | 6.7%                                         | \$107,174               |
| BG3, CT 5   | 86%                         | 0%                        | 4%                               | 1%    | 0%                                        | 1%                    | 8%             | 98%                              | 2%                     | 5.8%                                         | \$60,962                |
| BG4, CT 5   | 81%                         | 0%                        | 10%                              | 1%    | 0%                                        | 0%                    | 7%             | 99%                              | 1%                     | 3.8%                                         | \$50,302                |
| BG1, CT 6   | 71%                         | 8%                        | 7%                               | 1%    | 0%                                        | 2%                    | 11%            | 97%                              | 3%                     | 17.7%                                        | \$53,977                |
| BG2, CT 6   | 72%                         | 0%                        | 12%                              | 1%    | 0%                                        | 0%                    | 15%            | 94%                              | 6%                     | 7.5%                                         | \$77,784                |
| BG3, CT 6   | 67%                         | 4%                        | 15%                              | 0%    | 0%                                        | 0%                    | 14%            | 100%                             | 0%                     | 1.3%                                         | \$61,579                |
| BG4, CT 6   | 93%                         | 0%                        | 2%                               | 0%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 0.0%                                         | \$59,219                |
| BG5, CT 6   | 88%                         | 0%                        | 8%                               | 1%    | 0%                                        | 0%                    | 3%             | 98%                              | 2%                     | 15.7%                                        | \$66,848                |
| BG6, CT 6   | 84%                         | 0%                        | 11%                              | 1%    | 0%                                        | 2%                    | 2%             | 97%                              | 3%                     | 5.5%                                         | \$77,232                |
| BG1, CT 7   | 90%                         | 0%                        | 3%                               | 1%    | 0%                                        | 0%                    | 6%             | 99%                              | 1%                     | 4.1%                                         | \$67,025                |
| BG2, CT 7   | 74%                         | 1%                        | 21%                              | 4%    | 0%                                        | 0%                    | 1%             | 96%                              | 4%                     | 5.1%                                         | \$95,195                |
| BG3, CT 7   | 86%                         | 0%                        | 5%                               | 2%    | 0%                                        | 0%                    | 7%             | 87%                              | 13%                    | 2.1%                                         | \$84,524                |
| BG4, CT 7   | 93%                         | 0%                        | 3%                               | 0%    | 0%                                        | 0%                    | 4%             | 97%                              | 3%                     | 3.8%                                         | \$50,347                |
| BG5, CT 7   | 88%                         | 0%                        | 6%                               | 2%    | 0%                                        | 0%                    | 4%             | 85%                              | 15%                    | 4.2%                                         | \$70,117                |
| BG6, CT 7   | 83%                         | 0%                        | 12%                              | 0%    | 0%                                        | 1%                    | 3%             | 98%                              | 2%                     | 14.6%                                        | \$57,583                |
| BG1, CT 8   | 90%                         | 0%                        | 6%                               | 1%    | 0%                                        | 0%                    | 3%             | 99%                              | 1%                     | 18.0%                                        | \$48,083                |
| BG2, CT 8   | 95%                         | 0%                        | 4%                               | 0%    | 0%                                        | 0%                    | 1%             | 99%                              | 1%                     | 19.8%                                        | \$31,818                |
| BG3, CT 8   | 89%                         | 0%                        | 7%                               | 0%    | 0%                                        | 0%                    | 4%             | 95%                              | 5%                     | 11.1%                                        | \$50,750                |
| BG4, CT 8   | 92%                         | 0%                        | 2%                               | 0%    | 0%                                        | 1%                    | 5%             | 98%                              | 2%                     | 9.5%                                         | \$56,701                |
| BG1, CT 9   | 91%                         | 0%                        | 4%                               | 1%    | 2%                                        | 0%                    | 3%             | 99%                              | 1%                     | 9.9%                                         | \$76,786                |
| BG2, CT 9   | 93%                         | 1%                        | 1%                               | 2%    | 0%                                        | 0%                    | 2%             | 100%                             | 0%                     | 5.4%                                         | \$63,125                |
| BG1, CT 10  | 92%                         | 0%                        | 4%                               | 1%    | 0%                                        | 0%                    | 3%             | 95%                              | 5%                     | 10.6%                                        | \$48,750                |
| BG2, CT 10  | 85%                         | 1%                        | 8%                               | 1%    | 0%                                        | 0%                    | 4%             | 98%                              | 2%                     | 10.7%                                        | \$49,219                |
| BG1, CT 11  | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 31.7%                                        | \$46,250                |
| BG2, CT 11  | 95%                         | 0%                        | 2%                               | 1%    | 0%                                        | 0%                    | 3%             | 96%                              | 4%                     | 15.1%                                        | \$51,875                |
| BG3, CT 11  | 91%                         | 1%                        | 4%                               | 1%    | 0%                                        | 0%                    | 2%             | 94%                              | 6%                     | 4.7%                                         | \$44,808                |

| Block Group  | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|--------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|              | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG4, CT 11   | 91%                         | 0%                        | 3%                               | 2%    | 0%                                        | 0%                    | 4%             | 98%                              | 2%                     | 6.3%                                         | \$60,227                |
| BG1, CT 12   | 43%                         | 2%                        | 49%                              | 2%    | 1%                                        | 0%                    | 4%             | 99%                              | 1%                     | 21.2%                                        | \$36,667                |
| BG1, CT 13   | 78%                         | 1%                        | 14%                              | 3%    | 0%                                        | 0%                    | 4%             | 100%                             | 0%                     | 9.2%                                         | \$82,099                |
| BG2, CT 13   | 67%                         | 2%                        | 17%                              | 7%    | 0%                                        | 0%                    | 6%             | 98%                              | 2%                     | 5.3%                                         | \$46,971                |
| BG1, CT 1    | 92%                         | 0%                        | 3%                               | 5%    | 0%                                        | 0%                    | 0%             | 99%                              | 1%                     | 1.3%                                         | \$54,625                |
| BG2, CT 1    | 88%                         | 0%                        | 5%                               | 0%    | 0%                                        | 5%                    | 2%             | 94%                              | 6%                     | 4.0%                                         | \$84,830                |
| BG3, CT 1    | 68%                         | 0%                        | 21%                              | 0%    | 0%                                        | 0%                    | 10%            | 96%                              | 4%                     | 6.3%                                         | \$83,750                |
| BG4, CT 1    | 89%                         | 0%                        | 3%                               | 0%    | 0%                                        | 3%                    | 5%             | 94%                              | 6%                     | 0.2%                                         | \$94,219                |
| BG5, CT 1    | 83%                         | 5%                        | 11%                              | 0%    | 0%                                        | 0%                    | 0%             | 95%                              | 5%                     | 0.0%                                         | \$148,462               |
| BG1, CT 2    | 63%                         | 1%                        | 13%                              | 11%   | 0%                                        | 0%                    | 11%            | 94%                              | 6%                     | 12.3%                                        | \$61,875                |
| BG2, CT 2    | 63%                         | 0%                        | 17%                              | 11%   | 0%                                        | 0%                    | 9%             | 99%                              | 1%                     | 16.8%                                        | \$55,668                |
| BG3, CT 2    | 57%                         | 0%                        | 21%                              | 14%   | 0%                                        | 0%                    | 8%             | 93%                              | 7%                     | 9.1%                                         | \$47,813                |
| BG1, CT 3    | 51%                         | 1%                        | 16%                              | 6%    | 0%                                        | 0%                    | 27%            | 92%                              | 8%                     | 11.8%                                        | \$46,731                |
| BG2, CT 3    | 64%                         | 0%                        | 16%                              | 4%    | 0%                                        | 4%                    | 13%            | 94%                              | 6%                     | 22.5%                                        | \$53,405                |
| BG3, CT 3    | 62%                         | 0%                        | 15%                              | 9%    | 0%                                        | 0%                    | 14%            | 97%                              | 3%                     | 15.8%                                        | \$49,896                |
| BG1, CT 4    | 51%                         | 0%                        | 35%                              | 3%    | 0%                                        | 0%                    | 11%            | 97%                              | 3%                     | 13.7%                                        | \$76,932                |
| BG2, CT 4    | 87%                         | 0%                        | 5%                               | 3%    | 0%                                        | 0%                    | 6%             | 98%                              | 2%                     | 3.7%                                         | \$105,781               |
| BG1, CT 1    | 10%                         | 1%                        | 83%                              | 0%    | 0%                                        | 0%                    | 5%             | 90%                              | 10%                    | 21.8%                                        | \$35,417                |
| BG2, CT 1    | 38%                         | 0%                        | 56%                              | 3%    | 1%                                        | 1%                    | 2%             | 94%                              | 6%                     | 20.5%                                        | \$48,750                |
| BG3, CT 1    | 72%                         | 3%                        | 11%                              | 0%    | 0%                                        | 9%                    | 4%             | 91%                              | 9%                     | 10.2%                                        | \$89,901                |
| BG1, CT 2    | 80%                         | 0%                        | 13%                              | 0%    | 0%                                        | 2%                    | 6%             | 91%                              | 9%                     | 14.2%                                        | \$74,056                |
| BG2, CT 2    | 60%                         | 0%                        | 27%                              | 10%   | 0%                                        | 0%                    | 4%             | 98%                              | 2%                     | 2.4%                                         | \$97,280                |
| BG3, CT 2    | 43%                         | 1%                        | 11%                              | 22%   | 9%                                        | 6%                    | 8%             | 93%                              | 7%                     | 19.5%                                        | \$55,380                |
| BG1, CT 3    | 32%                         | 0%                        | 6%                               | 41%   | 0%                                        | 16%                   | 6%             | 78%                              | 22%                    | 12.5%                                        | \$51,442                |
| BG2, CT 3    | 30%                         | 0%                        | 4%                               | 65%   | 0%                                        | 0%                    | 1%             | 100%                             | 0%                     | 8.4%                                         | \$69,222                |
| BG1, CT 4    | 57%                         | 0%                        | 4%                               | 37%   | 0%                                        | 0%                    | 2%             | 95%                              | 5%                     | 7.1%                                         | \$60,139                |
| BG1, CT 5    | 87%                         | 2%                        | 0%                               | 4%    | 0%                                        | 0%                    | 6%             | 87%                              | 13%                    | 3.8%                                         | \$64,643                |
| BG1, CT 1    | 21%                         | 1%                        | 73%                              | 0%    | 0%                                        | 0%                    | 5%             | 97%                              | 3%                     | 24.7%                                        | \$51,071                |
| BG2, CT 1    | 27%                         | 0%                        | 65%                              | 2%    | 0%                                        | 0%                    | 6%             | 100%                             | 0%                     | 15.4%                                        | \$52,500                |
| BG1, CT 1.01 | 98%                         | 0%                        | 0%                               | 0%    | 1%                                        | 0%                    | 1%             | 99%                              | 1%                     | 28.8%                                        | \$51,167                |
| BG1, CT 1.02 | 95%                         | 0%                        | 0%                               | 1%    | 0%                                        | 0%                    | 4%             | 100%                             | 0%                     | 9.6%                                         | \$45,956                |



| Block Group  | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|--------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|              | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG2, CT 1.02 | 93%                         | 0%                        | 4%                               | 0%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 17.8%                                        | \$46,591                |
| BG1, CT 2    | 68%                         | 2%                        | 17%                              | 3%    | 1%                                        | 1%                    | 8%             | 97%                              | 3%                     | 26.6%                                        | \$37,708                |
| BG2, CT 2    | 93%                         | 0%                        | 2%                               | 0%    | 0%                                        | 1%                    | 4%             | 97%                              | 3%                     | 16.0%                                        | \$46,250                |
| BG1, CT 3    | 91%                         | 1%                        | 4%                               | 1%    | 0%                                        | 0%                    | 3%             | 90%                              | 10%                    | 2.1%                                         | \$82,636                |
| BG2, CT 3    | 89%                         | 0%                        | 2%                               | 0%    | 0%                                        | 0%                    | 8%             | 98%                              | 2%                     | 7.3%                                         | \$80,240                |
| BG1, CT 4.01 | 83%                         | 0%                        | 5%                               | 0%    | 0%                                        | 1%                    | 10%            | 98%                              | 2%                     | 16.8%                                        | \$51,974                |
| BG1, CT 4.02 | 91%                         | 0%                        | 5%                               | 1%    | 1%                                        | 0%                    | 3%             | 98%                              | 2%                     | 9.2%                                         | \$56,402                |
| BG2, CT 4.02 | 96%                         | 0%                        | 1%                               | 1%    | 0%                                        | 0%                    | 2%             | 99%                              | 1%                     | 16.9%                                        | \$59,583                |
| BG1, CT 5.01 | 63%                         | 3%                        | 9%                               | 2%    | 0%                                        | 0%                    | 23%            | 93%                              | 7%                     | 13.5%                                        | \$67,647                |
| BG2, CT 5.01 | 86%                         | 0%                        | 8%                               | 0%    | 2%                                        | 3%                    | 1%             | 94%                              | 6%                     | 9.3%                                         | \$79,100                |
| BG1, CT 5.02 | 87%                         | 0%                        | 3%                               | 0%    | 0%                                        | 0%                    | 9%             | 97%                              | 3%                     | 16.5%                                        | \$55,104                |
| BG2, CT 5.02 | 82%                         | 1%                        | 9%                               | 0%    | 0%                                        | 0%                    | 8%             | 98%                              | 2%                     | 2.2%                                         | \$64,079                |
| BG1, CT 6.01 | 82%                         | 1%                        | 8%                               | 0%    | 0%                                        | 0%                    | 9%             | 100%                             | 0%                     | 8.5%                                         | \$97,011                |
| BG2, CT 6.01 | 84%                         | 0%                        | 4%                               | 0%    | 0%                                        | 1%                    | 12%            | 98%                              | 2%                     | 11.5%                                        | \$79,261                |
| BG1, CT 6.03 | 77%                         | 2%                        | 6%                               | 10%   | 0%                                        | 0%                    | 6%             | 97%                              | 3%                     | 3.5%                                         | \$77,250                |
| BG2, CT 6.03 | 91%                         | 0%                        | 4%                               | 1%    | 0%                                        | 0%                    | 4%             | 92%                              | 8%                     | 7.9%                                         | \$81,145                |
| BG1, CT 6.04 | 90%                         | 0%                        | 2%                               | 1%    | 0%                                        | 0%                    | 6%             | 98%                              | 2%                     | 9.8%                                         | \$85,377                |
| BG2, CT 6.04 | 84%                         | 0%                        | 13%                              | 0%    | 0%                                        | 0%                    | 3%             | 98%                              | 2%                     | 17.1%                                        | \$41,964                |
| BG1, CT 7.01 | 94%                         | 0%                        | 6%                               | 0%    | 0%                                        | 0%                    | 0%             | 95%                              | 5%                     | 6.5%                                         | \$70,938                |
| BG2, CT 7.01 | 88%                         | 0%                        | 4%                               | 0%    | 0%                                        | 1%                    | 7%             | 97%                              | 3%                     | 5.2%                                         | \$51,481                |
| BG1, CT 7.03 | 85%                         | 1%                        | 4%                               | 2%    | 0%                                        | 0%                    | 8%             | 100%                             | 0%                     | 15.1%                                        | \$57,414                |
| BG2, CT 7.03 | 78%                         | 0%                        | 16%                              | 3%    | 1%                                        | 0%                    | 2%             | 92%                              | 8%                     | 13.2%                                        | \$55,913                |
| BG1, CT 7.05 | 86%                         | 0%                        | 1%                               | 1%    | 1%                                        | 1%                    | 11%            | 89%                              | 11%                    | 8.6%                                         | \$72,813                |
| BG2, CT 7.05 | 90%                         | 0%                        | 3%                               | 0%    | 0%                                        | 1%                    | 6%             | 91%                              | 9%                     | 8.2%                                         | \$68,269                |
| BG1, CT 7.06 | 88%                         | 1%                        | 1%                               | 0%    | 0%                                        | 2%                    | 7%             | 97%                              | 3%                     | 27.0%                                        | \$76,076                |
| BG2, CT 7.06 | 86%                         | 1%                        | 4%                               | 1%    | 0%                                        | 1%                    | 7%             | 97%                              | 3%                     | 13.7%                                        | \$81,464                |
| BG1, CT 8    | 86%                         | 1%                        | 7%                               | 1%    | 0%                                        | 0%                    | 5%             | 96%                              | 4%                     | 9.8%                                         | \$71,488                |
| BG2, CT 8    | 84%                         | 1%                        | 8%                               | 1%    | 1%                                        | 0%                    | 6%             | 100%                             | 0%                     | 12.3%                                        | \$57,431                |
| BG3, CT 8    | 74%                         | 3%                        | 9%                               | 5%    | 0%                                        | 1%                    | 9%             | 92%                              | 8%                     | 19.0%                                        | \$37,500                |
| BG1, CT 9    | 86%                         | 4%                        | 5%                               | 1%    | 0%                                        | 0%                    | 4%             | 95%                              | 5%                     | 4.6%                                         | \$59,286                |
| BG2, CT 9    | 72%                         | 1%                        | 10%                              | 5%    | 0%                                        | 0%                    | 12%            | 98%                              | 2%                     | 20.2%                                        | \$82,237                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 10.01 | 84%                         | 2%                        | 5%                               | 0%    | 0%                                        | 1%                    | 8%             | 96%                              | 4%                     | 6.6%                                         | \$76,488                |
| BG2, CT 10.01 | 77%                         | 0%                        | 6%                               | 4%    | 0%                                        | 0%                    | 13%            | 98%                              | 2%                     | 1.9%                                         | \$100,938               |
| BG1, CT 10.03 | 73%                         | 0%                        | 5%                               | 0%    | 0%                                        | 3%                    | 19%            | 91%                              | 9%                     | 14.6%                                        | \$47,969                |
| BG2, CT 10.03 | 87%                         | 0%                        | 7%                               | 0%    | 0%                                        | 0%                    | 6%             | 99%                              | 1%                     | 5.1%                                         | \$86,023                |
| BG1, CT 10.04 | 86%                         | 1%                        | 1%                               | 0%    | 0%                                        | 1%                    | 10%            | 94%                              | 6%                     | 7.1%                                         | \$80,357                |
| BG2, CT 10.04 | 76%                         | 0%                        | 8%                               | 7%    | 0%                                        | 0%                    | 9%             | 99%                              | 1%                     | 7.0%                                         | \$75,484                |
| BG1, CT 11    | 91%                         | 1%                        | 3%                               | 1%    | 0%                                        | 0%                    | 5%             | 98%                              | 2%                     | 3.7%                                         | \$107,672               |
| BG2, CT 11    | 84%                         | 2%                        | 3%                               | 0%    | 0%                                        | 1%                    | 9%             | 97%                              | 3%                     | 8.8%                                         | \$86,696                |
| BG1, CT 12.01 | 78%                         | 1%                        | 6%                               | 0%    | 0%                                        | 4%                    | 10%            | 94%                              | 6%                     | 5.4%                                         | \$63,472                |
| BG2, CT 12.01 | 86%                         | 1%                        | 6%                               | 1%    | 0%                                        | 0%                    | 6%             | 96%                              | 4%                     | 13.2%                                        | \$53,026                |
| BG1, CT 12.02 | 81%                         | 0%                        | 5%                               | 1%    | 3%                                        | 1%                    | 10%            | 96%                              | 4%                     | 8.9%                                         | \$79,615                |
| BG2, CT 12.02 | 82%                         | 2%                        | 4%                               | 1%    | 0%                                        | 1%                    | 11%            | 94%                              | 6%                     | 7.9%                                         | \$80,179                |
| BG1, CT 13    | 89%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 98%                              | 2%                     | 3.5%                                         | \$65,750                |
| BG2, CT 13    | 88%                         | 1%                        | 5%                               | 0%    | 0%                                        | 0%                    | 6%             | 95%                              | 5%                     | 9.1%                                         | \$86,964                |
| BG3, CT 13    | 90%                         | 2%                        | 1%                               | 1%    | 0%                                        | 0%                    | 5%             | 98%                              | 2%                     | 5.0%                                         | \$81,250                |
| BG4, CT 13    | 89%                         | 1%                        | 3%                               | 1%    | 0%                                        | 1%                    | 5%             | 98%                              | 2%                     | 9.1%                                         | \$75,288                |
| BG1, CT 1     | 1%                          | 0%                        | 97%                              | 0%    | 0%                                        | 0%                    | 2%             | 98%                              | 2%                     | 34.4%                                        | \$37,500                |
| BG2, CT 1     | 7%                          | 0%                        | 84%                              | 0%    | 3%                                        | 0%                    | 6%             | 97%                              | 3%                     | 53.2%                                        | \$32,019                |
| BG3, CT 1     | 3%                          | 0%                        | 92%                              | 0%    | 0%                                        | 0%                    | 5%             | 99%                              | 1%                     | 38.3%                                        | \$31,563                |
| BG4, CT 1     | 11%                         | 0%                        | 77%                              | 0%    | 0%                                        | 0%                    | 12%            | 100%                             | 0%                     | 18.5%                                        | \$46,806                |
| BG5, CT 1     | 2%                          | 0%                        | 94%                              | 0%    | 1%                                        | 0%                    | 3%             | 100%                             | 0%                     | 36.1%                                        | \$35,000                |
| BG6, CT 1     | 4%                          | 0%                        | 90%                              | 1%    | 0%                                        | 0%                    | 5%             | 99%                              | 1%                     | 48.1%                                        | \$31,705                |
| BG1, CT 2     | 49%                         | 6%                        | 27%                              | 3%    | 0%                                        | 3%                    | 12%            | 98%                              | 2%                     | 4.6%                                         | \$113,611               |
| BG2, CT 2     | 43%                         | 2%                        | 51%                              | 1%    | 0%                                        | 0%                    | 4%             | 99%                              | 1%                     | 15.5%                                        | \$67,500                |
| BG3, CT 2     | 29%                         | 1%                        | 44%                              | 0%    | 0%                                        | 0%                    | 26%            | 96%                              | 4%                     | 14.9%                                        | \$70,476                |
| BG4, CT 2     | 32%                         | 0%                        | 49%                              | 2%    | 0%                                        | 0%                    | 17%            | 98%                              | 2%                     | 8.9%                                         | \$53,879                |
| BG1, CT 1     | 18%                         | 1%                        | 55%                              | 7%    | 4%                                        | 3%                    | 12%            | 95%                              | 5%                     | 11.0%                                        | \$109,537               |
| BG2, CT 1     | 20%                         | 1%                        | 59%                              | 15%   | 1%                                        | 0%                    | 4%             | 96%                              | 4%                     | 14.5%                                        | \$61,552                |
| BG1, CT 2     | 8%                          | 0%                        | 82%                              | 0%    | 0%                                        | 0%                    | 9%             | 99%                              | 1%                     | 10.7%                                        | \$72,500                |
| BG2, CT 2     | 4%                          | 0%                        | 92%                              | 0%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 17.6%                                        | \$61,250                |
| BG3, CT 2     | 11%                         | 0%                        | 84%                              | 0%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 10.1%                                        | \$72,500                |

| Block Group  | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|--------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|              | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 3    | 87%                         | 0%                        | 6%                               | 2%    | 0%                                        | 2%                    | 3%             | 97%                              | 3%                     | 5.0%                                         | ND                      |
| BG1, CT 1    | 14%                         | 0%                        | 83%                              | 0%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 15.3%                                        | \$58,594                |
| BG2, CT 1    | 4%                          | 0%                        | 92%                              | 0%    | 0%                                        | 0%                    | 4%             | 99%                              | 1%                     | 29.5%                                        | \$49,583                |
| BG3, CT 1    | 4%                          | 0%                        | 95%                              | 0%    | 0%                                        | 0%                    | 1%             | 98%                              | 2%                     | 32.5%                                        | \$48,125                |
| BG4, CT 1    | 0%                          | 0%                        | 97%                              | 0%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 36.8%                                        | \$35,625                |
| BG5, CT 1    | 3%                          | 0%                        | 97%                              | 0%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 22.8%                                        | \$47,875                |
| BG1, CT 2    | 15%                         | 1%                        | 72%                              | 2%    | 0%                                        | 0%                    | 9%             | 99%                              | 1%                     | 13.1%                                        | \$77,188                |
| BG2, CT 2    | 15%                         | 1%                        | 66%                              | 3%    | 0%                                        | 1%                    | 14%            | 96%                              | 4%                     | 12.6%                                        | \$66,136                |
| BG3, CT 2    | 47%                         | 4%                        | 36%                              | 1%    | 0%                                        | 0%                    | 12%            | 96%                              | 4%                     | 7.6%                                         | \$90,313                |
| BG4, CT 2    | 18%                         | 1%                        | 74%                              | 0%    | 0%                                        | 1%                    | 5%             | 99%                              | 1%                     | 22.1%                                        | \$90,909                |
| BG1, CT 2    | 78%                         | 4%                        | 7%                               | 0%    | 1%                                        | 6%                    | 4%             | 92%                              | 8%                     | 8.6%                                         | \$76,250                |
| BG2, CT 2    | 79%                         | 0%                        | 4%                               | 3%    | 0%                                        | 1%                    | 13%            | 96%                              | 4%                     | 7.9%                                         | \$61,667                |
| BG3, CT 2    | 81%                         | 3%                        | 11%                              | 0%    | 0%                                        | 0%                    | 5%             | 99%                              | 1%                     | 9.9%                                         | \$72,802                |
| BG4, CT 2    | 60%                         | 0%                        | 24%                              | 0%    | 0%                                        | 4%                    | 12%            | 94%                              | 6%                     | 21.2%                                        | \$49,750                |
| BG1, CT 1    | 94%                         | 0%                        | 2%                               | 0%    | 0%                                        | 3%                    | 2%             | 100%                             | 0%                     | 18.1%                                        | \$29,643                |
| BG2, CT 1    | 87%                         | 0%                        | 5%                               | 0%    | 0%                                        | 0%                    | 8%             | 100%                             | 0%                     | 18.7%                                        | \$49,050                |
| BG3, CT 1    | 32%                         | 0%                        | 56%                              | 4%    | 0%                                        | 0%                    | 7%             | 100%                             | 0%                     | 10.8%                                        | \$34,125                |
| BG1, CT 2    | 51%                         | 0%                        | 36%                              | 1%    | 0%                                        | 0%                    | 12%            | 97%                              | 3%                     | 18.8%                                        | \$38,125                |
| BG2, CT 2    | 68%                         | 0%                        | 20%                              | 1%    | 1%                                        | 0%                    | 10%            | 95%                              | 5%                     | 16.0%                                        | \$61,339                |
| BG3, CT 2    | 81%                         | 0%                        | 11%                              | 1%    | 0%                                        | 0%                    | 7%             | 97%                              | 3%                     | 17.1%                                        | \$66,875                |
| BG1, CT 3    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 4.9%                                         | \$21,944                |
| BG1, CT 9401 | 2%                          | 0%                        | 86%                              | 0%    | 0%                                        | 0%                    | 11%            | 95%                              | 5%                     | 11.5%                                        | \$51,719                |
| BG2, CT 9401 | 9%                          | 1%                        | 84%                              | 0%    | 0%                                        | 0%                    | 6%             | 97%                              | 3%                     | 16.0%                                        | \$43,375                |
| BG3, CT 9401 | 3%                          | 0%                        | 77%                              | 0%    | 0%                                        | 0%                    | 21%            | 98%                              | 2%                     | 1.6%                                         | \$65,625                |
| BG1, CT 1    | 85%                         | 11%                       | 4%                               | 0%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 0.0%                                         | ND                      |
| BG2, CT 1    | 50%                         | 0%                        | 36%                              | 2%    | 0%                                        | 0%                    | 12%            | 100%                             | 0%                     | 20.7%                                        | \$65,855                |
| BG3, CT 1    | 78%                         | 0%                        | 16%                              | 1%    | 0%                                        | 0%                    | 5%             | 98%                              | 2%                     | 8.2%                                         | \$62,303                |
| BG4, CT 1    | 53%                         | 0%                        | 25%                              | 4%    | 1%                                        | 1%                    | 16%            | 96%                              | 4%                     | 19.1%                                        | \$66,821                |
| BG5, CT 1    | 75%                         | 3%                        | 16%                              | 0%    | 0%                                        | 0%                    | 6%             | 99%                              | 1%                     | 2.8%                                         | \$92,868                |
| BG1, CT 2    | 75%                         | 0%                        | 5%                               | 13%   | 0%                                        | 2%                    | 5%             | 96%                              | 4%                     | 9.4%                                         | \$74,798                |
| BG2, CT 2    | 68%                         | 0%                        | 11%                              | 14%   | 0%                                        | 1%                    | 6%             | 97%                              | 3%                     | 4.8%                                         | \$61,607                |

| Block Group | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|             | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG3, CT 2   | 52%                         | 1%                        | 31%                              | 4%    | 0%                                        | 2%                    | 10%            | 93%                              | 7%                     | 5.4%                                         | \$65,536                |
| BG4, CT 2   | 71%                         | 0%                        | 14%                              | 2%    | 0%                                        | 0%                    | 14%            | 86%                              | 14%                    | 20.2%                                        | \$61,528                |
| BG5, CT 2   | 51%                         | 2%                        | 34%                              | 0%    | 0%                                        | 3%                    | 10%            | 93%                              | 7%                     | 10.7%                                        | \$44,167                |
| BG6, CT 2   | 54%                         | 10%                       | 9%                               | 1%    | 0%                                        | 7%                    | 19%            | 58%                              | 42%                    | 16.9%                                        | ND                      |
| BG1, CT 1   | 78%                         | 0%                        | 4%                               | 14%   | 0%                                        | 0%                    | 4%             | 99%                              | 1%                     | 5.5%                                         | \$71,667                |
| BG1, CT 1   | 41%                         | 0%                        | 55%                              | 0%    | 0%                                        | 0%                    | 4%             | 100%                             | 0%                     | 22.6%                                        | \$36,591                |
| BG2, CT 1   | 75%                         | 0%                        | 10%                              | 2%    | 0%                                        | 0%                    | 13%            | 100%                             | 0%                     | 14.9%                                        | \$47,946                |
| BG1, CT 4   | 89%                         | 0%                        | 1%                               | 8%    | 0%                                        | 0%                    | 1%             | 92%                              | 8%                     | 8.2%                                         | \$59,231                |
| BG2, CT 4   | 94%                         | 0%                        | 2%                               | 0%    | 0%                                        | 0%                    | 3%             | 93%                              | 7%                     | 9.1%                                         | \$81,875                |
| BG3, CT 4   | 90%                         | 0%                        | 1%                               | 1%    | 2%                                        | 2%                    | 4%             | 96%                              | 4%                     | 19.2%                                        | \$51,000                |
| BG4, CT 4   | 81%                         | 12%                       | 3%                               | 1%    | 0%                                        | 1%                    | 2%             | 95%                              | 5%                     | 0.0%                                         | \$112,625               |
| BG1, CT 1   | 56%                         | 0%                        | 40%                              | 0%    | 2%                                        | 0%                    | 2%             | 98%                              | 2%                     | 24.0%                                        | \$30,188                |
| BG2, CT 1   | 97%                         | 0%                        | 1%                               | 0%    | 0%                                        | 0%                    | 2%             | 99%                              | 1%                     | 0.0%                                         | \$50,486                |
| BG3, CT 1   | 61%                         | 0%                        | 36%                              | 0%    | 0%                                        | 0%                    | 3%             | 98%                              | 2%                     | 11.5%                                        | \$62,917                |
| BG4, CT 1   | 68%                         | 4%                        | 19%                              | 0%    | 0%                                        | 0%                    | 9%             | 100%                             | 0%                     | 15.0%                                        | \$62,583                |
| BG1, CT 2   | 58%                         | 0%                        | 9%                               | 19%   | 0%                                        | 1%                    | 14%            | 99%                              | 1%                     | 0.0%                                         | \$104,609               |
| BG2, CT 2   | 78%                         | 0%                        | 11%                              | 8%    | 0%                                        | 0%                    | 3%             | 99%                              | 1%                     | 1.5%                                         | \$91,923                |
| BG1, CT 3   | 58%                         | 0%                        | 30%                              | 6%    | 2%                                        | 0%                    | 5%             | 98%                              | 2%                     | 22.8%                                        | \$41,875                |
| BG2, CT 3   | 76%                         | 1%                        | 17%                              | 1%    | 0%                                        | 0%                    | 5%             | 100%                             | 0%                     | 6.3%                                         | \$115,662               |
| BG3, CT 3   | 65%                         | 0%                        | 6%                               | 0%    | 6%                                        | 6%                    | 17%            | 85%                              | 15%                    | 16.1%                                        | \$73,636                |
| BG4, CT 3   | 88%                         | 0%                        | 11%                              | 0%    | 0%                                        | 0%                    | 1%             | 89%                              | 11%                    | 7.2%                                         | \$126,328               |
| BG5, CT 3   | 86%                         | 0%                        | 6%                               | 3%    | 0%                                        | 5%                    | 0%             | 87%                              | 13%                    | 5.8%                                         | \$77,098                |
| BG1, CT 1   | 3%                          | 0%                        | 93%                              | 0%    | 1%                                        | 0%                    | 3%             | 100%                             | 0%                     | 31.0%                                        | \$39,345                |
| BG2, CT 1   | 4%                          | 0%                        | 71%                              | 0%    | 0%                                        | 0%                    | 25%            | 100%                             | 0%                     | 25.9%                                        | \$39,063                |
| BG3, CT 1   | 5%                          | 0%                        | 92%                              | 0%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 22.2%                                        | \$43,846                |
| BG4, CT 1   | 3%                          | 1%                        | 92%                              | 1%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 39.5%                                        | \$35,625                |
| BG1, CT 3   | 76%                         | 0%                        | 18%                              | 1%    | 0%                                        | 0%                    | 5%             | 95%                              | 5%                     | 12.2%                                        | \$46,488                |
| BG2, CT 3   | 79%                         | 0%                        | 10%                              | 2%    | 0%                                        | 0%                    | 9%             | 100%                             | 0%                     | 5.3%                                         | \$45,313                |
| BG3, CT 3   | 56%                         | 0%                        | 30%                              | 1%    | 0%                                        | 0%                    | 13%            | 99%                              | 1%                     | 12.1%                                        | \$56,875                |
| BG4, CT 3   | 45%                         | 0%                        | 43%                              | 3%    | 0%                                        | 0%                    | 9%             | 97%                              | 3%                     | 8.5%                                         | \$33,704                |
| BG1, CT 1   | 35%                         | 6%                        | 41%                              | 1%    | 0%                                        | 1%                    | 14%            | 98%                              | 2%                     | 5.9%                                         | \$72,500                |

| Block Group | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|             | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG1, CT 1   | 3%                          | 0%                        | 95%                              | 0%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 40.8%                                        | \$23,958                |
| BG2, CT 1   | 23%                         | 0%                        | 73%                              | 0%    | 2%                                        | 0%                    | 2%             | 98%                              | 2%                     | 24.2%                                        | \$31,818                |
| BG1, CT 2   | 15%                         | 1%                        | 77%                              | 0%    | 0%                                        | 1%                    | 6%             | 93%                              | 7%                     | 25.7%                                        | \$31,500                |
| BG2, CT 2   | 67%                         | 0%                        | 20%                              | 0%    | 0%                                        | 0%                    | 13%            | 99%                              | 1%                     | 17.3%                                        | \$54,250                |
| BG1, CT 3   | 5%                          | 0%                        | 88%                              | 0%    | 0%                                        | 0%                    | 6%             | 100%                             | 0%                     | 29.8%                                        | \$26,667                |
| BG2, CT 3   | 31%                         | 0%                        | 61%                              | 3%    | 0%                                        | 1%                    | 4%             | 99%                              | 1%                     | 11.5%                                        | \$60,313                |
| BG3, CT 3   | 5%                          | 0%                        | 93%                              | 0%    | 0%                                        | 0%                    | 3%             | 100%                             | 0%                     | 29.7%                                        | \$26,667                |
| BG1, CT 4   | 2%                          | 0%                        | 97%                              | 0%    | 0%                                        | 0%                    | 1%             | 100%                             | 0%                     | 28.6%                                        | \$25,694                |
| BG2, CT 4   | 31%                         | 0%                        | 51%                              | 2%    | 0%                                        | 0%                    | 16%            | 98%                              | 2%                     | 13.7%                                        | \$63,088                |
| Statewide   | 67%                         | 3%                        | 14%                              | 5%    | 1%                                        | 1%                    | 8%             | 6%                               | 94%                    | 9.9%                                         | \$70,760                |

Source: U.S. Census Bureau 2013

BG = Block Group; CT = Census Tract; ND = no data

<sup>a</sup> Totals may not add to 100 percent, due to rounding.

**Table 2: Block Group Demographic Data, Hawaii**

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 201    | 27%                         | 2%                        | 0%                               | 20%   | 19%                                       | 5%                    | 26%            | 84%                              | 16%                    | 34%                                          | \$30,398                |
| BG 2, CT 201    | 66%                         | 0%                        | 0%                               | 15%   | 3%                                        | 0%                    | 17%            | 92%                              | 8%                     | 11%                                          | \$61,653                |
| BG 3, CT 201    | 44%                         | 0%                        | 0%                               | 41%   | 0%                                        | 0%                    | 14%            | 96%                              | 4%                     | 9%                                           | \$47,604                |
| BG 4, CT 201    | 26%                         | 0%                        | 0%                               | 27%   | 8%                                        | 0%                    | 38%            | 90%                              | 10%                    | 10%                                          | \$44,671                |
| BG 1, CT 202.02 | 28%                         | 5%                        | 0%                               | 12%   | 12%                                       | 20%                   | 23%            | 97%                              | 3%                     | 13%                                          | \$36,303                |
| BG 2, CT 202.02 | 40%                         | 0%                        | 0%                               | 32%   | 5%                                        | 1%                    | 23%            | 88%                              | 12%                    | 18%                                          | \$45,179                |
| BG 1, CT 203    | 39%                         | 0%                        | 0%                               | 29%   | 4%                                        | 2%                    | 25%            | 87%                              | 13%                    | 15%                                          | \$71,111                |
| BG 2, CT 203    | 29%                         | 0%                        | 0%                               | 13%   | 22%                                       | 0%                    | 36%            | 98%                              | 2%                     | 52%                                          | \$21,818                |
| BG 3, CT 203    | 22%                         | 2%                        | 0%                               | 23%   | 16%                                       | 0%                    | 37%            | 84%                              | 16%                    | 36%                                          | \$26,216                |
| BG 1, CT 204    | 10%                         | 4%                        | 0%                               | 19%   | 29%                                       | 0%                    | 38%            | 87%                              | 13%                    | 30%                                          | \$38,056                |
| BG 2, CT 204    | 13%                         | 1%                        | 0%                               | 23%   | 3%                                        | 0%                    | 59%            | 71%                              | 29%                    | 33%                                          | \$19,189                |
| BG 3, CT 204    | 20%                         | 0%                        | 0%                               | 18%   | 6%                                        | 1%                    | 55%            | 69%                              | 31%                    | 44%                                          | \$29,919                |
| BG 4, CT 204    | 12%                         | 0%                        | 0%                               | 42%   | 10%                                       | 0%                    | 37%            | 100%                             | 0%                     | 27%                                          | \$35,385                |
| BG 1, CT 205    | 25%                         | 0%                        | 0%                               | 36%   | 17%                                       | 0%                    | 23%            | 79%                              | 21%                    | 50%                                          | \$18,750                |
| BG 2, CT 205    | 13%                         | 0%                        | 0%                               | 43%   | 4%                                        | 0%                    | 40%            | 97%                              | 3%                     | 11%                                          | \$50,111                |
| BG 3, CT 205    | 23%                         | 9%                        | 0%                               | 62%   | 4%                                        | 0%                    | 3%             | 100%                             | 0%                     | 23%                                          | \$71,058                |
| BG 4, CT 205    | 17%                         | 0%                        | 0%                               | 34%   | 18%                                       | 0%                    | 30%            | 97%                              | 3%                     | 12%                                          | \$37,759                |
| BG 5, CT 205    | 21%                         | 1%                        | 1%                               | 31%   | 10%                                       | 0%                    | 36%            | 81%                              | 19%                    | 31%                                          | \$20,455                |
| BG 1, CT 206    | 37%                         | 8%                        | 0%                               | 18%   | 11%                                       | 2%                    | 24%            | 79%                              | 21%                    | 15%                                          | \$44,886                |
| BG 2, CT 206    | 5%                          | 0%                        | 0%                               | 16%   | 29%                                       | 0%                    | 49%            | 91%                              | 9%                     | 11%                                          | \$59,583                |
| BG 3, CT 206    | 2%                          | 0%                        | 0%                               | 2%    | 44%                                       | 0%                    | 52%            | 98%                              | 2%                     | 14%                                          | \$48,077                |
| BG 4, CT 206    | 8%                          | 0%                        | 0%                               | 21%   | 25%                                       | 0%                    | 45%            | 94%                              | 6%                     | 11%                                          | \$69,250                |
| BG 1, CT 207.01 | 6%                          | 0%                        | 0%                               | 48%   | 14%                                       | 1%                    | 30%            | 90%                              | 10%                    | 5%                                           | \$48,816                |
| BG 2, CT 207.01 | 13%                         | 0%                        | 0%                               | 47%   | 9%                                        | 0%                    | 32%            | 89%                              | 11%                    | 16%                                          | \$77,407                |
| BG 3, CT 207.01 | 8%                          | 0%                        | 0%                               | 62%   | 13%                                       | 0%                    | 17%            | 97%                              | 3%                     | 1%                                           | \$82,798                |
| BG 1, CT 207.02 | 22%                         | 0%                        | 0%                               | 49%   | 5%                                        | 0%                    | 24%            | 96%                              | 4%                     | 2%                                           | \$68,333                |
| BG 2, CT 207.02 | 9%                          | 2%                        | 0%                               | 56%   | 6%                                        | 2%                    | 25%            | 94%                              | 6%                     | 2%                                           | \$76,714                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 3, CT 207.02 | 8%                          | 1%                        | 1%                               | 50%   | 5%                                        | 1%                    | 35%            | 85%                              | 15%                    | 3%                                           | \$79,926                |
| BG 1, CT 208.01 | 24%                         | 0%                        | 0%                               | 28%   | 22%                                       | 0%                    | 26%            | 96%                              | 4%                     | 5%                                           | \$64,477                |
| BG 2, CT 208.01 | 13%                         | 0%                        | 0%                               | 49%   | 5%                                        | 1%                    | 33%            | 93%                              | 7%                     | 2%                                           | \$77,625                |
| BG 1, CT 208.02 | 23%                         | 0%                        | 0%                               | 51%   | 1%                                        | 3%                    | 22%            | 89%                              | 11%                    | 17%                                          | \$56,058                |
| BG 2, CT 208.02 | 13%                         | 0%                        | 0%                               | 29%   | 10%                                       | 0%                    | 47%            | 89%                              | 11%                    | 31%                                          | \$49,500                |
| BG 3, CT 208.02 | 19%                         | 0%                        | 0%                               | 52%   | 10%                                       | 0%                    | 19%            | 100%                             | 0%                     | 12%                                          | \$54,167                |
| BG 4, CT 208.02 | 30%                         | 0%                        | 0%                               | 34%   | 9%                                        | 0%                    | 27%            | 94%                              | 6%                     | 6%                                           | \$59,928                |
| BG 1, CT 209    | 27%                         | 0%                        | 0%                               | 31%   | 19%                                       | 0%                    | 23%            | 93%                              | 7%                     | 6%                                           | \$59,226                |
| BG 2, CT 209    | 11%                         | 0%                        | 6%                               | 45%   | 6%                                        | 0%                    | 32%            | 92%                              | 8%                     | 8%                                           | \$86,726                |
| BG 3, CT 209    | 22%                         | 1%                        | 0%                               | 23%   | 8%                                        | 1%                    | 45%            | 82%                              | 18%                    | 14%                                          | \$59,762                |
| BG 1, CT 210.03 | 25%                         | 1%                        | 0%                               | 26%   | 36%                                       | 4%                    | 8%             | 84%                              | 16%                    | 27%                                          | \$55,259                |
| BG 2, CT 210.03 | 20%                         | 0%                        | 1%                               | 27%   | 15%                                       | 4%                    | 33%            | 90%                              | 10%                    | 14%                                          | \$51,964                |
| BG 3, CT 210.03 | 33%                         | 0%                        | 1%                               | 17%   | 14%                                       | 2%                    | 32%            | 87%                              | 13%                    | 29%                                          | \$29,861                |
| BG 1, CT 210.05 | 60%                         | 2%                        | 0%                               | 4%    | 7%                                        | 10%                   | 17%            | 78%                              | 22%                    | 42%                                          | \$22,422                |
| BG 2, CT 210.05 | 4%                          | 0%                        | 0%                               | 56%   | 28%                                       | 0%                    | 12%            | 81%                              | 19%                    | 27%                                          | \$22,330                |
| BG 3, CT 210.05 | 32%                         | 5%                        | 0%                               | 24%   | 27%                                       | 0%                    | 12%            | 84%                              | 16%                    | 30%                                          | \$36,970                |
| BG 4, CT 210.05 | 54%                         | 0%                        | 0%                               | 7%    | 18%                                       | 12%                   | 9%             | 59%                              | 41%                    | 35%                                          | \$54,881                |
| BG 1, CT 210.10 | 55%                         | 0%                        | 2%                               | 9%    | 5%                                        | 0%                    | 28%            | 82%                              | 18%                    | 39%                                          | \$25,761                |
| BG 2, CT 210.10 | 34%                         | 1%                        | 0%                               | 9%    | 30%                                       | 1%                    | 25%            | 77%                              | 23%                    | 37%                                          | \$28,083                |
| BG 3, CT 210.10 | 45%                         | 7%                        | 0%                               | 16%   | 8%                                        | 4%                    | 20%            | 87%                              | 13%                    | 32%                                          | \$28,684                |
| BG 1, CT 210.11 | 60%                         | 0%                        | 0%                               | 9%    | 8%                                        | 4%                    | 19%            | 78%                              | 22%                    | 23%                                          | \$50,775                |
| BG 2, CT 210.11 | 43%                         | 0%                        | 0%                               | 23%   | 9%                                        | 2%                    | 23%            | 84%                              | 16%                    | 27%                                          | \$37,336                |
| BG 1, CT 210.13 | 8%                          | 0%                        | 1%                               | 55%   | 20%                                       | 0%                    | 17%            | 93%                              | 7%                     | 20%                                          | \$26,250                |
| BG 2, CT 210.13 | 21%                         | 0%                        | 0%                               | 37%   | 17%                                       | 0%                    | 25%            | 90%                              | 10%                    | 31%                                          | \$37,692                |
| BG 3, CT 210.13 | 16%                         | 0%                        | 0%                               | 31%   | 23%                                       | 1%                    | 28%            | 93%                              | 7%                     | 21%                                          | \$45,694                |
| BG 1, CT 211.01 | 56%                         | 0%                        | 1%                               | 10%   | 8%                                        | 9%                    | 16%            | 81%                              | 19%                    | 33%                                          | \$30,294                |
| BG 2, CT 211.01 | 80%                         | 0%                        | 0%                               | 13%   | 4%                                        | 3%                    | 0%             | 97%                              | 3%                     | 1%                                           | \$73,750                |
| BG 1, CT 211.06 | 32%                         | 0%                        | 2%                               | 26%   | 11%                                       | 0%                    | 29%            | 89%                              | 11%                    | 27%                                          | \$26,918                |
| BG 2, CT 211.06 | 23%                         | 4%                        | 1%                               | 9%    | 12%                                       | 4%                    | 48%            | 87%                              | 13%                    | 45%                                          | \$19,683                |
| BG 3, CT 211.06 | 17%                         | 1%                        | 2%                               | 29%   | 21%                                       | 4%                    | 27%            | 79%                              | 21%                    | 27%                                          | \$33,188                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 4, CT 211.06 | 32%                         | 0%                        | 0%                               | 20%   | 22%                                       | 4%                    | 22%            | 90%                              | 10%                    | 40%                                          | \$28,750                |
| BG 1, CT 212.02 | 11%                         | 0%                        | 0%                               | 37%   | 5%                                        | 3%                    | 43%            | 87%                              | 13%                    | 14%                                          | \$42,566                |
| BG 2, CT 212.02 | 44%                         | 0%                        | 0%                               | 2%    | 12%                                       | 4%                    | 37%            | 86%                              | 14%                    | 36%                                          | \$39,125                |
| BG 3, CT 212.02 | 61%                         | 0%                        | 0%                               | 12%   | 0%                                        | 0%                    | 26%            | 99%                              | 1%                     | 24%                                          | \$33,224                |
| BG 4, CT 212.02 | 8%                          | 0%                        | 1%                               | 64%   | 4%                                        | 0%                    | 23%            | 98%                              | 2%                     | 18%                                          | \$43,750                |
| BG 1, CT 213    | 42%                         | 0%                        | 2%                               | 11%   | 9%                                        | 0%                    | 37%            | 96%                              | 4%                     | 27%                                          | \$40,221                |
| BG 2, CT 213    | 35%                         | 0%                        | 0%                               | 21%   | 5%                                        | 0%                    | 38%            | 91%                              | 9%                     | 17%                                          | \$38,194                |
| BG 3, CT 213    | 48%                         | 0%                        | 0%                               | 14%   | 3%                                        | 3%                    | 31%            | 94%                              | 6%                     | 7%                                           | \$66,356                |
| BG 1, CT 214.02 | 19%                         | 2%                        | 0%                               | 24%   | 17%                                       | 1%                    | 36%            | 82%                              | 18%                    | 18%                                          | \$62,125                |
| BG 2, CT 214.02 | 23%                         | 0%                        | 1%                               | 40%   | 9%                                        | 1%                    | 26%            | 94%                              | 6%                     | 7%                                           | \$41,500                |
| BG 3, CT 214.02 | 17%                         | 0%                        | 0%                               | 26%   | 7%                                        | 3%                    | 48%            | 89%                              | 11%                    | 8%                                           | \$47,292                |
| BG 1, CT 215.02 | 54%                         | 2%                        | 1%                               | 9%    | 3%                                        | 0%                    | 30%            | 95%                              | 5%                     | 9%                                           | \$66,990                |
| BG 2, CT 215.02 | 31%                         | 0%                        | 1%                               | 20%   | 4%                                        | 5%                    | 40%            | 82%                              | 18%                    | 13%                                          | \$49,934                |
| BG 1, CT 215.04 | 20%                         | 0%                        | 1%                               | 14%   | 42%                                       | 5%                    | 19%            | 89%                              | 11%                    | 22%                                          | \$37,500                |
| BG 2, CT 215.04 | 21%                         | 0%                        | 0%                               | 9%    | 25%                                       | 2%                    | 42%            | 88%                              | 12%                    | 9%                                           | \$59,485                |
| BG 1, CT 215.07 | 61%                         | 0%                        | 1%                               | 9%    | 5%                                        | 0%                    | 25%            | 86%                              | 14%                    | 13%                                          | \$69,201                |
| BG 2, CT 215.07 | 47%                         | 0%                        | 0%                               | 5%    | 2%                                        | 27%                   | 19%            | 66%                              | 34%                    | 5%                                           | \$72,833                |
| BG 3, CT 215.07 | 43%                         | 1%                        | 0%                               | 8%    | 14%                                       | 0%                    | 34%            | 93%                              | 7%                     | 17%                                          | \$57,149                |
| BG 1, CT 215.09 | 46%                         | 0%                        | 0%                               | 17%   | 12%                                       | 0%                    | 25%            | 96%                              | 4%                     | 18%                                          | \$55,938                |
| BG 2, CT 215.09 | 66%                         | 0%                        | 0%                               | 2%    | 22%                                       | 0%                    | 10%            | 92%                              | 8%                     | 29%                                          | \$63,750                |
| BG 3, CT 215.09 | 36%                         | 1%                        | 0%                               | 10%   | 12%                                       | 3%                    | 38%            | 79%                              | 21%                    | 22%                                          | \$58,636                |
| BG 1, CT 216.01 | 36%                         | 0%                        | 0%                               | 34%   | 7%                                        | 0%                    | 22%            | 89%                              | 11%                    | 14%                                          | \$76,964                |
| BG 2, CT 216.01 | 24%                         | 4%                        | 0%                               | 24%   | 6%                                        | 0%                    | 42%            | 89%                              | 11%                    | 8%                                           | \$32,944                |
| BG 3, CT 216.01 | 85%                         | 0%                        | 0%                               | 7%    | 2%                                        | 0%                    | 7%             | 97%                              | 3%                     | 0%                                           | \$68,864                |
| BG 4, CT 216.01 | 61%                         | 0%                        | 1%                               | 3%    | 19%                                       | 1%                    | 15%            | 97%                              | 3%                     | 12%                                          | \$55,833                |
| BG 5, CT 216.01 | 40%                         | 0%                        | 0%                               | 18%   | 15%                                       | 9%                    | 17%            | 85%                              | 15%                    | 20%                                          | \$60,282                |
| BG 1, CT 216.04 | 79%                         | 0%                        | 0%                               | 5%    | 0%                                        | 17%                   | 0%             | 76%                              | 24%                    | 4%                                           | \$70,034                |
| BG 2, CT 216.04 | 49%                         | 1%                        | 0%                               | 17%   | 2%                                        | 12%                   | 18%            | 85%                              | 15%                    | 8%                                           | \$62,239                |
| BG 3, CT 216.04 | 33%                         | 0%                        | 0%                               | 10%   | 8%                                        | 23%                   | 26%            | 77%                              | 23%                    | 16%                                          | \$50,593                |
| BG 4, CT 216.04 | 65%                         | 0%                        | 0%                               | 12%   | 2%                                        | 0%                    | 20%            | 98%                              | 2%                     | 8%                                           | \$95,833                |



| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 5, CT 216.04 | 28%                         | 3%                        | 0%                               | 28%   | 2%                                        | 26%                   | 12%            | 69%                              | 31%                    | 5%                                           | \$64,489                |
| BG 1, CT 217.02 | 50%                         | 0%                        | 0%                               | 13%   | 14%                                       | 1%                    | 22%            | 82%                              | 18%                    | 18%                                          | \$39,097                |
| BG 2, CT 217.02 | 42%                         | 0%                        | 0%                               | 14%   | 1%                                        | 1%                    | 42%            | 96%                              | 4%                     | 11%                                          | \$80,036                |
| BG 3, CT 217.02 | 33%                         | 0%                        | 0%                               | 8%    | 19%                                       | 1%                    | 39%            | 92%                              | 8%                     | 7%                                           | \$50,759                |
| BG 1, CT 217.04 | 81%                         | 0%                        | 0%                               | 16%   | 2%                                        | 0%                    | 2%             | 100%                             | 0%                     | 6%                                           | \$61,029                |
| BG 2, CT 217.04 | 55%                         | 1%                        | 0%                               | 15%   | 3%                                        | 1%                    | 26%            | 90%                              | 10%                    | 3%                                           | \$80,759                |
| BG 3, CT 217.04 | 49%                         | 0%                        | 0%                               | 20%   | 4%                                        | 3%                    | 24%            | 93%                              | 7%                     | 6%                                           | \$76,333                |
| BG 4, CT 217.04 | 49%                         | 0%                        | 0%                               | 8%    | 18%                                       | 2%                    | 23%            | 95%                              | 5%                     | 11%                                          | \$66,955                |
| BG 1, CT 218    | 12%                         | 0%                        | 0%                               | 11%   | 12%                                       | 5%                    | 59%            | 84%                              | 16%                    | 14%                                          | \$67,500                |
| BG 2, CT 218    | 17%                         | 0%                        | 0%                               | 14%   | 9%                                        | 0%                    | 60%            | 90%                              | 10%                    | 31%                                          | \$52,619                |
| BG 3, CT 218    | 19%                         | 1%                        | 0%                               | 22%   | 10%                                       | 1%                    | 48%            | 76%                              | 24%                    | 13%                                          | \$55,417                |
| BG 4, CT 218    | 33%                         | 0%                        | 0%                               | 23%   | 22%                                       | 2%                    | 19%            | 92%                              | 8%                     | 10%                                          | \$59,286                |
| BG 1, CT 219.02 | 35%                         | 0%                        | 0%                               | 16%   | 16%                                       | 4%                    | 29%            | 90%                              | 10%                    | 5%                                           | \$59,757                |
| BG 2, CT 219.02 | 37%                         | 0%                        | 1%                               | 31%   | 7%                                        | 0%                    | 24%            | 97%                              | 3%                     | 33%                                          | \$27,333                |
| BG 3, CT 219.02 | 19%                         | 0%                        | 1%                               | 43%   | 6%                                        | 5%                    | 27%            | 94%                              | 6%                     | 5%                                           | \$57,936                |
| BG 1, CT 220    | 49%                         | 0%                        | 0%                               | 14%   | 16%                                       | 1%                    | 20%            | 95%                              | 5%                     | 10%                                          | \$55,610                |
| BG 2, CT 220    | 20%                         | 0%                        | 0%                               | 52%   | 2%                                        | 0%                    | 25%            | 98%                              | 2%                     | 9%                                           | \$44,844                |
| BG 1, CT 221.02 | 23%                         | 0%                        | 0%                               | 44%   | 5%                                        | 0%                    | 29%            | 86%                              | 14%                    | 16%                                          | \$62,788                |
| BG 2, CT 221.02 | 24%                         | 0%                        | 0%                               | 32%   | 14%                                       | 3%                    | 26%            | 92%                              | 8%                     | 8%                                           | \$76,830                |
| BG 0, CT 9900   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9901   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9903   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9904   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9905   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9906   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9907   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9908   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9909   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9910   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9911   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 0, CT 9912 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9913 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9914 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9915 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9916 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9917 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 1.06 | 23%                         | 0%                        | 0%                               | 54%   | 3%                                        | 0%                    | 20%            | 94%                              | 6%                     | 4%                                           | \$80,357                |
| BG 2, CT 1.06 | 37%                         | 4%                        | 0%                               | 42%   | 3%                                        | 0%                    | 13%            | 93%                              | 7%                     | 3%                                           | \$85,224                |
| BG 3, CT 1.06 | 23%                         | 0%                        | 0%                               | 60%   | 2%                                        | 0%                    | 15%            | 93%                              | 7%                     | 1%                                           | \$127,353               |
| BG 4, CT 1.06 | 36%                         | 2%                        | 2%                               | 35%   | 13%                                       | 0%                    | 12%            | 95%                              | 5%                     | 11%                                          | \$88,382                |
| BG 1, CT 1.07 | 23%                         | 0%                        | 0%                               | 53%   | 2%                                        | 0%                    | 22%            | 98%                              | 2%                     | 1%                                           | \$110,250               |
| BG 2, CT 1.07 | 31%                         | 0%                        | 0%                               | 29%   | 6%                                        | 0%                    | 34%            | 98%                              | 2%                     | 0%                                           | \$152,266               |
| BG 3, CT 1.07 | 19%                         | 0%                        | 0%                               | 56%   | 0%                                        | 0%                    | 25%            | 99%                              | 1%                     | 1%                                           | \$142,250               |
| BG 1, CT 1.08 | 42%                         | 1%                        | 0%                               | 32%   | 1%                                        | 0%                    | 25%            | 91%                              | 9%                     | 5%                                           | \$107,137               |
| BG 2, CT 1.08 | 36%                         | 0%                        | 0%                               | 27%   | 19%                                       | 0%                    | 18%            | 99%                              | 1%                     | 2%                                           | \$115,948               |
| BG 1, CT 1.10 | 28%                         | 0%                        | 0%                               | 58%   | 4%                                        | 0%                    | 10%            | 100%                             | 0%                     | 3%                                           | \$109,200               |
| BG 2, CT 1.10 | 44%                         | 2%                        | 0%                               | 36%   | 0%                                        | 0%                    | 19%            | 99%                              | 1%                     | 9%                                           | \$127,237               |
| BG 3, CT 1.10 | 25%                         | 0%                        | 0%                               | 45%   | 0%                                        | 0%                    | 29%            | 97%                              | 3%                     | 4%                                           | \$96,316                |
| BG 1, CT 1.11 | 23%                         | 0%                        | 0%                               | 51%   | 1%                                        | 1%                    | 24%            | 95%                              | 5%                     | 1%                                           | \$125,179               |
| BG 2, CT 1.11 | 9%                          | 0%                        | 0%                               | 62%   | 4%                                        | 0%                    | 24%            | 98%                              | 2%                     | 2%                                           | \$107,375               |
| BG 3, CT 1.11 | 16%                         | 0%                        | 0%                               | 66%   | 1%                                        | 0%                    | 17%            | 98%                              | 2%                     | 3%                                           | \$160,417               |
| BG 1, CT 1.12 | 7%                          | 0%                        | 0%                               | 70%   | 7%                                        | 0%                    | 15%            | 98%                              | 2%                     | 0%                                           | \$88,529                |
| BG 2, CT 1.12 | 51%                         | 0%                        | 0%                               | 35%   | 0%                                        | 1%                    | 12%            | 94%                              | 6%                     | 9%                                           | \$109,607               |
| BG 3, CT 1.12 | 13%                         | 0%                        | 0%                               | 63%   | 2%                                        | 0%                    | 23%            | 98%                              | 2%                     | 4%                                           | \$56,667                |
| BG 1, CT 1.14 | 52%                         | 0%                        | 0%                               | 35%   | 0%                                        | 0%                    | 13%            | 96%                              | 4%                     | 4%                                           | \$113,696               |
| BG 1, CT 2    | 15%                         | 0%                        | 0%                               | 54%   | 0%                                        | 0%                    | 31%            | 87%                              | 13%                    | 2%                                           | \$100,000               |
| BG 2, CT 2    | 14%                         | 0%                        | 0%                               | 59%   | 5%                                        | 0%                    | 23%            | 100%                             | 0%                     | 4%                                           | \$90,333                |
| BG 3, CT 2    | 11%                         | 0%                        | 0%                               | 61%   | 5%                                        | 0%                    | 23%            | 98%                              | 2%                     | 2%                                           | \$126,360               |
| BG 4, CT 2    | 31%                         | 0%                        | 0%                               | 48%   | 4%                                        | 0%                    | 17%            | 97%                              | 3%                     | 6%                                           | \$128,125               |
| BG 5, CT 2    | 26%                         | 1%                        | 0%                               | 32%   | 5%                                        | 0%                    | 35%            | 90%                              | 10%                    | 4%                                           | \$101,958               |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 3.01 | 28%                         | 1%                        | 0%                               | 50%   | 1%                                        | 0%                    | 20%            | 94%                              | 6%                     | 0%                                           | \$95,387                |
| BG 2, CT 3.01 | 16%                         | 1%                        | 2%                               | 65%   | 1%                                        | 0%                    | 14%            | 97%                              | 3%                     | 4%                                           | \$130,667               |
| BG 1, CT 3.02 | 11%                         | 0%                        | 0%                               | 51%   | 4%                                        | 4%                    | 30%            | 95%                              | 5%                     | 2%                                           | \$119,444               |
| BG 2, CT 3.02 | 23%                         | 0%                        | 0%                               | 40%   | 0%                                        | 0%                    | 36%            | 100%                             | 0%                     | 0%                                           | \$163,611               |
| BG 3, CT 3.02 | 15%                         | 0%                        | 0%                               | 77%   | 5%                                        | 0%                    | 3%             | 100%                             | 0%                     | 9%                                           | \$82,438                |
| BG 1, CT 4.01 | 26%                         | 0%                        | 0%                               | 56%   | 0%                                        | 0%                    | 17%            | 98%                              | 2%                     | 5%                                           | \$82,250                |
| BG 1, CT 4.02 | 21%                         | 0%                        | 0%                               | 64%   | 2%                                        | 2%                    | 11%            | 93%                              | 7%                     | 0%                                           | \$174,125               |
| BG 2, CT 4.02 | 24%                         | 0%                        | 0%                               | 70%   | 0%                                        | 0%                    | 5%             | 99%                              | 1%                     | 3%                                           | \$139,750               |
| BG 1, CT 5    | 25%                         | 2%                        | 0%                               | 71%   | 0%                                        | 0%                    | 2%             | 98%                              | 2%                     | 2%                                           | \$115,156               |
| BG 2, CT 5    | 26%                         | 0%                        | 0%                               | 33%   | 3%                                        | 0%                    | 38%            | 73%                              | 27%                    | 4%                                           | \$59,167                |
| BG 3, CT 5    | 54%                         | 0%                        | 0%                               | 33%   | 9%                                        | 0%                    | 4%             | 100%                             | 0%                     | 0%                                           | \$130,909               |
| BG 4, CT 5    | 19%                         | 0%                        | 0%                               | 74%   | 0%                                        | 0%                    | 7%             | 91%                              | 9%                     | 0%                                           | \$99,375                |
| BG 5, CT 5    | 37%                         | 0%                        | 0%                               | 39%   | 0%                                        | 0%                    | 24%            | 97%                              | 3%                     | 7%                                           | \$127,500               |
| BG 1, CT 6    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 2, CT 6    | 36%                         | 0%                        | 0%                               | 50%   | 0%                                        | 0%                    | 14%            | 100%                             | 0%                     | 2%                                           | \$114,231               |
| BG 1, CT 7    | 6%                          | 0%                        | 0%                               | 79%   | 2%                                        | 0%                    | 13%            | 96%                              | 4%                     | 3%                                           | \$84,583                |
| BG 2, CT 7    | 7%                          | 0%                        | 0%                               | 55%   | 1%                                        | 1%                    | 37%            | 91%                              | 9%                     | 13%                                          | \$60,536                |
| BG 3, CT 7    | 7%                          | 0%                        | 0%                               | 60%   | 0%                                        | 0%                    | 33%            | 88%                              | 12%                    | 6%                                           | \$90,625                |
| BG 1, CT 8    | 13%                         | 0%                        | 2%                               | 65%   | 1%                                        | 0%                    | 20%            | 96%                              | 4%                     | 8%                                           | \$61,758                |
| BG 2, CT 8    | 18%                         | 0%                        | 0%                               | 62%   | 3%                                        | 0%                    | 17%            | 97%                              | 3%                     | 3%                                           | \$100,536               |
| BG 3, CT 8    | 11%                         | 1%                        | 0%                               | 62%   | 11%                                       | 0%                    | 15%            | 98%                              | 2%                     | 2%                                           | \$124,063               |
| BG 4, CT 8    | 3%                          | 0%                        | 0%                               | 60%   | 4%                                        | 1%                    | 34%            | 95%                              | 5%                     | 12%                                          | \$95,375                |
| BG 1, CT 9.01 | 22%                         | 0%                        | 0%                               | 60%   | 3%                                        | 0%                    | 16%            | 100%                             | 0%                     | 1%                                           | \$99,583                |
| BG 2, CT 9.01 | 19%                         | 0%                        | 0%                               | 53%   | 0%                                        | 1%                    | 27%            | 95%                              | 5%                     | 11%                                          | \$67,344                |
| BG 1, CT 9.02 | 28%                         | 1%                        | 0%                               | 51%   | 1%                                        | 1%                    | 18%            | 93%                              | 7%                     | 4%                                           | \$106,477               |
| BG 2, CT 9.02 | 34%                         | 4%                        | 0%                               | 52%   | 4%                                        | 0%                    | 5%             | 100%                             | 0%                     | 5%                                           | \$79,559                |
| BG 1, CT 9.03 | 19%                         | 1%                        | 0%                               | 57%   | 4%                                        | 1%                    | 17%            | 94%                              | 6%                     | 1%                                           | \$69,022                |
| BG 2, CT 9.03 | 19%                         | 1%                        | 0%                               | 54%   | 4%                                        | 5%                    | 17%            | 96%                              | 4%                     | 12%                                          | \$85,286                |
| BG 1, CT 10   | 14%                         | 0%                        | 1%                               | 50%   | 2%                                        | 1%                    | 33%            | 87%                              | 13%                    | 8%                                           | \$59,333                |
| BG 2, CT 10   | 29%                         | 0%                        | 2%                               | 50%   | 10%                                       | 0%                    | 10%            | 98%                              | 2%                     | 12%                                          | \$61,216                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 11    | 7%                          | 0%                        | 0%                               | 37%   | 30%                                       | 0%                    | 26%            | 87%                              | 13%                    | 28%                                          | \$49,018                |
| BG 2, CT 11    | 8%                          | 0%                        | 0%                               | 39%   | 33%                                       | 0%                    | 20%            | 96%                              | 4%                     | 12%                                          | \$67,273                |
| BG 1, CT 12.01 | 14%                         | 0%                        | 0%                               | 62%   | 4%                                        | 0%                    | 20%            | 89%                              | 11%                    | 7%                                           | \$50,375                |
| BG 2, CT 12.01 | 10%                         | 0%                        | 0%                               | 54%   | 4%                                        | 0%                    | 31%            | 94%                              | 6%                     | 3%                                           | \$83,438                |
| BG 1, CT 12.02 | 6%                          | 0%                        | 0%                               | 69%   | 4%                                        | 0%                    | 22%            | 87%                              | 13%                    | 1%                                           | \$88,611                |
| BG 2, CT 12.02 | 12%                         | 0%                        | 0%                               | 71%   | 7%                                        | 0%                    | 10%            | 99%                              | 1%                     | 9%                                           | \$65,337                |
| BG 1, CT 13    | 13%                         | 0%                        | 0%                               | 63%   | 1%                                        | 0%                    | 22%            | 99%                              | 1%                     | 9%                                           | \$55,323                |
| BG 2, CT 13    | 17%                         | 0%                        | 0%                               | 60%   | 1%                                        | 0%                    | 21%            | 94%                              | 6%                     | 2%                                           | \$86,290                |
| BG 3, CT 13    | 20%                         | 5%                        | 0%                               | 69%   | 2%                                        | 0%                    | 5%             | 88%                              | 12%                    | 23%                                          | \$39,837                |
| BG 4, CT 13    | 15%                         | 0%                        | 0%                               | 58%   | 2%                                        | 0%                    | 25%            | 97%                              | 3%                     | 9%                                           | \$81,188                |
| BG 1, CT 14    | 13%                         | 0%                        | 0%                               | 62%   | 3%                                        | 0%                    | 22%            | 99%                              | 1%                     | 1%                                           | \$72,434                |
| BG 2, CT 14    | 11%                         | 2%                        | 0%                               | 65%   | 4%                                        | 0%                    | 19%            | 99%                              | 1%                     | 5%                                           | \$91,964                |
| BG 1, CT 15    | 17%                         | 0%                        | 0%                               | 56%   | 1%                                        | 0%                    | 26%            | 95%                              | 5%                     | 6%                                           | \$81,944                |
| BG 2, CT 15    | 21%                         | 0%                        | 0%                               | 56%   | 5%                                        | 0%                    | 17%            | 99%                              | 1%                     | 1%                                           | \$69,398                |
| BG 3, CT 15    | 20%                         | 0%                        | 1%                               | 53%   | 5%                                        | 1%                    | 20%            | 95%                              | 5%                     | 8%                                           | \$84,779                |
| BG 1, CT 16    | 27%                         | 0%                        | 0%                               | 59%   | 0%                                        | 1%                    | 12%            | 91%                              | 9%                     | 6%                                           | \$71,643                |
| BG 2, CT 16    | 8%                          | 0%                        | 0%                               | 64%   | 10%                                       | 0%                    | 18%            | 95%                              | 5%                     | 9%                                           | \$66,250                |
| BG 3, CT 16    | 23%                         | 0%                        | 0%                               | 50%   | 0%                                        | 2%                    | 24%            | 100%                             | 0%                     | 0%                                           | \$68,098                |
| BG 1, CT 17    | 70%                         | 0%                        | 0%                               | 13%   | 0%                                        | 0%                    | 17%            | 95%                              | 5%                     | 15%                                          | \$64,048                |
| BG 2, CT 17    | 51%                         | 3%                        | 0%                               | 27%   | 0%                                        | 0%                    | 18%            | 97%                              | 3%                     | 7%                                           | \$72,446                |
| BG 1, CT 18.01 | 41%                         | 1%                        | 2%                               | 43%   | 1%                                        | 0%                    | 12%            | 98%                              | 2%                     | 35%                                          | \$25,855                |
| BG 2, CT 18.01 | 45%                         | 0%                        | 0%                               | 32%   | 10%                                       | 1%                    | 12%            | 85%                              | 15%                    | 25%                                          | \$45,357                |
| BG 1, CT 18.03 | 43%                         | 12%                       | 1%                               | 34%   | 5%                                        | 0%                    | 5%             | 95%                              | 5%                     | 8%                                           | \$46,503                |
| BG 2, CT 18.03 | 29%                         | 3%                        | 0%                               | 55%   | 0%                                        | 4%                    | 10%            | 96%                              | 4%                     | 4%                                           | \$30,357                |
| BG 3, CT 18.03 | 51%                         | 0%                        | 0%                               | 38%   | 0%                                        | 0%                    | 11%            | 92%                              | 8%                     | 15%                                          | \$50,750                |
| BG 1, CT 18.04 | 54%                         | 2%                        | 0%                               | 31%   | 1%                                        | 0%                    | 11%            | 93%                              | 7%                     | 13%                                          | \$57,222                |
| BG 1, CT 19.01 | 75%                         | 3%                        | 0%                               | 19%   | 1%                                        | 0%                    | 2%             | 98%                              | 2%                     | 15%                                          | \$53,438                |
| BG 1, CT 19.03 | 39%                         | 0%                        | 0%                               | 50%   | 0%                                        | 0%                    | 10%            | 94%                              | 6%                     | 6%                                           | \$61,905                |
| BG 2, CT 19.03 | 54%                         | 0%                        | 0%                               | 32%   | 0%                                        | 0%                    | 14%            | 87%                              | 13%                    | 18%                                          | \$27,431                |
| BG 1, CT 19.04 | 53%                         | 1%                        | 0%                               | 35%   | 2%                                        | 1%                    | 8%             | 96%                              | 4%                     | 7%                                           | \$60,809                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 19.04 | 50%                         | 2%                        | 0%                               | 35%   | 0%                                        | 0%                    | 14%            | 95%                              | 5%                     | 6%                                           | \$48,750                |
| BG 1, CT 20.03 | 51%                         | 2%                        | 0%                               | 36%   | 2%                                        | 0%                    | 8%             | 95%                              | 5%                     | 34%                                          | \$29,926                |
| BG 2, CT 20.03 | 40%                         | 3%                        | 0%                               | 46%   | 2%                                        | 0%                    | 9%             | 92%                              | 8%                     | 34%                                          | \$41,548                |
| BG 1, CT 20.04 | 51%                         | 2%                        | 0%                               | 31%   | 7%                                        | 1%                    | 9%             | 87%                              | 13%                    | 15%                                          | \$39,911                |
| BG 1, CT 20.05 | 57%                         | 6%                        | 0%                               | 31%   | 2%                                        | 0%                    | 5%             | 97%                              | 3%                     | 37%                                          | \$21,824                |
| BG 2, CT 20.05 | 39%                         | 3%                        | 0%                               | 31%   | 3%                                        | 7%                    | 17%            | 95%                              | 5%                     | 9%                                           | \$46,652                |
| BG 1, CT 20.06 | 34%                         | 2%                        | 0%                               | 40%   | 10%                                       | 5%                    | 9%             | 91%                              | 9%                     | 25%                                          | \$39,328                |
| BG 2, CT 20.06 | 56%                         | 3%                        | 0%                               | 22%   | 0%                                        | 0%                    | 20%            | 99%                              | 1%                     | 8%                                           | \$61,848                |
| BG 1, CT 21    | 6%                          | 0%                        | 0%                               | 46%   | 20%                                       | 1%                    | 28%            | 91%                              | 9%                     | 13%                                          | \$54,256                |
| BG 2, CT 21    | 26%                         | 1%                        | 0%                               | 42%   | 9%                                        | 0%                    | 22%            | 93%                              | 7%                     | 16%                                          | \$53,015                |
| BG 1, CT 22.01 | 18%                         | 0%                        | 0%                               | 64%   | 1%                                        | 1%                    | 16%            | 92%                              | 8%                     | 17%                                          | \$48,368                |
| BG 2, CT 22.01 | 10%                         | 1%                        | 0%                               | 59%   | 21%                                       | 1%                    | 9%             | 97%                              | 3%                     | 5%                                           | \$45,909                |
| BG 1, CT 22.02 | 4%                          | 0%                        | 0%                               | 80%   | 0%                                        | 0%                    | 16%            | 100%                             | 0%                     | 16%                                          | \$37,452                |
| BG 2, CT 22.02 | 32%                         | 1%                        | 0%                               | 52%   | 5%                                        | 0%                    | 10%            | 95%                              | 5%                     | 5%                                           | \$64,341                |
| BG 1, CT 23    | 12%                         | 0%                        | 0%                               | 50%   | 1%                                        | 0%                    | 36%            | 87%                              | 13%                    | 10%                                          | \$51,190                |
| BG 2, CT 23    | 13%                         | 6%                        | 0%                               | 60%   | 2%                                        | 0%                    | 20%            | 85%                              | 15%                    | 13%                                          | \$56,471                |
| BG 3, CT 23    | 20%                         | 0%                        | 0%                               | 48%   | 5%                                        | 0%                    | 28%            | 79%                              | 21%                    | 33%                                          | \$44,833                |
| BG 4, CT 23    | 13%                         | 0%                        | 0%                               | 35%   | 33%                                       | 0%                    | 19%            | 89%                              | 11%                    | 22%                                          | \$37,435                |
| BG 5, CT 23    | 5%                          | 0%                        | 0%                               | 68%   | 2%                                        | 0%                    | 25%            | 93%                              | 7%                     | 20%                                          | \$40,815                |
| BG 1, CT 24.01 | 8%                          | 0%                        | 0%                               | 63%   | 14%                                       | 0%                    | 15%            | 98%                              | 2%                     | 19%                                          | \$31,594                |
| BG 2, CT 24.01 | 15%                         | 1%                        | 0%                               | 48%   | 11%                                       | 1%                    | 24%            | 93%                              | 7%                     | 4%                                           | \$46,146                |
| BG 3, CT 24.01 | 1%                          | 3%                        | 0%                               | 63%   | 2%                                        | 2%                    | 29%            | 96%                              | 4%                     | 25%                                          | \$44,732                |
| BG 1, CT 24.02 | 10%                         | 0%                        | 0%                               | 72%   | 4%                                        | 1%                    | 13%            | 98%                              | 2%                     | 14%                                          | \$45,058                |
| BG 2, CT 24.02 | 19%                         | 0%                        | 0%                               | 48%   | 13%                                       | 1%                    | 19%            | 95%                              | 5%                     | 26%                                          | \$31,750                |
| BG 1, CT 25    | 16%                         | 3%                        | 0%                               | 53%   | 10%                                       | 1%                    | 18%            | 95%                              | 5%                     | 19%                                          | \$26,934                |
| BG 2, CT 25    | 16%                         | 0%                        | 0%                               | 55%   | 4%                                        | 0%                    | 25%            | 96%                              | 4%                     | 25%                                          | \$38,576                |
| BG 1, CT 26    | 31%                         | 0%                        | 0%                               | 36%   | 13%                                       | 0%                    | 19%            | 89%                              | 11%                    | 27%                                          | \$32,340                |
| BG 2, CT 26    | 13%                         | 0%                        | 1%                               | 64%   | 6%                                        | 0%                    | 17%            | 99%                              | 1%                     | 9%                                           | \$41,587                |
| BG 3, CT 26    | 14%                         | 0%                        | 0%                               | 69%   | 6%                                        | 1%                    | 10%            | 96%                              | 4%                     | 8%                                           | \$73,400                |
| BG 4, CT 26    | 13%                         | 1%                        | 0%                               | 56%   | 9%                                        | 3%                    | 18%            | 91%                              | 9%                     | 13%                                          | \$43,580                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 27.01 | 22%                         | 9%                        | 0%                               | 35%   | 2%                                        | 11%                   | 22%            | 86%                              | 14%                    | 18%                                          | \$86,167                |
| BG 2, CT 27.01 | 33%                         | 1%                        | 0%                               | 32%   | 9%                                        | 0%                    | 25%            | 95%                              | 5%                     | 30%                                          | \$61,250                |
| BG 3, CT 27.01 | 16%                         | 0%                        | 1%                               | 53%   | 6%                                        | 1%                    | 22%            | 96%                              | 4%                     | 12%                                          | \$51,875                |
| BG 1, CT 27.02 | 28%                         | 1%                        | 0%                               | 49%   | 7%                                        | 2%                    | 12%            | 91%                              | 9%                     | 24%                                          | \$63,382                |
| BG 2, CT 27.02 | 11%                         | 3%                        | 0%                               | 66%   | 1%                                        | 0%                    | 20%            | 96%                              | 4%                     | 23%                                          | \$51,375                |
| BG 3, CT 27.02 | 18%                         | 0%                        | 0%                               | 43%   | 10%                                       | 3%                    | 26%            | 95%                              | 5%                     | 2%                                           | \$49,920                |
| BG 1, CT 28    | 30%                         | 0%                        | 0%                               | 64%   | 1%                                        | 0%                    | 4%             | 99%                              | 1%                     | 2%                                           | \$92,788                |
| BG 2, CT 28    | 30%                         | 0%                        | 0%                               | 47%   | 5%                                        | 0%                    | 17%            | 90%                              | 10%                    | 8%                                           | \$82,083                |
| BG 1, CT 29    | 30%                         | 0%                        | 1%                               | 53%   | 4%                                        | 0%                    | 13%            | 95%                              | 5%                     | 5%                                           | \$96,728                |
| BG 1, CT 30    | 46%                         | 0%                        | 0%                               | 32%   | 1%                                        | 0%                    | 20%            | 97%                              | 3%                     | 6%                                           | \$133,555               |
| BG 2, CT 30    | 17%                         | 0%                        | 0%                               | 63%   | 0%                                        | 3%                    | 16%            | 86%                              | 14%                    | 13%                                          | \$117,768               |
| BG 3, CT 30    | 12%                         | 0%                        | 0%                               | 71%   | 6%                                        | 0%                    | 12%            | 100%                             | 0%                     | 7%                                           | \$103,333               |
| BG 4, CT 30    | 30%                         | 0%                        | 0%                               | 55%   | 1%                                        | 0%                    | 14%            | 90%                              | 10%                    | 9%                                           | \$80,455                |
| BG 1, CT 31.01 | 10%                         | 1%                        | 0%                               | 79%   | 1%                                        | 0%                    | 9%             | 99%                              | 1%                     | 3%                                           | \$72,950                |
| BG 2, CT 31.01 | 17%                         | 1%                        | 0%                               | 54%   | 4%                                        | 0%                    | 24%            | 96%                              | 4%                     | 3%                                           | \$112,875               |
| BG 1, CT 31.02 | 27%                         | 0%                        | 0%                               | 59%   | 1%                                        | 1%                    | 13%            | 100%                             | 0%                     | 3%                                           | \$106,477               |
| BG 2, CT 31.02 | 11%                         | 0%                        | 0%                               | 65%   | 0%                                        | 0%                    | 24%            | 93%                              | 7%                     | 6%                                           | \$128,864               |
| BG 1, CT 32    | 46%                         | 0%                        | 0%                               | 30%   | 0%                                        | 1%                    | 22%            | 96%                              | 4%                     | 12%                                          | \$107,917               |
| BG 1, CT 33    | 24%                         | 0%                        | 0%                               | 44%   | 8%                                        | 0%                    | 24%            | 98%                              | 2%                     | 7%                                           | \$128,500               |
| BG 1, CT 34.03 | 25%                         | 1%                        | 0%                               | 52%   | 6%                                        | 0%                    | 17%            | 91%                              | 9%                     | 14%                                          | \$71,367                |
| BG 2, CT 34.03 | 22%                         | 0%                        | 0%                               | 44%   | 0%                                        | 1%                    | 33%            | 91%                              | 9%                     | 18%                                          | \$50,906                |
| BG 3, CT 34.03 | 16%                         | 4%                        | 0%                               | 44%   | 25%                                       | 2%                    | 9%             | 93%                              | 7%                     | 14%                                          | \$56,307                |
| BG 4, CT 34.03 | 23%                         | 1%                        | 0%                               | 45%   | 13%                                       | 1%                    | 17%            | 91%                              | 9%                     | 5%                                           | \$51,591                |
| BG 1, CT 34.04 | 21%                         | 0%                        | 0%                               | 71%   | 1%                                        | 0%                    | 7%             | 98%                              | 2%                     | 10%                                          | \$57,799                |
| BG 2, CT 34.04 | 10%                         | 3%                        | 0%                               | 53%   | 5%                                        | 1%                    | 29%            | 86%                              | 14%                    | 6%                                           | \$61,250                |
| BG 3, CT 34.04 | 20%                         | 0%                        | 0%                               | 48%   | 4%                                        | 0%                    | 28%            | 87%                              | 13%                    | 10%                                          | \$39,665                |
| BG 1, CT 34.05 | 34%                         | 0%                        | 0%                               | 41%   | 9%                                        | 0%                    | 15%            | 93%                              | 7%                     | 28%                                          | \$41,829                |
| BG 2, CT 34.05 | 35%                         | 1%                        | 0%                               | 42%   | 0%                                        | 0%                    | 23%            | 94%                              | 6%                     | 13%                                          | \$51,157                |
| BG 1, CT 34.06 | 21%                         | 0%                        | 0%                               | 38%   | 36%                                       | 0%                    | 6%             | 98%                              | 2%                     | 36%                                          | \$42,813                |
| BG 2, CT 34.06 | 17%                         | 0%                        | 0%                               | 59%   | 5%                                        | 4%                    | 14%            | 93%                              | 7%                     | 8%                                           | \$50,319                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 3, CT 34.06 | 7%                          | 2%                        | 0%                               | 67%   | 7%                                        | 4%                    | 13%            | 87%                              | 13%                    | 22%                                          | \$45,194                |
| BG 4, CT 34.06 | 15%                         | 0%                        | 0%                               | 62%   | 4%                                        | 1%                    | 18%            | 90%                              | 10%                    | 13%                                          | \$43,918                |
| BG 1, CT 34.07 | 39%                         | 0%                        | 0%                               | 50%   | 1%                                        | 0%                    | 10%            | 97%                              | 3%                     | 9%                                           | \$67,500                |
| BG 1, CT 35.01 | 21%                         | 4%                        | 0%                               | 61%   | 1%                                        | 0%                    | 13%            | 98%                              | 2%                     | 17%                                          | \$26,863                |
| BG 2, CT 35.01 | 19%                         | 1%                        | 0%                               | 50%   | 10%                                       | 0%                    | 20%            | 96%                              | 4%                     | 9%                                           | \$67,350                |
| BG 1, CT 35.02 | 8%                          | 0%                        | 0%                               | 81%   | 0%                                        | 1%                    | 9%             | 97%                              | 3%                     | 12%                                          | \$48,750                |
| BG 2, CT 35.02 | 16%                         | 0%                        | 0%                               | 50%   | 9%                                        | 0%                    | 25%            | 98%                              | 2%                     | 18%                                          | \$42,725                |
| BG 3, CT 35.02 | 9%                          | 0%                        | 0%                               | 82%   | 2%                                        | 0%                    | 7%             | 98%                              | 2%                     | 11%                                          | \$37,829                |
| BG 1, CT 36.01 | 13%                         | 4%                        | 0%                               | 66%   | 2%                                        | 0%                    | 16%            | 97%                              | 3%                     | 13%                                          | \$26,825                |
| BG 2, CT 36.01 | 22%                         | 3%                        | 0%                               | 61%   | 1%                                        | 0%                    | 14%            | 94%                              | 6%                     | 12%                                          | \$75,795                |
| BG 1, CT 36.03 | 15%                         | 0%                        | 0%                               | 58%   | 8%                                        | 0%                    | 19%            | 97%                              | 3%                     | 13%                                          | \$52,305                |
| BG 2, CT 36.03 | 7%                          | 0%                        | 0%                               | 83%   | 3%                                        | 0%                    | 7%             | 100%                             | 0%                     | 32%                                          | \$16,730                |
| BG 1, CT 36.04 | 14%                         | 2%                        | 0%                               | 67%   | 15%                                       | 0%                    | 3%             | 97%                              | 3%                     | 14%                                          | \$52,167                |
| BG 2, CT 36.04 | 18%                         | 2%                        | 0%                               | 60%   | 6%                                        | 1%                    | 13%            | 96%                              | 4%                     | 10%                                          | \$43,962                |
| BG 1, CT 37    | 24%                         | 0%                        | 0%                               | 13%   | 0%                                        | 0%                    | 63%            | 44%                              | 56%                    | 5%                                           | \$97,808                |
| BG 2, CT 37    | 44%                         | 0%                        | 1%                               | 45%   | 1%                                        | 0%                    | 9%             | 93%                              | 7%                     | 4%                                           | \$84,205                |
| BG 3, CT 37    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 4, CT 37    | 8%                          | 0%                        | 0%                               | 92%   | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 40%                                          | \$31,557                |
| BG 5, CT 37    | 43%                         | 1%                        | 0%                               | 38%   | 7%                                        | 0%                    | 10%            | 95%                              | 5%                     | 13%                                          | \$49,225                |
| BG 6, CT 37    | 3%                          | 3%                        | 0%                               | 77%   | 1%                                        | 0%                    | 16%            | 92%                              | 8%                     | 5%                                           | \$59,597                |
| BG 7, CT 37    | 13%                         | 0%                        | 0%                               | 81%   | 0%                                        | 0%                    | 5%             | 96%                              | 4%                     | 7%                                           | \$76,139                |
| BG 1, CT 38    | 21%                         | 1%                        | 0%                               | 71%   | 3%                                        | 0%                    | 4%             | 97%                              | 3%                     | 2%                                           | \$83,879                |
| BG 2, CT 38    | 22%                         | 0%                        | 0%                               | 65%   | 0%                                        | 0%                    | 13%            | 100%                             | 0%                     | 5%                                           | \$112,292               |
| BG 3, CT 38    | 27%                         | 0%                        | 0%                               | 58%   | 1%                                        | 0%                    | 13%            | 98%                              | 2%                     | 12%                                          | \$21,309                |
| BG 1, CT 39    | 28%                         | 13%                       | 0%                               | 39%   | 5%                                        | 0%                    | 14%            | 98%                              | 2%                     | 20%                                          | \$25,323                |
| BG 1, CT 40    | 25%                         | 7%                        | 0%                               | 50%   | 8%                                        | 0%                    | 10%            | 99%                              | 1%                     | 17%                                          | \$38,144                |
| BG 2, CT 40    | 62%                         | 9%                        | 0%                               | 25%   | 0%                                        | 0%                    | 5%             | 99%                              | 1%                     | 12%                                          | \$84,643                |
| BG 1, CT 41    | 12%                         | 2%                        | 0%                               | 64%   | 14%                                       | 0%                    | 8%             | 96%                              | 4%                     | 16%                                          | \$42,857                |
| BG 2, CT 41    | 18%                         | 11%                       | 0%                               | 34%   | 13%                                       | 2%                    | 23%            | 93%                              | 7%                     | 8%                                           | \$46,380                |
| BG 3, CT 41    | 12%                         | 1%                        | 0%                               | 56%   | 2%                                        | 0%                    | 29%            | 97%                              | 3%                     | 0%                                           | \$62,278                |

| Block Group | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|             | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 42 | 28%                         | 0%                        | 0%                               | 55%   | 1%                                        | 1%                    | 14%            | 97%                              | 3%                     | 5%                                           | \$62,574                |
| BG 2, CT 42 | 29%                         | 0%                        | 0%                               | 52%   | 5%                                        | 0%                    | 13%            | 96%                              | 4%                     | 11%                                          | \$80,345                |
| BG 1, CT 43 | 11%                         | 2%                        | 0%                               | 41%   | 9%                                        | 3%                    | 34%            | 98%                              | 2%                     | 8%                                           | \$54,861                |
| BG 2, CT 43 | 25%                         | 4%                        | 1%                               | 42%   | 4%                                        | 1%                    | 24%            | 98%                              | 2%                     | 13%                                          | \$68,958                |
| BG 3, CT 43 | 16%                         | 0%                        | 0%                               | 39%   | 15%                                       | 0%                    | 30%            | 92%                              | 8%                     | 39%                                          | \$19,506                |
| BG 1, CT 44 | 5%                          | 0%                        | 0%                               | 23%   | 41%                                       | 1%                    | 30%            | 93%                              | 7%                     | 11%                                          | \$87,679                |
| BG 2, CT 44 | 12%                         | 0%                        | 0%                               | 56%   | 6%                                        | 0%                    | 26%            | 94%                              | 6%                     | 5%                                           | \$72,250                |
| BG 1, CT 45 | 14%                         | 0%                        | 0%                               | 80%   | 4%                                        | 0%                    | 2%             | 96%                              | 4%                     | 0%                                           | \$96,328                |
| BG 2, CT 45 | 14%                         | 0%                        | 0%                               | 71%   | 1%                                        | 0%                    | 14%            | 95%                              | 5%                     | 1%                                           | \$103,365               |
| BG 3, CT 45 | 31%                         | 0%                        | 0%                               | 54%   | 2%                                        | 0%                    | 12%            | 97%                              | 3%                     | 0%                                           | \$85,417                |
| BG 4, CT 45 | 23%                         | 0%                        | 0%                               | 45%   | 10%                                       | 2%                    | 20%            | 97%                              | 3%                     | 5%                                           | \$60,640                |
| BG 1, CT 46 | 17%                         | 0%                        | 0%                               | 67%   | 0%                                        | 0%                    | 16%            | 100%                             | 0%                     | 7%                                           | \$154,688               |
| BG 2, CT 46 | 11%                         | 0%                        | 0%                               | 68%   | 6%                                        | 0%                    | 14%            | 94%                              | 6%                     | 2%                                           | \$91,728                |
| BG 3, CT 46 | 6%                          | 0%                        | 0%                               | 67%   | 0%                                        | 0%                    | 27%            | 99%                              | 1%                     | 1%                                           | \$89,760                |
| BG 1, CT 47 | 4%                          | 0%                        | 0%                               | 86%   | 5%                                        | 0%                    | 5%             | 100%                             | 0%                     | 6%                                           | \$65,833                |
| BG 2, CT 47 | 17%                         | 0%                        | 1%                               | 44%   | 3%                                        | 0%                    | 35%            | 91%                              | 9%                     | 8%                                           | \$100,769               |
| BG 3, CT 47 | 7%                          | 0%                        | 0%                               | 82%   | 6%                                        | 0%                    | 6%             | 100%                             | 0%                     | 5%                                           | \$91,719                |
| BG 4, CT 47 | 11%                         | 0%                        | 2%                               | 73%   | 1%                                        | 0%                    | 14%            | 100%                             | 0%                     | 6%                                           | \$96,641                |
| BG 1, CT 48 | 21%                         | 0%                        | 2%                               | 40%   | 11%                                       | 2%                    | 25%            | 90%                              | 10%                    | 37%                                          | \$75,893                |
| BG 2, CT 48 | 2%                          | 0%                        | 0%                               | 41%   | 34%                                       | 0%                    | 23%            | 93%                              | 7%                     | 7%                                           | \$52,067                |
| BG 3, CT 48 | 8%                          | 2%                        | 0%                               | 56%   | 8%                                        | 0%                    | 26%            | 93%                              | 7%                     | 12%                                          | \$69,483                |
| BG 4, CT 48 | 5%                          | 0%                        | 0%                               | 62%   | 10%                                       | 0%                    | 23%            | 89%                              | 11%                    | 8%                                           | \$111,115               |
| BG 1, CT 49 | 3%                          | 0%                        | 0%                               | 74%   | 5%                                        | 1%                    | 16%            | 92%                              | 8%                     | 12%                                          | \$62,569                |
| BG 2, CT 49 | 4%                          | 0%                        | 0%                               | 72%   | 11%                                       | 0%                    | 14%            | 91%                              | 9%                     | 5%                                           | \$57,875                |
| BG 3, CT 49 | 7%                          | 2%                        | 0%                               | 65%   | 4%                                        | 0%                    | 22%            | 96%                              | 4%                     | 4%                                           | \$55,833                |
| BG 1, CT 50 | 10%                         | 0%                        | 0%                               | 76%   | 0%                                        | 1%                    | 13%            | 99%                              | 1%                     | 2%                                           | \$75,625                |
| BG 2, CT 50 | 17%                         | 2%                        | 0%                               | 63%   | 4%                                        | 0%                    | 14%            | 95%                              | 5%                     | 17%                                          | \$49,783                |
| BG 3, CT 50 | 5%                          | 0%                        | 0%                               | 65%   | 12%                                       | 0%                    | 19%            | 92%                              | 8%                     | 13%                                          | \$34,219                |
| BG 4, CT 50 | 14%                         | 2%                        | 0%                               | 57%   | 6%                                        | 0%                    | 21%            | 100%                             | 0%                     | 6%                                           | \$69,500                |
| BG 1, CT 51 | 0%                          | 0%                        | 0%                               | 96%   | 0%                                        | 0%                    | 4%             | 100%                             | 0%                     | 37%                                          | \$16,587                |



| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 51    | 38%                         | 0%                        | 1%                               | 51%   | 0%                                        | 0%                    | 11%            | 97%                              | 3%                     | 3%                                           | \$74,044                |
| BG 1, CT 52    | 14%                         | 2%                        | 0%                               | 66%   | 3%                                        | 0%                    | 14%            | 98%                              | 2%                     | 17%                                          | \$28,676                |
| BG 2, CT 52    | 8%                          | 0%                        | 0%                               | 84%   | 3%                                        | 0%                    | 5%             | 97%                              | 3%                     | 28%                                          | \$21,447                |
| BG 1, CT 53    | 7%                          | 6%                        | 0%                               | 75%   | 2%                                        | 2%                    | 8%             | 96%                              | 4%                     | 23%                                          | \$39,028                |
| BG 2, CT 53    | 2%                          | 3%                        | 0%                               | 88%   | 3%                                        | 0%                    | 4%             | 91%                              | 9%                     | 32%                                          | \$25,125                |
| BG 1, CT 54    | 0%                          | 0%                        | 0%                               | 19%   | 60%                                       | 2%                    | 19%            | 90%                              | 10%                    | 57%                                          | \$23,466                |
| BG 1, CT 55    | 0%                          | 0%                        | 0%                               | 82%   | 5%                                        | 4%                    | 9%             | 96%                              | 4%                     | 3%                                           | \$101,136               |
| BG 2, CT 55    | 2%                          | 0%                        | 0%                               | 75%   | 7%                                        | 0%                    | 16%            | 94%                              | 6%                     | 22%                                          | \$31,455                |
| BG 1, CT 56    | 2%                          | 0%                        | 0%                               | 69%   | 16%                                       | 0%                    | 13%            | 89%                              | 11%                    | 3%                                           | \$78,958                |
| BG 2, CT 56    | 1%                          | 0%                        | 0%                               | 85%   | 7%                                        | 0%                    | 7%             | 99%                              | 1%                     | 1%                                           | \$59,390                |
| BG 3, CT 56    | 1%                          | 0%                        | 0%                               | 89%   | 3%                                        | 0%                    | 7%             | 100%                             | 0%                     | 31%                                          | \$21,082                |
| BG 4, CT 56    | 10%                         | 0%                        | 0%                               | 56%   | 7%                                        | 0%                    | 27%            | 100%                             | 0%                     | 13%                                          | \$75,938                |
| BG 1, CT 57    | 22%                         | 2%                        | 0%                               | 60%   | 6%                                        | 1%                    | 9%             | 96%                              | 4%                     | 37%                                          | \$61,250                |
| BG 2, CT 57    | 9%                          | 2%                        | 0%                               | 55%   | 12%                                       | 0%                    | 21%            | 95%                              | 5%                     | 27%                                          | \$29,318                |
| BG 1, CT 58    | 2%                          | 0%                        | 0%                               | 51%   | 27%                                       | 0%                    | 20%            | 92%                              | 8%                     | 55%                                          | \$19,734                |
| BG 2, CT 58    | 2%                          | 0%                        | 0%                               | 90%   | 1%                                        | 0%                    | 7%             | 100%                             | 0%                     | 11%                                          | \$59,000                |
| BG 1, CT 59    | 12%                         | 5%                        | 2%                               | 34%   | 16%                                       | 0%                    | 32%            | 86%                              | 14%                    | 15%                                          | \$49,821                |
| BG 2, CT 59    | 1%                          | 0%                        | 0%                               | 75%   | 19%                                       | 0%                    | 6%             | 99%                              | 1%                     | 5%                                           | \$60,789                |
| BG 1, CT 60    | 0%                          | 3%                        | 0%                               | 39%   | 36%                                       | 0%                    | 21%            | 99%                              | 1%                     | 2%                                           | \$68,403                |
| BG 2, CT 60    | 6%                          | 0%                        | 0%                               | 84%   | 5%                                        | 0%                    | 4%             | 88%                              | 12%                    | 6%                                           | \$67,024                |
| BG 3, CT 60    | 1%                          | 2%                        | 0%                               | 85%   | 10%                                       | 0%                    | 2%             | 100%                             | 0%                     | 3%                                           | \$125,217               |
| BG 1, CT 61    | 0%                          | 0%                        | 0%                               | 66%   | 18%                                       | 3%                    | 12%            | 91%                              | 9%                     | 25%                                          | \$72,438                |
| BG 2, CT 61    | 4%                          | 0%                        | 0%                               | 84%   | 1%                                        | 0%                    | 11%            | 98%                              | 2%                     | 2%                                           | \$107,813               |
| BG 1, CT 62.01 | 5%                          | 1%                        | 0%                               | 67%   | 10%                                       | 0%                    | 18%            | 96%                              | 4%                     | 6%                                           | \$73,250                |
| BG 2, CT 62.01 | 1%                          | 0%                        | 0%                               | 53%   | 35%                                       | 1%                    | 10%            | 95%                              | 5%                     | 22%                                          | \$49,808                |
| BG 3, CT 62.01 | 0%                          | 0%                        | 0%                               | 77%   | 14%                                       | 0%                    | 9%             | 100%                             | 0%                     | 4%                                           | \$55,395                |
| BG 4, CT 62.01 | 2%                          | 0%                        | 0%                               | 40%   | 30%                                       | 0%                    | 28%            | 97%                              | 3%                     | 38%                                          | \$30,208                |
| BG 1, CT 62.02 | 3%                          | 0%                        | 7%                               | 3%    | 73%                                       | 0%                    | 14%            | 87%                              | 13%                    | 70%                                          | \$25,500                |
| BG 1, CT 63.01 | 10%                         | 0%                        | 0%                               | 72%   | 0%                                        | 0%                    | 18%            | 99%                              | 1%                     | 6%                                           | \$67,875                |
| BG 2, CT 63.01 | 1%                          | 0%                        | 0%                               | 59%   | 26%                                       | 0%                    | 13%            | 92%                              | 8%                     | 10%                                          | \$86,750                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 3, CT 63.01 | 0%                          | 1%                        | 0%                               | 84%   | 9%                                        | 0%                    | 6%             | 100%                             | 0%                     | 2%                                           | \$67,031                |
| BG 1, CT 63.02 | 2%                          | 0%                        | 0%                               | 32%   | 47%                                       | 0%                    | 20%            | 92%                              | 8%                     | 45%                                          | \$36,542                |
| BG 1, CT 64.01 | 1%                          | 0%                        | 0%                               | 87%   | 1%                                        | 1%                    | 10%            | 95%                              | 5%                     | 4%                                           | \$92,472                |
| BG 1, CT 64.02 | 8%                          | 1%                        | 0%                               | 41%   | 20%                                       | 2%                    | 28%            | 84%                              | 16%                    | 18%                                          | \$86,371                |
| BG 2, CT 64.02 | 8%                          | 1%                        | 0%                               | 67%   | 2%                                        | 1%                    | 20%            | 94%                              | 6%                     | 7%                                           | \$89,000                |
| BG 3, CT 64.02 | 4%                          | 0%                        | 0%                               | 77%   | 2%                                        | 0%                    | 17%            | 98%                              | 2%                     | 2%                                           | \$104,231               |
| BG 1, CT 65    | 19%                         | 1%                        | 0%                               | 61%   | 1%                                        | 0%                    | 18%            | 87%                              | 13%                    | 4%                                           | \$93,646                |
| BG 2, CT 65    | 5%                          | 1%                        | 0%                               | 61%   | 14%                                       | 0%                    | 20%            | 99%                              | 1%                     | 2%                                           | \$100,675               |
| BG 1, CT 66    | 35%                         | 17%                       | 1%                               | 34%   | 0%                                        | 2%                    | 10%            | 96%                              | 4%                     | 0%                                           | \$110,000               |
| BG 1, CT 67.01 | 6%                          | 0%                        | 0%                               | 84%   | 0%                                        | 1%                    | 9%             | 99%                              | 1%                     | 3%                                           | \$98,864                |
| BG 2, CT 67.01 | 5%                          | 0%                        | 0%                               | 70%   | 4%                                        | 0%                    | 20%            | 98%                              | 2%                     | 2%                                           | \$93,614                |
| BG 3, CT 67.01 | 23%                         | 7%                        | 0%                               | 42%   | 6%                                        | 2%                    | 20%            | 96%                              | 4%                     | 11%                                          | \$70,294                |
| BG 1, CT 67.02 | 34%                         | 5%                        | 0%                               | 31%   | 13%                                       | 0%                    | 16%            | 92%                              | 8%                     | 6%                                           | \$65,224                |
| BG 1, CT 68.02 | 7%                          | 0%                        | 0%                               | 73%   | 7%                                        | 0%                    | 13%            | 98%                              | 2%                     | 7%                                           | \$111,875               |
| BG 2, CT 68.02 | 3%                          | 10%                       | 0%                               | 65%   | 13%                                       | 0%                    | 8%             | 99%                              | 1%                     | 9%                                           | \$82,734                |
| BG 3, CT 68.02 | 6%                          | 0%                        | 0%                               | 59%   | 15%                                       | 0%                    | 20%            | 91%                              | 9%                     | 4%                                           | \$89,643                |
| BG 1, CT 68.04 | 28%                         | 35%                       | 0%                               | 20%   | 13%                                       | 0%                    | 4%             | 100%                             | 0%                     | 20%                                          | \$91,591                |
| BG 2, CT 68.04 | 44%                         | 33%                       | 0%                               | 3%    | 7%                                        | 2%                    | 12%            | 86%                              | 14%                    | 16%                                          | \$62,000                |
| BG 3, CT 68.04 | 42%                         | 6%                        | 7%                               | 9%    | 9%                                        | 0%                    | 27%            | 65%                              | 35%                    | 3%                                           | \$76,250                |
| BG 1, CT 68.05 | 0%                          | 0%                        | 0%                               | 100%  | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 0%                                           | \$64,333                |
| BG 2, CT 68.05 | 11%                         | 4%                        | 0%                               | 70%   | 6%                                        | 0%                    | 9%             | 98%                              | 2%                     | 7%                                           | \$75,653                |
| BG 3, CT 68.05 | 15%                         | 4%                        | 0%                               | 58%   | 7%                                        | 0%                    | 16%            | 91%                              | 9%                     | 6%                                           | \$72,377                |
| BG 1, CT 68.06 | 2%                          | 0%                        | 0%                               | 85%   | 0%                                        | 0%                    | 13%            | 99%                              | 1%                     | 3%                                           | \$90,729                |
| BG 1, CT 68.08 | 11%                         | 8%                        | 0%                               | 59%   | 8%                                        | 2%                    | 13%            | 98%                              | 2%                     | 4%                                           | \$77,895                |
| BG 2, CT 68.08 | 4%                          | 3%                        | 0%                               | 58%   | 8%                                        | 1%                    | 25%            | 94%                              | 6%                     | 14%                                          | \$43,859                |
| BG 3, CT 68.08 | 10%                         | 5%                        | 0%                               | 75%   | 4%                                        | 0%                    | 7%             | 100%                             | 0%                     | 2%                                           | \$58,967                |
| BG 1, CT 68.09 | 6%                          | 0%                        | 0%                               | 45%   | 17%                                       | 1%                    | 31%            | 82%                              | 18%                    | 31%                                          | \$53,839                |
| BG 2, CT 68.09 | 7%                          | 0%                        | 0%                               | 53%   | 18%                                       | 0%                    | 21%            | 96%                              | 4%                     | 11%                                          | \$54,682                |
| BG 1, CT 69    | 66%                         | 6%                        | 0%                               | 4%    | 0%                                        | 3%                    | 22%            | 83%                              | 17%                    | 7%                                           | \$69,939                |
| BG 2, CT 69    | 62%                         | 11%                       | 0%                               | 3%    | 7%                                        | 4%                    | 13%            | 82%                              | 18%                    | 21%                                          | \$55,250                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 70    | 58%                         | 10%                       | 0%                               | 10%   | 4%                                        | 3%                    | 15%            | 83%                              | 17%                    | 6%                                           | \$71,053                |
| BG 2, CT 70    | 59%                         | 7%                        | 0%                               | 2%    | 0%                                        | 6%                    | 26%            | 83%                              | 17%                    | 15%                                          | \$49,583                |
| BG 3, CT 70    | 59%                         | 14%                       | 0%                               | 8%    | 0%                                        | 9%                    | 9%             | 81%                              | 19%                    | 4%                                           | \$49,583                |
| BG 1, CT 71    | 69%                         | 16%                       | 0%                               | 3%    | 2%                                        | 1%                    | 10%            | 85%                              | 15%                    | 5%                                           | \$77,391                |
| BG 1, CT 73.02 | 79%                         | 3%                        | 0%                               | 7%    | 1%                                        | 1%                    | 9%             | 86%                              | 14%                    | 7%                                           | \$74,716                |
| BG 2, CT 73.02 | 76%                         | 9%                        | 1%                               | 4%    | 3%                                        | 2%                    | 6%             | 91%                              | 9%                     | 10%                                          | \$78,235                |
| BG 1, CT 73.03 | 64%                         | 20%                       | 2%                               | 1%    | 0%                                        | 6%                    | 7%             | 84%                              | 16%                    | 0%                                           | ND                      |
| BG 1, CT 74    | 74%                         | 8%                        | 0%                               | 7%    | 0%                                        | 2%                    | 8%             | 87%                              | 13%                    | 7%                                           | \$67,135                |
| BG 1, CT 75.02 | 29%                         | 5%                        | 1%                               | 20%   | 11%                                       | 1%                    | 34%            | 80%                              | 20%                    | 4%                                           | \$67,000                |
| BG 1, CT 75.03 | 4%                          | 0%                        | 0%                               | 65%   | 4%                                        | 0%                    | 26%            | 85%                              | 15%                    | 11%                                          | \$80,583                |
| BG 2, CT 75.03 | 17%                         | 2%                        | 0%                               | 57%   | 6%                                        | 0%                    | 18%            | 98%                              | 2%                     | 2%                                           | \$93,375                |
| BG 1, CT 75.04 | 5%                          | 0%                        | 0%                               | 66%   | 8%                                        | 0%                    | 21%            | 96%                              | 4%                     | 1%                                           | \$73,047                |
| BG 2, CT 75.04 | 3%                          | 0%                        | 0%                               | 23%   | 34%                                       | 0%                    | 40%            | 89%                              | 11%                    | 38%                                          | \$26,979                |
| BG 1, CT 75.05 | 16%                         | 0%                        | 0%                               | 56%   | 3%                                        | 0%                    | 25%            | 96%                              | 4%                     | 5%                                           | \$103,984               |
| BG 2, CT 75.05 | 14%                         | 0%                        | 0%                               | 57%   | 3%                                        | 1%                    | 25%            | 90%                              | 10%                    | 7%                                           | \$104,702               |
| BG 3, CT 75.05 | 20%                         | 1%                        | 0%                               | 60%   | 1%                                        | 3%                    | 15%            | 87%                              | 13%                    | 6%                                           | \$67,768                |
| BG 1, CT 75.06 | 58%                         | 11%                       | 0%                               | 3%    | 0%                                        | 0%                    | 28%            | 80%                              | 20%                    | 0%                                           | \$70,972                |
| BG 1, CT 77.01 | 2%                          | 0%                        | 0%                               | 85%   | 0%                                        | 0%                    | 13%            | 98%                              | 2%                     | 7%                                           | \$71,700                |
| BG 2, CT 77.01 | 7%                          | 0%                        | 0%                               | 71%   | 2%                                        | 0%                    | 21%            | 91%                              | 9%                     | 11%                                          | \$72,250                |
| BG 3, CT 77.01 | 73%                         | 0%                        | 0%                               | 17%   | 0%                                        | 1%                    | 8%             | 94%                              | 6%                     | 7%                                           | \$128,409               |
| BG 1, CT 77.02 | 7%                          | 0%                        | 0%                               | 39%   | 9%                                        | 0%                    | 45%            | 85%                              | 15%                    | 17%                                          | \$43,500                |
| BG 2, CT 77.02 | 20%                         | 0%                        | 0%                               | 47%   | 15%                                       | 0%                    | 18%            | 97%                              | 3%                     | 1%                                           | \$100,938               |
| BG 3, CT 77.02 | 10%                         | 0%                        | 0%                               | 57%   | 2%                                        | 0%                    | 31%            | 99%                              | 1%                     | 3%                                           | \$88,450                |
| BG 1, CT 78.04 | 8%                          | 0%                        | 1%                               | 64%   | 2%                                        | 0%                    | 25%            | 91%                              | 9%                     | 1%                                           | \$85,903                |
| BG 1, CT 78.05 | 8%                          | 0%                        | 0%                               | 51%   | 6%                                        | 4%                    | 30%            | 89%                              | 11%                    | 4%                                           | \$75,000                |
| BG 2, CT 78.05 | 10%                         | 3%                        | 0%                               | 48%   | 4%                                        | 2%                    | 34%            | 86%                              | 14%                    | 5%                                           | \$91,250                |
| BG 1, CT 78.07 | 2%                          | 0%                        | 0%                               | 67%   | 12%                                       | 0%                    | 19%            | 100%                             | 0%                     | 0%                                           | \$85,375                |
| BG 2, CT 78.07 | 25%                         | 2%                        | 0%                               | 42%   | 0%                                        | 0%                    | 30%            | 79%                              | 21%                    | 0%                                           | \$59,386                |
| BG 3, CT 78.07 | 14%                         | 3%                        | 0%                               | 43%   | 17%                                       | 0%                    | 23%            | 93%                              | 7%                     | 23%                                          | \$55,513                |
| BG 4, CT 78.07 | 26%                         | 1%                        | 0%                               | 36%   | 2%                                        | 1%                    | 33%            | 88%                              | 12%                    | 5%                                           | \$56,786                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 5, CT 78.07 | 29%                         | 0%                        | 3%                               | 20%   | 4%                                        | 1%                    | 42%            | 57%                              | 43%                    | 7%                                           | \$62,029                |
| BG 6, CT 78.07 | 12%                         | 7%                        | 0%                               | 58%   | 2%                                        | 7%                    | 14%            | 84%                              | 16%                    | 1%                                           | \$71,607                |
| BG 1, CT 78.08 | 11%                         | 2%                        | 0%                               | 72%   | 3%                                        | 2%                    | 10%            | 89%                              | 11%                    | 6%                                           | \$64,219                |
| BG 2, CT 78.08 | 10%                         | 0%                        | 0%                               | 53%   | 3%                                        | 2%                    | 32%            | 79%                              | 21%                    | 4%                                           | \$58,859                |
| BG 1, CT 78.09 | 6%                          | 0%                        | 0%                               | 79%   | 2%                                        | 0%                    | 13%            | 99%                              | 1%                     | 2%                                           | \$117,284               |
| BG 2, CT 78.09 | 9%                          | 0%                        | 0%                               | 62%   | 7%                                        | 2%                    | 20%            | 87%                              | 13%                    | 5%                                           | \$112,745               |
| BG 1, CT 78.10 | 7%                          | 0%                        | 0%                               | 74%   | 3%                                        | 0%                    | 16%            | 95%                              | 5%                     | 3%                                           | \$109,405               |
| BG 2, CT 78.10 | 6%                          | 0%                        | 0%                               | 70%   | 1%                                        | 0%                    | 23%            | 94%                              | 6%                     | 0%                                           | \$142,361               |
| BG 3, CT 78.10 | 24%                         | 1%                        | 0%                               | 58%   | 1%                                        | 1%                    | 16%            | 99%                              | 1%                     | 1%                                           | \$124,145               |
| BG 1, CT 78.11 | 8%                          | 0%                        | 0%                               | 75%   | 3%                                        | 0%                    | 14%            | 97%                              | 3%                     | 4%                                           | \$100,795               |
| BG 2, CT 78.11 | 27%                         | 2%                        | 0%                               | 36%   | 6%                                        | 0%                    | 29%            | 91%                              | 9%                     | 4%                                           | \$89,423                |
| BG 1, CT 80.01 | 5%                          | 1%                        | 0%                               | 65%   | 4%                                        | 0%                    | 23%            | 86%                              | 14%                    | 15%                                          | \$34,250                |
| BG 2, CT 80.01 | 2%                          | 0%                        | 0%                               | 35%   | 16%                                       | 0%                    | 47%            | 68%                              | 32%                    | 21%                                          | \$55,341                |
| BG 1, CT 80.02 | 7%                          | 0%                        | 0%                               | 67%   | 2%                                        | 0%                    | 25%            | 97%                              | 3%                     | 4%                                           | \$81,964                |
| BG 2, CT 80.02 | 2%                          | 1%                        | 0%                               | 73%   | 5%                                        | 0%                    | 19%            | 96%                              | 4%                     | 13%                                          | \$79,074                |
| BG 1, CT 80.03 | 34%                         | 5%                        | 0%                               | 24%   | 8%                                        | 3%                    | 27%            | 91%                              | 9%                     | 6%                                           | \$64,483                |
| BG 2, CT 80.03 | 15%                         | 1%                        | 0%                               | 28%   | 12%                                       | 0%                    | 44%            | 86%                              | 14%                    | 12%                                          | \$49,451                |
| BG 1, CT 80.05 | 14%                         | 0%                        | 0%                               | 41%   | 5%                                        | 1%                    | 38%            | 94%                              | 6%                     | 3%                                           | \$108,639               |
| BG 2, CT 80.05 | 13%                         | 0%                        | 0%                               | 54%   | 5%                                        | 1%                    | 26%            | 78%                              | 22%                    | 4%                                           | \$84,911                |
| BG 3, CT 80.05 | 10%                         | 0%                        | 0%                               | 62%   | 0%                                        | 0%                    | 28%            | 100%                             | 0%                     | 14%                                          | \$61,250                |
| BG 1, CT 80.06 | 7%                          | 1%                        | 0%                               | 54%   | 13%                                       | 0%                    | 26%            | 89%                              | 11%                    | 1%                                           | \$87,569                |
| BG 2, CT 80.06 | 3%                          | 0%                        | 1%                               | 69%   | 1%                                        | 1%                    | 25%            | 92%                              | 8%                     | 5%                                           | \$90,000                |
| BG 1, CT 80.07 | 8%                          | 0%                        | 0%                               | 74%   | 3%                                        | 0%                    | 16%            | 97%                              | 3%                     | 5%                                           | \$110,699               |
| BG 2, CT 80.07 | 4%                          | 1%                        | 0%                               | 62%   | 1%                                        | 0%                    | 32%            | 92%                              | 8%                     | 4%                                           | \$92,348                |
| BG 1, CT 83.01 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 2, CT 83.01 | 22%                         | 19%                       | 2%                               | 17%   | 6%                                        | 0%                    | 32%            | 95%                              | 5%                     | 15%                                          | \$81,023                |
| BG 3, CT 83.01 | 44%                         | 5%                        | 1%                               | 7%    | 15%                                       | 1%                    | 27%            | 83%                              | 17%                    | 9%                                           | \$74,154                |
| BG 1, CT 83.02 | 5%                          | 0%                        | 0%                               | 61%   | 4%                                        | 0%                    | 30%            | 98%                              | 2%                     | 4%                                           | \$90,929                |
| BG 2, CT 83.02 | 8%                          | 0%                        | 0%                               | 61%   | 11%                                       | 0%                    | 19%            | 96%                              | 4%                     | 15%                                          | \$112,868               |
| BG 3, CT 83.02 | 15%                         | 1%                        | 0%                               | 52%   | 3%                                        | 0%                    | 29%            | 82%                              | 18%                    | 16%                                          | \$68,021                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 84.02 | 16%                         | 0%                        | 0%                               | 48%   | 5%                                        | 1%                    | 31%            | 92%                              | 8%                     | 20%                                          | \$43,611                |
| BG 2, CT 84.02 | 7%                          | 1%                        | 0%                               | 38%   | 21%                                       | 0%                    | 32%            | 84%                              | 16%                    | 9%                                           | \$73,107                |
| BG 3, CT 84.02 | 6%                          | 1%                        | 0%                               | 62%   | 13%                                       | 1%                    | 18%            | 93%                              | 7%                     | 24%                                          | \$91,111                |
| BG 1, CT 84.05 | 26%                         | 1%                        | 0%                               | 52%   | 2%                                        | 1%                    | 19%            | 94%                              | 6%                     | 2%                                           | \$90,577                |
| BG 1, CT 84.06 | 15%                         | 11%                       | 0%                               | 39%   | 9%                                        | 1%                    | 24%            | 91%                              | 9%                     | 4%                                           | \$99,429                |
| BG 1, CT 84.07 | 26%                         | 21%                       | 0%                               | 29%   | 6%                                        | 1%                    | 18%            | 93%                              | 7%                     | 5%                                           | \$105,438               |
| BG 1, CT 84.08 | 43%                         | 7%                        | 0%                               | 22%   | 4%                                        | 1%                    | 22%            | 92%                              | 8%                     | 3%                                           | \$102,347               |
| BG 2, CT 84.08 | 46%                         | 0%                        | 0%                               | 29%   | 0%                                        | 0%                    | 25%            | 78%                              | 22%                    | 0%                                           | \$140,962               |
| BG 1, CT 84.10 | 17%                         | 5%                        | 0%                               | 34%   | 8%                                        | 2%                    | 33%            | 94%                              | 6%                     | 3%                                           | \$105,508               |
| BG 1, CT 84.11 | 11%                         | 0%                        | 0%                               | 48%   | 22%                                       | 1%                    | 19%            | 93%                              | 7%                     | 0%                                           | \$107,440               |
| BG 2, CT 84.11 | 22%                         | 1%                        | 0%                               | 42%   | 5%                                        | 0%                    | 30%            | 86%                              | 14%                    | 7%                                           | \$72,188                |
| BG 1, CT 84.12 | 23%                         | 1%                        | 0%                               | 34%   | 12%                                       | 2%                    | 29%            | 82%                              | 18%                    | 5%                                           | \$61,293                |
| BG 2, CT 84.12 | 16%                         | 1%                        | 0%                               | 51%   | 1%                                        | 2%                    | 28%            | 93%                              | 7%                     | 1%                                           | \$75,479                |
| BG 1, CT 85.02 | 41%                         | 6%                        | 0%                               | 5%    | 12%                                       | 6%                    | 30%            | 85%                              | 15%                    | 23%                                          | \$68,208                |
| BG 1, CT 86.06 | 14%                         | 4%                        | 0%                               | 55%   | 4%                                        | 0%                    | 22%            | 96%                              | 4%                     | 1%                                           | \$109,229               |
| BG 2, CT 86.06 | 16%                         | 0%                        | 0%                               | 49%   | 7%                                        | 0%                    | 29%            | 91%                              | 9%                     | 2%                                           | \$99,744                |
| BG 3, CT 86.06 | 1%                          | 0%                        | 0%                               | 15%   | 34%                                       | 0%                    | 50%            | 97%                              | 3%                     | 0%                                           | \$98,750                |
| BG 4, CT 86.06 | 8%                          | 15%                       | 0%                               | 53%   | 1%                                        | 0%                    | 22%            | 82%                              | 18%                    | 7%                                           | \$68,583                |
| BG 1, CT 86.09 | 23%                         | 2%                        | 0%                               | 32%   | 12%                                       | 2%                    | 28%            | 86%                              | 14%                    | 5%                                           | \$115,813               |
| BG 2, CT 86.09 | 65%                         | 0%                        | 0%                               | 13%   | 3%                                        | 0%                    | 19%            | 95%                              | 5%                     | 7%                                           | \$90,107                |
| BG 1, CT 86.10 | 81%                         | 2%                        | 0%                               | 10%   | 0%                                        | 0%                    | 7%             | 96%                              | 4%                     | 4%                                           | \$128,167               |
| BG 1, CT 86.11 | 28%                         | 0%                        | 0%                               | 19%   | 29%                                       | 0%                    | 24%            | 82%                              | 18%                    | 29%                                          | \$100,938               |
| BG 1, CT 86.12 | 31%                         | 9%                        | 1%                               | 28%   | 5%                                        | 1%                    | 25%            | 84%                              | 16%                    | 3%                                           | \$92,621                |
| BG 1, CT 86.13 | 11%                         | 2%                        | 0%                               | 51%   | 9%                                        | 0%                    | 27%            | 83%                              | 17%                    | 12%                                          | \$87,664                |
| BG 1, CT 86.14 | 11%                         | 0%                        | 0%                               | 33%   | 0%                                        | 0%                    | 56%            | 84%                              | 16%                    | 0%                                           | \$99,911                |
| BG 2, CT 86.14 | 0%                          | 0%                        | 0%                               | 62%   | 7%                                        | 0%                    | 31%            | 74%                              | 26%                    | 6%                                           | \$48,346                |
| BG 3, CT 86.14 | 27%                         | 2%                        | 0%                               | 47%   | 0%                                        | 0%                    | 24%            | 97%                              | 3%                     | 2%                                           | \$149,432               |
| BG 4, CT 86.14 | 35%                         | 3%                        | 0%                               | 39%   | 2%                                        | 0%                    | 22%            | 100%                             | 0%                     | 0%                                           | \$66,884                |
| BG 5, CT 86.14 | 18%                         | 1%                        | 3%                               | 11%   | 26%                                       | 0%                    | 42%            | 78%                              | 22%                    | 3%                                           | \$72,054                |
| BG 6, CT 86.14 | 10%                         | 16%                       | 0%                               | 20%   | 18%                                       | 0%                    | 36%            | 87%                              | 13%                    | 3%                                           | \$95,446                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 7, CT 86.14 | 29%                         | 0%                        | 0%                               | 24%   | 0%                                        | 0%                    | 47%            | 73%                              | 27%                    | 2%                                           | \$152,267               |
| BG 8, CT 86.14 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 9, CT 86.14 | 3%                          | 0%                        | 0%                               | 43%   | 0%                                        | 1%                    | 53%            | 95%                              | 5%                     | 13%                                          | \$82,071                |
| BG 1, CT 86.17 | 1%                          | 1%                        | 0%                               | 42%   | 17%                                       | 0%                    | 38%            | 83%                              | 17%                    | 13%                                          | \$86,964                |
| BG 2, CT 86.17 | 4%                          | 1%                        | 0%                               | 44%   | 12%                                       | 0%                    | 39%            | 80%                              | 20%                    | 9%                                           | \$79,900                |
| BG 3, CT 86.17 | 15%                         | 3%                        | 0%                               | 54%   | 4%                                        | 5%                    | 19%            | 87%                              | 13%                    | 5%                                           | \$94,000                |
| BG 4, CT 86.17 | 2%                          | 0%                        | 0%                               | 59%   | 15%                                       | 1%                    | 24%            | 91%                              | 9%                     | 5%                                           | \$83,167                |
| BG 5, CT 86.17 | 8%                          | 0%                        | 0%                               | 24%   | 54%                                       | 0%                    | 13%            | 100%                             | 0%                     | 9%                                           | \$28,167                |
| BG 1, CT 86.22 | 37%                         | 0%                        | 0%                               | 26%   | 9%                                        | 0%                    | 28%            | 90%                              | 10%                    | 1%                                           | \$105,469               |
| BG 2, CT 86.22 | 19%                         | 0%                        | 0%                               | 40%   | 7%                                        | 0%                    | 34%            | 93%                              | 7%                     | 2%                                           | \$98,148                |
| BG 3, CT 86.22 | 7%                          | 0%                        | 0%                               | 28%   | 42%                                       | 0%                    | 23%            | 90%                              | 10%                    | 6%                                           | \$106,905               |
| BG 1, CT 87.01 | 2%                          | 0%                        | 0%                               | 70%   | 0%                                        | 0%                    | 27%            | 96%                              | 4%                     | 7%                                           | \$94,265                |
| BG 2, CT 87.01 | 29%                         | 0%                        | 0%                               | 26%   | 2%                                        | 4%                    | 39%            | 74%                              | 26%                    | 0%                                           | \$78,860                |
| BG 3, CT 87.01 | 4%                          | 0%                        | 0%                               | 76%   | 0%                                        | 1%                    | 20%            | 97%                              | 3%                     | 5%                                           | \$79,704                |
| BG 4, CT 87.01 | 3%                          | 2%                        | 0%                               | 84%   | 4%                                        | 0%                    | 7%             | 98%                              | 2%                     | 7%                                           | \$80,764                |
| BG 1, CT 87.02 | 3%                          | 0%                        | 0%                               | 76%   | 4%                                        | 1%                    | 17%            | 87%                              | 13%                    | 12%                                          | \$38,886                |
| BG 2, CT 87.02 | 4%                          | 0%                        | 0%                               | 68%   | 15%                                       | 4%                    | 9%             | 92%                              | 8%                     | 10%                                          | \$42,083                |
| BG 1, CT 87.03 | 16%                         | 0%                        | 0%                               | 51%   | 2%                                        | 0%                    | 30%            | 84%                              | 16%                    | 10%                                          | \$83,971                |
| BG 2, CT 87.03 | 6%                          | 0%                        | 0%                               | 7%    | 55%                                       | 3%                    | 29%            | 80%                              | 20%                    | 44%                                          | \$22,589                |
| BG 3, CT 87.03 | 3%                          | 0%                        | 0%                               | 17%   | 48%                                       | 0%                    | 31%            | 88%                              | 12%                    | 46%                                          | \$32,055                |
| BG 4, CT 87.03 | 9%                          | 0%                        | 0%                               | 33%   | 52%                                       | 2%                    | 5%             | 95%                              | 5%                     | 35%                                          | \$41,420                |
| BG 1, CT 88    | 1%                          | 0%                        | 0%                               | 83%   | 0%                                        | 0%                    | 16%            | 100%                             | 0%                     | 5%                                           | \$118,906               |
| BG 2, CT 88    | 10%                         | 1%                        | 0%                               | 79%   | 2%                                        | 1%                    | 7%             | 97%                              | 3%                     | 14%                                          | \$56,970                |
| BG 3, CT 88    | 13%                         | 0%                        | 0%                               | 61%   | 12%                                       | 0%                    | 13%            | 93%                              | 7%                     | 10%                                          | \$123,614               |
| BG 4, CT 88    | 5%                          | 0%                        | 0%                               | 89%   | 2%                                        | 1%                    | 3%             | 99%                              | 1%                     | 12%                                          | \$104,539               |
| BG 1, CT 89.06 | 31%                         | 1%                        | 1%                               | 26%   | 2%                                        | 0%                    | 40%            | 84%                              | 16%                    | 2%                                           | \$70,408                |
| BG 2, CT 89.06 | 10%                         | 0%                        | 0%                               | 48%   | 8%                                        | 0%                    | 34%            | 97%                              | 3%                     | 0%                                           | \$109,662               |
| BG 3, CT 89.06 | 16%                         | 7%                        | 0%                               | 24%   | 6%                                        | 2%                    | 45%            | 89%                              | 11%                    | 6%                                           | \$82,500                |
| BG 1, CT 89.07 | 17%                         | 4%                        | 1%                               | 28%   | 2%                                        | 1%                    | 48%            | 91%                              | 9%                     | 21%                                          | \$100,694               |
| BG 2, CT 89.07 | 18%                         | 9%                        | 0%                               | 34%   | 5%                                        | 0%                    | 33%            | 94%                              | 6%                     | 1%                                           | \$104,306               |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 3, CT 89.07 | 19%                         | 0%                        | 0%                               | 22%   | 21%                                       | 0%                    | 38%            | 95%                              | 5%                     | 0%                                           | \$49,297                |
| BG 4, CT 89.07 | 27%                         | 0%                        | 0%                               | 50%   | 2%                                        | 0%                    | 22%            | 100%                             | 0%                     | 0%                                           | \$99,773                |
| BG 1, CT 89.08 | 20%                         | 0%                        | 0%                               | 52%   | 0%                                        | 0%                    | 27%            | 86%                              | 14%                    | 2%                                           | \$115,278               |
| BG 2, CT 89.08 | 24%                         | 0%                        | 0%                               | 48%   | 4%                                        | 0%                    | 23%            | 94%                              | 6%                     | 5%                                           | \$111,071               |
| BG 3, CT 89.08 | 25%                         | 2%                        | 0%                               | 49%   | 1%                                        | 2%                    | 22%            | 88%                              | 12%                    | 1%                                           | \$99,609                |
| BG 1, CT 89.09 | 15%                         | 1%                        | 0%                               | 43%   | 4%                                        | 1%                    | 36%            | 81%                              | 19%                    | 2%                                           | \$71,885                |
| BG 2, CT 89.09 | 8%                          | 1%                        | 0%                               | 53%   | 4%                                        | 0%                    | 34%            | 85%                              | 15%                    | 0%                                           | \$95,288                |
| BG 1, CT 89.12 | 5%                          | 1%                        | 0%                               | 81%   | 3%                                        | 1%                    | 9%             | 97%                              | 3%                     | 7%                                           | \$101,371               |
| BG 1, CT 89.13 | 4%                          | 0%                        | 0%                               | 64%   | 10%                                       | 0%                    | 22%            | 87%                              | 13%                    | 12%                                          | \$69,632                |
| BG 2, CT 89.13 | 2%                          | 0%                        | 0%                               | 78%   | 6%                                        | 0%                    | 14%            | 92%                              | 8%                     | 3%                                           | \$59,375                |
| BG 1, CT 89.14 | 6%                          | 3%                        | 0%                               | 51%   | 28%                                       | 0%                    | 12%            | 88%                              | 12%                    | 14%                                          | \$71,905                |
| BG 2, CT 89.14 | 2%                          | 0%                        | 0%                               | 73%   | 9%                                        | 0%                    | 16%            | 96%                              | 4%                     | 12%                                          | \$68,611                |
| BG 1, CT 89.15 | 8%                          | 1%                        | 0%                               | 41%   | 9%                                        | 0%                    | 42%            | 91%                              | 9%                     | 16%                                          | \$77,716                |
| BG 2, CT 89.15 | 27%                         | 3%                        | 1%                               | 34%   | 10%                                       | 2%                    | 22%            | 92%                              | 8%                     | 12%                                          | \$56,401                |
| BG 1, CT 89.17 | 13%                         | 1%                        | 0%                               | 52%   | 8%                                        | 0%                    | 25%            | 95%                              | 5%                     | 0%                                           | \$111,645               |
| BG 2, CT 89.17 | 14%                         | 1%                        | 0%                               | 43%   | 7%                                        | 1%                    | 35%            | 93%                              | 7%                     | 0%                                           | \$90,673                |
| BG 1, CT 89.18 | 28%                         | 9%                        | 0%                               | 29%   | 10%                                       | 4%                    | 21%            | 87%                              | 13%                    | 7%                                           | \$77,368                |
| BG 2, CT 89.18 | 13%                         | 0%                        | 0%                               | 61%   | 3%                                        | 1%                    | 22%            | 97%                              | 3%                     | 0%                                           | \$136,875               |
| BG 3, CT 89.18 | 17%                         | 0%                        | 0%                               | 43%   | 0%                                        | 0%                    | 40%            | 99%                              | 1%                     | 0%                                           | \$87,326                |
| BG 4, CT 89.18 | 12%                         | 0%                        | 0%                               | 64%   | 2%                                        | 2%                    | 21%            | 97%                              | 3%                     | 2%                                           | \$115,125               |
| BG 1, CT 89.20 | 8%                          | 0%                        | 0%                               | 51%   | 18%                                       | 2%                    | 20%            | 80%                              | 20%                    | 4%                                           | \$81,361                |
| BG 2, CT 89.20 | 7%                          | 4%                        | 0%                               | 65%   | 4%                                        | 0%                    | 21%            | 92%                              | 8%                     | 0%                                           | \$87,935                |
| BG 3, CT 89.20 | 37%                         | 2%                        | 0%                               | 38%   | 2%                                        | 0%                    | 21%            | 86%                              | 14%                    | 1%                                           | \$54,556                |
| BG 4, CT 89.20 | 31%                         | 3%                        | 0%                               | 59%   | 1%                                        | 0%                    | 6%             | 99%                              | 1%                     | 6%                                           | \$82,434                |
| BG 1, CT 89.21 | 7%                          | 1%                        | 0%                               | 47%   | 8%                                        | 1%                    | 37%            | 80%                              | 20%                    | 5%                                           | \$87,500                |
| BG 1, CT 89.22 | 15%                         | 3%                        | 1%                               | 55%   | 3%                                        | 3%                    | 20%            | 92%                              | 8%                     | 2%                                           | \$113,523               |
| BG 2, CT 89.22 | 21%                         | 7%                        | 0%                               | 61%   | 5%                                        | 0%                    | 6%             | 97%                              | 3%                     | 0%                                           | \$89,286                |
| BG 3, CT 89.22 | 13%                         | 4%                        | 0%                               | 54%   | 1%                                        | 0%                    | 28%            | 91%                              | 9%                     | 0%                                           | \$94,533                |
| BG 4, CT 89.22 | 5%                          | 2%                        | 0%                               | 56%   | 2%                                        | 1%                    | 34%            | 96%                              | 4%                     | 1%                                           | \$92,500                |
| BG 1, CT 89.23 | 12%                         | 4%                        | 0%                               | 51%   | 4%                                        | 1%                    | 27%            | 87%                              | 13%                    | 2%                                           | \$63,031                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 89.23 | 13%                         | 0%                        | 0%                               | 55%   | 4%                                        | 9%                    | 19%            | 90%                              | 10%                    | 4%                                           | \$69,583                |
| BG 3, CT 89.23 | 11%                         | 0%                        | 0%                               | 71%   | 0%                                        | 0%                    | 17%            | 98%                              | 2%                     | 2%                                           | \$81,750                |
| BG 1, CT 89.24 | 12%                         | 2%                        | 0%                               | 59%   | 2%                                        | 0%                    | 26%            | 96%                              | 4%                     | 1%                                           | \$116,731               |
| BG 2, CT 89.24 | 19%                         | 2%                        | 0%                               | 50%   | 13%                                       | 0%                    | 17%            | 96%                              | 4%                     | 3%                                           | \$113,493               |
| BG 3, CT 89.24 | 8%                          | 0%                        | 0%                               | 67%   | 2%                                        | 0%                    | 23%            | 91%                              | 9%                     | 7%                                           | \$109,375               |
| BG 1, CT 89.25 | 27%                         | 7%                        | 1%                               | 48%   | 1%                                        | 4%                    | 13%            | 93%                              | 7%                     | 1%                                           | \$86,285                |
| BG 2, CT 89.25 | 2%                          | 0%                        | 0%                               | 53%   | 16%                                       | 0%                    | 30%            | 83%                              | 17%                    | 12%                                          | \$107,852               |
| BG 3, CT 89.25 | 6%                          | 0%                        | 0%                               | 52%   | 29%                                       | 0%                    | 14%            | 97%                              | 3%                     | 5%                                           | \$97,188                |
| BG 1, CT 89.26 | 41%                         | 5%                        | 0%                               | 36%   | 3%                                        | 0%                    | 15%            | 97%                              | 3%                     | 2%                                           | \$88,677                |
| BG 1, CT 89.27 | 13%                         | 1%                        | 0%                               | 53%   | 5%                                        | 2%                    | 27%            | 96%                              | 4%                     | 1%                                           | \$99,535                |
| BG 1, CT 89.28 | 14%                         | 2%                        | 0%                               | 59%   | 2%                                        | 1%                    | 22%            | 87%                              | 13%                    | 0%                                           | \$112,295               |
| BG 1, CT 89.29 | 21%                         | 4%                        | 0%                               | 41%   | 9%                                        | 0%                    | 24%            | 79%                              | 21%                    | 8%                                           | \$64,750                |
| BG 2, CT 89.29 | 14%                         | 0%                        | 0%                               | 45%   | 10%                                       | 1%                    | 30%            | 96%                              | 4%                     | 0%                                           | \$98,179                |
| BG 1, CT 89.30 | 18%                         | 0%                        | 0%                               | 59%   | 0%                                        | 0%                    | 23%            | 96%                              | 4%                     | 0%                                           | \$140,848               |
| BG 1, CT 89.31 | 15%                         | 2%                        | 0%                               | 49%   | 1%                                        | 0%                    | 32%            | 94%                              | 6%                     | 0%                                           | \$125,536               |
| BG 2, CT 89.31 | 5%                          | 0%                        | 4%                               | 11%   | 28%                                       | 0%                    | 53%            | 77%                              | 23%                    | 67%                                          | ND                      |
| BG 1, CT 90    | 68%                         | 9%                        | 2%                               | 5%    | 3%                                        | 1%                    | 12%            | 84%                              | 16%                    | 12%                                          | \$53,606                |
| BG 1, CT 91    | 4%                          | 2%                        | 1%                               | 67%   | 4%                                        | 0%                    | 21%            | 95%                              | 5%                     | 11%                                          | \$70,046                |
| BG 2, CT 91    | 19%                         | 1%                        | 1%                               | 53%   | 8%                                        | 1%                    | 17%            | 92%                              | 8%                     | 2%                                           | \$80,250                |
| BG 1, CT 92    | 9%                          | 0%                        | 0%                               | 43%   | 5%                                        | 4%                    | 39%            | 74%                              | 26%                    | 7%                                           | \$70,273                |
| BG 2, CT 92    | 14%                         | 0%                        | 3%                               | 42%   | 9%                                        | 1%                    | 32%            | 93%                              | 7%                     | 8%                                           | \$62,448                |
| BG 3, CT 92    | 7%                          | 0%                        | 0%                               | 59%   | 21%                                       | 2%                    | 10%            | 94%                              | 6%                     | 3%                                           | \$58,354                |
| BG 1, CT 93    | 9%                          | 7%                        | 0%                               | 60%   | 4%                                        | 2%                    | 17%            | 96%                              | 4%                     | 8%                                           | \$75,901                |
| BG 2, CT 93    | 8%                          | 11%                       | 0%                               | 43%   | 1%                                        | 0%                    | 37%            | 75%                              | 25%                    | 14%                                          | \$45,000                |
| BG 3, CT 93    | 19%                         | 0%                        | 0%                               | 39%   | 7%                                        | 0%                    | 36%            | 79%                              | 21%                    | 13%                                          | \$109,821               |
| BG 4, CT 93    | 13%                         | 0%                        | 0%                               | 28%   | 19%                                       | 1%                    | 39%            | 79%                              | 21%                    | 28%                                          | \$28,024                |
| BG 1, CT 94    | 6%                          | 0%                        | 1%                               | 34%   | 21%                                       | 0%                    | 38%            | 90%                              | 10%                    | 35%                                          | \$34,905                |
| BG 2, CT 94    | 18%                         | 6%                        | 1%                               | 44%   | 9%                                        | 0%                    | 23%            | 82%                              | 18%                    | 4%                                           | \$69,375                |
| BG 3, CT 94    | 5%                          | 0%                        | 0%                               | 74%   | 4%                                        | 1%                    | 15%            | 99%                              | 1%                     | 17%                                          | \$49,844                |
| BG 4, CT 94    | 32%                         | 6%                        | 1%                               | 7%    | 26%                                       | 1%                    | 26%            | 88%                              | 12%                    | 29%                                          | \$31,417                |



| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 95.01 | 48%                         | 35%                       | 0%                               | 1%    | 4%                                        | 3%                    | 8%             | 75%                              | 25%                    | 18%                                          | \$41,862                |
| BG 2, CT 95.01 | 61%                         | 16%                       | 0%                               | 5%    | 5%                                        | 5%                    | 7%             | 68%                              | 32%                    | 12%                                          | \$46,330                |
| BG 1, CT 95.02 | 65%                         | 17%                       | 0%                               | 2%    | 1%                                        | 11%                   | 4%             | 80%                              | 20%                    | 25%                                          | \$36,818                |
| BG 2, CT 95.02 | 59%                         | 12%                       | 0%                               | 7%    | 0%                                        | 8%                    | 14%            | 77%                              | 23%                    | 13%                                          | \$61,926                |
| BG 1, CT 95.03 | 66%                         | 14%                       | 2%                               | 5%    | 1%                                        | 3%                    | 9%             | 87%                              | 13%                    | 9%                                           | \$62,250                |
| BG 1, CT 95.04 | 67%                         | 22%                       | 0%                               | 1%    | 2%                                        | 1%                    | 6%             | 87%                              | 13%                    | 4%                                           | \$71,597                |
| BG 1, CT 95.07 | 56%                         | 19%                       | 0%                               | 2%    | 4%                                        | 4%                    | 14%            | 75%                              | 25%                    | 20%                                          | \$40,096                |
| BG 2, CT 95.07 | 63%                         | 19%                       | 3%                               | 6%    | 1%                                        | 0%                    | 8%             | 93%                              | 7%                     | ND                                           | ND                      |
| BG 1, CT 96.03 | 23%                         | 1%                        | 0%                               | 12%   | 13%                                       | 0%                    | 51%            | 97%                              | 3%                     | 0%                                           | \$86,042                |
| BG 2, CT 96.03 | 20%                         | 3%                        | 0%                               | 14%   | 24%                                       | 2%                    | 37%            | 88%                              | 12%                    | 36%                                          | \$75,500                |
| BG 3, CT 96.03 | 1%                          | 0%                        | 0%                               | 13%   | 39%                                       | 0%                    | 47%            | 83%                              | 17%                    | 17%                                          | \$44,184                |
| BG 4, CT 96.03 | 9%                          | 2%                        | 0%                               | 15%   | 31%                                       | 0%                    | 43%            | 94%                              | 6%                     | 37%                                          | \$31,397                |
| BG 5, CT 96.03 | 2%                          | 0%                        | 2%                               | 7%    | 33%                                       | 0%                    | 56%            | 70%                              | 30%                    | 14%                                          | \$44,175                |
| BG 6, CT 96.03 | 9%                          | 0%                        | 0%                               | 42%   | 31%                                       | 0%                    | 18%            | 93%                              | 7%                     | 16%                                          | \$73,185                |
| BG 1, CT 96.08 | 6%                          | 2%                        | 1%                               | 17%   | 36%                                       | 1%                    | 37%            | 89%                              | 11%                    | 23%                                          | \$68,182                |
| BG 2, CT 96.08 | 9%                          | 3%                        | 0%                               | 10%   | 43%                                       | 0%                    | 35%            | 90%                              | 10%                    | 24%                                          | \$50,256                |
| BG 1, CT 97.01 | 8%                          | 1%                        | 1%                               | 6%    | 62%                                       | 1%                    | 22%            | 85%                              | 15%                    | 43%                                          | \$43,438                |
| BG 2, CT 97.01 | 9%                          | 0%                        | 0%                               | 24%   | 40%                                       | 0%                    | 28%            | 86%                              | 14%                    | 34%                                          | \$29,688                |
| BG 3, CT 97.01 | 12%                         | 1%                        | 0%                               | 9%    | 32%                                       | 0%                    | 46%            | 81%                              | 19%                    | 33%                                          | \$33,469                |
| BG 1, CT 97.03 | 9%                          | 1%                        | 0%                               | 33%   | 19%                                       | 0%                    | 37%            | 91%                              | 9%                     | 17%                                          | \$79,458                |
| BG 2, CT 97.03 | 2%                          | 0%                        | 0%                               | 7%    | 45%                                       | 1%                    | 45%            | 88%                              | 12%                    | 7%                                           | \$85,855                |
| BG 3, CT 97.03 | 6%                          | 8%                        | 0%                               | 29%   | 6%                                        | 0%                    | 51%            | 86%                              | 14%                    | 28%                                          | \$69,500                |
| BG 1, CT 97.04 | 9%                          | 1%                        | 0%                               | 23%   | 31%                                       | 2%                    | 34%            | 87%                              | 13%                    | 17%                                          | \$68,698                |
| BG 1, CT 98.01 | 31%                         | 11%                       | 1%                               | 9%    | 20%                                       | 2%                    | 27%            | 74%                              | 26%                    | 40%                                          | \$31,845                |
| BG 2, CT 98.01 | 34%                         | 0%                        | 0%                               | 13%   | 14%                                       | 0%                    | 39%            | 99%                              | 1%                     | 35%                                          | \$91,172                |
| BG 1, CT 98.02 | 11%                         | 1%                        | 1%                               | 17%   | 23%                                       | 3%                    | 44%            | 88%                              | 12%                    | 32%                                          | \$41,985                |
| BG 2, CT 98.02 | 8%                          | 1%                        | 0%                               | 13%   | 43%                                       | 0%                    | 35%            | 85%                              | 15%                    | 32%                                          | \$42,450                |
| BG 3, CT 98.02 | 9%                          | 1%                        | 2%                               | 10%   | 31%                                       | 0%                    | 47%            | 82%                              | 18%                    | 27%                                          | \$49,125                |
| BG 1, CT 99.02 | 57%                         | 2%                        | 0%                               | 10%   | 2%                                        | 0%                    | 29%            | 76%                              | 24%                    | 7%                                           | \$78,750                |
| BG 2, CT 99.02 | 33%                         | 0%                        | 1%                               | 32%   | 2%                                        | 1%                    | 32%            | 89%                              | 11%                    | 10%                                          | \$70,543                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 3, CT 99.02  | 19%                         | 0%                        | 0%                               | 32%   | 22%                                       | 0%                    | 27%            | 83%                              | 17%                    | 7%                                           | \$74,907                |
| BG 4, CT 99.02  | 30%                         | 9%                        | 0%                               | 9%    | 14%                                       | 0%                    | 39%            | 95%                              | 5%                     | 17%                                          | \$52,014                |
| BG 1, CT 99.04  | 59%                         | 5%                        | 0%                               | 11%   | 4%                                        | 0%                    | 20%            | 89%                              | 11%                    | 7%                                           | \$70,815                |
| BG 2, CT 99.04  | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 3, CT 99.04  | 23%                         | 0%                        | 0%                               | 49%   | 4%                                        | 0%                    | 24%            | 91%                              | 9%                     | 6%                                           | \$60,724                |
| BG 4, CT 99.04  | 22%                         | 0%                        | 0%                               | 42%   | 6%                                        | 0%                    | 30%            | 91%                              | 9%                     | 5%                                           | \$55,125                |
| BG 5, CT 99.04  | 35%                         | 1%                        | 0%                               | 37%   | 3%                                        | 1%                    | 23%            | 88%                              | 12%                    | 8%                                           | \$81,719                |
| BG 1, CT 100    | 59%                         | 0%                        | 0%                               | 23%   | 3%                                        | 0%                    | 14%            | 95%                              | 5%                     | 35%                                          | \$69,333                |
| BG 2, CT 100    | 64%                         | 10%                       | 0%                               | 2%    | 7%                                        | 2%                    | 15%            | 80%                              | 20%                    | 10%                                          | \$47,972                |
| BG 1, CT 101    | 41%                         | 2%                        | 1%                               | 17%   | 18%                                       | 0%                    | 21%            | 95%                              | 5%                     | 4%                                           | \$108,548               |
| BG 2, CT 101    | 77%                         | 0%                        | 1%                               | 5%    | 1%                                        | 0%                    | 16%            | 96%                              | 4%                     | 10%                                          | \$75,227                |
| BG 3, CT 101    | 28%                         | 2%                        | 1%                               | 3%    | 24%                                       | 0%                    | 42%            | 95%                              | 5%                     | 11%                                          | \$55,469                |
| BG 4, CT 101    | 8%                          | 0%                        | 0%                               | 38%   | 28%                                       | 1%                    | 26%            | 84%                              | 16%                    | 8%                                           | \$54,375                |
| BG 1, CT 102.01 | 31%                         | 3%                        | 0%                               | 9%    | 21%                                       | 0%                    | 36%            | 93%                              | 7%                     | 23%                                          | \$52,069                |
| BG 2, CT 102.01 | 43%                         | 0%                        | 0%                               | 9%    | 9%                                        | 0%                    | 39%            | 87%                              | 13%                    | 3%                                           | \$77,614                |
| BG 3, CT 102.01 | 31%                         | 1%                        | 0%                               | 6%    | 18%                                       | 0%                    | 44%            | 88%                              | 12%                    | 18%                                          | \$64,444                |
| BG 1, CT 102.02 | 26%                         | 1%                        | 0%                               | 15%   | 28%                                       | 0%                    | 29%            | 96%                              | 4%                     | 15%                                          | \$76,250                |
| BG 2, CT 102.02 | 16%                         | 2%                        | 0%                               | 5%    | 45%                                       | 1%                    | 31%            | 97%                              | 3%                     | 18%                                          | \$68,508                |
| BG 3, CT 102.02 | 15%                         | 0%                        | 0%                               | 8%    | 30%                                       | 0%                    | 47%            | 91%                              | 9%                     | 22%                                          | \$46,042                |
| BG 4, CT 102.02 | 31%                         | 1%                        | 0%                               | 7%    | 35%                                       | 0%                    | 25%            | 94%                              | 6%                     | 8%                                           | \$85,714                |
| BG 1, CT 103.03 | 20%                         | 2%                        | 0%                               | 29%   | 16%                                       | 0%                    | 33%            | 98%                              | 2%                     | 10%                                          | \$83,750                |
| BG 2, CT 103.03 | 18%                         | 0%                        | 0%                               | 16%   | 38%                                       | 2%                    | 26%            | 89%                              | 11%                    | 6%                                           | \$70,172                |
| BG 3, CT 103.03 | 18%                         | 0%                        | 1%                               | 25%   | 26%                                       | 0%                    | 30%            | 90%                              | 10%                    | 7%                                           | \$61,528                |
| BG 1, CT 103.05 | 23%                         | 0%                        | 0%                               | 36%   | 14%                                       | 0%                    | 27%            | 88%                              | 12%                    | 14%                                          | \$85,642                |
| BG 2, CT 103.05 | 23%                         | 0%                        | 0%                               | 32%   | 9%                                        | 3%                    | 34%            | 96%                              | 4%                     | 16%                                          | \$119,938               |
| BG 3, CT 103.05 | 12%                         | 0%                        | 0%                               | 23%   | 2%                                        | 0%                    | 63%            | 67%                              | 33%                    | 14%                                          | \$90,132                |
| BG 1, CT 103.06 | 43%                         | 2%                        | 0%                               | 30%   | 0%                                        | 9%                    | 17%            | 91%                              | 9%                     | 5%                                           | \$154,036               |
| BG 2, CT 103.06 | 24%                         | 1%                        | 2%                               | 43%   | 4%                                        | 0%                    | 26%            | 84%                              | 16%                    | 7%                                           | \$92,083                |
| BG 3, CT 103.06 | 7%                          | 0%                        | 0%                               | 49%   | 18%                                       | 0%                    | 26%            | 98%                              | 2%                     | 0%                                           | \$129,049               |
| BG 4, CT 103.06 | 26%                         | 0%                        | 0%                               | 49%   | 2%                                        | 0%                    | 23%            | 94%                              | 6%                     | 6%                                           | \$161,378               |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 5, CT 103.06 | 30%                         | 2%                        | 0%                               | 34%   | 5%                                        | 0%                    | 29%            | 96%                              | 4%                     | 5%                                           | \$83,284                |
| BG 1, CT 103.08 | 13%                         | 0%                        | 1%                               | 47%   | 5%                                        | 4%                    | 31%            | 88%                              | 12%                    | 3%                                           | \$92,396                |
| BG 2, CT 103.08 | 15%                         | 0%                        | 0%                               | 64%   | 0%                                        | 0%                    | 21%            | 98%                              | 2%                     | 6%                                           | \$91,500                |
| BG 3, CT 103.08 | 20%                         | 0%                        | 0%                               | 47%   | 4%                                        | 0%                    | 29%            | 97%                              | 3%                     | 0%                                           | \$91,094                |
| BG 1, CT 105.03 | 22%                         | 7%                        | 0%                               | 25%   | 8%                                        | 1%                    | 36%            | 79%                              | 21%                    | 17%                                          | \$51,667                |
| BG 2, CT 105.03 | 8%                          | 0%                        | 0%                               | 26%   | 21%                                       | 0%                    | 45%            | 96%                              | 4%                     | 1%                                           | \$102,917               |
| BG 1, CT 105.04 | 7%                          | 0%                        | 0%                               | 33%   | 33%                                       | 2%                    | 25%            | 91%                              | 9%                     | 12%                                          | \$63,971                |
| BG 2, CT 105.04 | 24%                         | 0%                        | 1%                               | 35%   | 7%                                        | 0%                    | 33%            | 94%                              | 6%                     | 12%                                          | \$84,491                |
| BG 3, CT 105.04 | 13%                         | 0%                        | 2%                               | 44%   | 17%                                       | 1%                    | 24%            | 94%                              | 6%                     | 7%                                           | \$76,346                |
| BG 1, CT 105.05 | 28%                         | 0%                        | 0%                               | 39%   | 7%                                        | 0%                    | 25%            | 99%                              | 1%                     | 0%                                           | \$106,719               |
| BG 2, CT 105.05 | 21%                         | 0%                        | 0%                               | 45%   | 11%                                       | 1%                    | 21%            | 93%                              | 7%                     | 0%                                           | \$100,313               |
| BG 3, CT 105.05 | 38%                         | 0%                        | 0%                               | 42%   | 1%                                        | 0%                    | 18%            | 92%                              | 8%                     | 0%                                           | \$89,875                |
| BG 1, CT 105.07 | 17%                         | 1%                        | 1%                               | 25%   | 5%                                        | 9%                    | 43%            | 83%                              | 17%                    | 10%                                          | \$79,411                |
| BG 2, CT 105.07 | 12%                         | 4%                        | 0%                               | 15%   | 22%                                       | 4%                    | 43%            | 85%                              | 15%                    | 17%                                          | \$57,692                |
| BG 1, CT 105.08 | 24%                         | 1%                        | 0%                               | 41%   | 7%                                        | 0%                    | 27%            | 95%                              | 5%                     | 2%                                           | \$120,000               |
| BG 2, CT 105.08 | 52%                         | 0%                        | 0%                               | 29%   | 2%                                        | 1%                    | 17%            | 92%                              | 8%                     | 9%                                           | \$100,250               |
| BG 1, CT 106.01 | 17%                         | 1%                        | 0%                               | 32%   | 2%                                        | 0%                    | 47%            | 88%                              | 12%                    | 6%                                           | \$84,485                |
| BG 2, CT 106.01 | 10%                         | 0%                        | 0%                               | 53%   | 7%                                        | 0%                    | 30%            | 88%                              | 12%                    | 14%                                          | \$44,559                |
| BG 3, CT 106.01 | 13%                         | 0%                        | 0%                               | 77%   | 0%                                        | 1%                    | 9%             | 99%                              | 1%                     | 5%                                           | \$96,250                |
| BG 1, CT 106.02 | 13%                         | 0%                        | 0%                               | 45%   | 3%                                        | 1%                    | 38%            | 95%                              | 5%                     | 4%                                           | \$69,167                |
| BG 2, CT 106.02 | 12%                         | 1%                        | 1%                               | 41%   | 10%                                       | 0%                    | 35%            | 88%                              | 12%                    | 9%                                           | \$90,655                |
| BG 3, CT 106.02 | 15%                         | 1%                        | 0%                               | 45%   | 3%                                        | 0%                    | 36%            | 92%                              | 8%                     | 3%                                           | \$117,750               |
| BG 1, CT 107.01 | 58%                         | 3%                        | 0%                               | 22%   | 0%                                        | 0%                    | 17%            | 99%                              | 1%                     | 7%                                           | \$89,279                |
| BG 2, CT 107.01 | 29%                         | 0%                        | 0%                               | 44%   | 3%                                        | 0%                    | 23%            | 89%                              | 11%                    | 5%                                           | \$89,000                |
| BG 1, CT 107.02 | 13%                         | 2%                        | 0%                               | 39%   | 4%                                        | 1%                    | 41%            | 87%                              | 13%                    | 5%                                           | \$86,738                |
| BG 2, CT 107.02 | 28%                         | 0%                        | 0%                               | 47%   | 2%                                        | 0%                    | 22%            | 93%                              | 7%                     | 2%                                           | \$69,063                |
| BG 1, CT 108.01 | 74%                         | 8%                        | 1%                               | 2%    | 2%                                        | 6%                    | 9%             | 84%                              | 16%                    | ND                                           | ND                      |
| BG 2, CT 108.01 | 70%                         | 2%                        | 1%                               | 3%    | 0%                                        | 11%                   | 13%            | 82%                              | 18%                    | 11%                                          | \$40,000                |
| BG 1, CT 108.02 | 71%                         | 8%                        | 0%                               | 5%    | 1%                                        | 4%                    | 11%            | 81%                              | 19%                    | 15%                                          | \$47,139                |
| BG 2, CT 108.02 | 70%                         | 7%                        | 1%                               | 6%    | 0%                                        | 7%                    | 8%             | 78%                              | 22%                    | ND                                           | ND                      |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 3, CT 108.02 | 72%                         | 14%                       | 0%                               | 3%    | 0%                                        | 6%                    | 5%             | 85%                              | 15%                    | 0%                                           | \$77,939                |
| BG 1, CT 109.01 | 67%                         | 2%                        | 0%                               | 12%   | 3%                                        | 0%                    | 16%            | 96%                              | 4%                     | 1%                                           | \$144,438               |
| BG 2, CT 109.01 | 72%                         | 1%                        | 0%                               | 10%   | 0%                                        | 0%                    | 17%            | 95%                              | 5%                     | 3%                                           | \$106,136               |
| BG 1, CT 109.03 | 39%                         | 2%                        | 1%                               | 15%   | 5%                                        | 0%                    | 38%            | 96%                              | 4%                     | 14%                                          | \$83,542                |
| BG 2, CT 109.03 | 29%                         | 1%                        | 1%                               | 13%   | 19%                                       | 3%                    | 34%            | 91%                              | 9%                     | 19%                                          | \$69,950                |
| BG 1, CT 109.04 | 46%                         | 1%                        | 0%                               | 10%   | 1%                                        | 2%                    | 40%            | 94%                              | 6%                     | 7%                                           | \$91,000                |
| BG 2, CT 109.04 | 45%                         | 2%                        | 1%                               | 14%   | 3%                                        | 0%                    | 35%            | 93%                              | 7%                     | 7%                                           | \$70,982                |
| BG 1, CT 109.05 | 42%                         | 0%                        | 0%                               | 24%   | 4%                                        | 4%                    | 26%            | 89%                              | 11%                    | 14%                                          | \$68,565                |
| BG 1, CT 110    | 33%                         | 1%                        | 1%                               | 28%   | 9%                                        | 0%                    | 28%            | 88%                              | 12%                    | 2%                                           | \$119,917               |
| BG 2, CT 110    | 38%                         | 0%                        | 0%                               | 38%   | 4%                                        | 0%                    | 20%            | 97%                              | 3%                     | 2%                                           | \$135,833               |
| BG 3, CT 110    | 24%                         | 12%                       | 0%                               | 5%    | 25%                                       | 0%                    | 35%            | 81%                              | 19%                    | ND                                           | ND                      |
| BG 1, CT 111.03 | 21%                         | 0%                        | 0%                               | 42%   | 4%                                        | 0%                    | 33%            | 98%                              | 2%                     | 1%                                           | \$110,952               |
| BG 2, CT 111.03 | 37%                         | 0%                        | 0%                               | 32%   | 1%                                        | 5%                    | 25%            | 94%                              | 6%                     | 3%                                           | \$117,679               |
| BG 1, CT 111.04 | 44%                         | 0%                        | 0%                               | 17%   | 5%                                        | 0%                    | 34%            | 96%                              | 4%                     | 10%                                          | \$96,625                |
| BG 2, CT 111.04 | 30%                         | 0%                        | 0%                               | 36%   | 5%                                        | 0%                    | 28%            | 96%                              | 4%                     | 10%                                          | \$96,713                |
| BG 3, CT 111.04 | 35%                         | 0%                        | 0%                               | 21%   | 13%                                       | 0%                    | 32%            | 94%                              | 6%                     | 2%                                           | \$141,786               |
| BG 1, CT 111.05 | 58%                         | 0%                        | 0%                               | 8%    | 2%                                        | 0%                    | 32%            | 97%                              | 3%                     | 6%                                           | \$84,107                |
| BG 2, CT 111.05 | 64%                         | 3%                        | 0%                               | 15%   | 2%                                        | 1%                    | 15%            | 94%                              | 6%                     | 3%                                           | \$89,583                |
| BG 3, CT 111.05 | 42%                         | 9%                        | 5%                               | 11%   | 13%                                       | 0%                    | 21%            | 92%                              | 8%                     | 10%                                          | \$74,113                |
| BG 1, CT 111.06 | 21%                         | 0%                        | 0%                               | 38%   | 18%                                       | 0%                    | 22%            | 99%                              | 1%                     | 1%                                           | \$116,667               |
| BG 2, CT 111.06 | 17%                         | 1%                        | 0%                               | 36%   | 13%                                       | 0%                    | 34%            | 89%                              | 11%                    | 2%                                           | \$119,063               |
| BG 3, CT 111.06 | 49%                         | 0%                        | 0%                               | 9%    | 16%                                       | 0%                    | 26%            | 97%                              | 3%                     | 5%                                           | \$77,463                |
| BG 4, CT 111.06 | 32%                         | 1%                        | 0%                               | 37%   | 6%                                        | 0%                    | 23%            | 95%                              | 5%                     | 2%                                           | \$98,750                |
| BG 1, CT 112.01 | 76%                         | 0%                        | 7%                               | 0%    | 0%                                        | 0%                    | 18%            | 91%                              | 9%                     | 0%                                           | \$86,364                |
| BG 2, CT 112.01 | 63%                         | 0%                        | 1%                               | 14%   | 13%                                       | 0%                    | 9%             | 96%                              | 4%                     | 4%                                           | \$107,188               |
| BG 3, CT 112.01 | 70%                         | 0%                        | 0%                               | 17%   | 4%                                        | 0%                    | 8%             | 73%                              | 27%                    | 4%                                           | \$96,169                |
| BG 4, CT 112.01 | 72%                         | 0%                        | 0%                               | 16%   | 0%                                        | 1%                    | 11%            | 97%                              | 3%                     | 0%                                           | \$101,719               |
| BG 5, CT 112.01 | 63%                         | 0%                        | 0%                               | 9%    | 0%                                        | 0%                    | 28%            | 84%                              | 16%                    | 15%                                          | \$146,000               |
| BG 1, CT 112.02 | 62%                         | 0%                        | 0%                               | 15%   | 5%                                        | 0%                    | 17%            | 97%                              | 3%                     | 8%                                           | \$99,129                |
| BG 1, CT 113    | 37%                         | 1%                        | 0%                               | 14%   | 29%                                       | 0%                    | 19%            | 96%                              | 4%                     | 19%                                          | \$69,219                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 113     | 7%                          | 1%                        | 0%                               | 13%   | 23%                                       | 0%                    | 55%            | 96%                              | 4%                     | 17%                                          | \$74,882                |
| BG 3, CT 113     | 20%                         | 0%                        | 0%                               | 2%    | 15%                                       | 0%                    | 62%            | 98%                              | 2%                     | 2%                                           | \$156,250               |
| BG 4, CT 113     | 13%                         | 0%                        | 0%                               | 26%   | 9%                                        | 0%                    | 51%            | 83%                              | 17%                    | 23%                                          | \$47,917                |
| BG 1, CT 114     | 0%                          | 0%                        | 0%                               | 78%   | 19%                                       | 0%                    | 4%             | 100%                             | 0%                     | 0%                                           | \$162,750               |
| BG 2, CT 114     | 63%                         | 10%                       | 0%                               | 6%    | 2%                                        | 2%                    | 16%            | 87%                              | 13%                    | 15%                                          | \$57,750                |
| BG 3, CT 114     | 61%                         | 13%                       | 0%                               | 6%    | 2%                                        | 7%                    | 12%            | 72%                              | 28%                    | 15%                                          | \$49,688                |
| BG 1, CT 115     | 15%                         | 47%                       | 0%                               | 25%   | 2%                                        | 0%                    | 11%            | 87%                              | 13%                    | 0%                                           | \$112,108               |
| BG 2, CT 115     | 14%                         | 0%                        | 3%                               | 20%   | 28%                                       | 0%                    | 36%            | 85%                              | 15%                    | 0%                                           | \$98,250                |
| BG 3, CT 115     | 13%                         | 5%                        | 0%                               | 25%   | 19%                                       | 0%                    | 38%            | 86%                              | 14%                    | 5%                                           | \$79,427                |
| BG 1, CT 9400.01 | 4%                          | 0%                        | 0%                               | 4%    | 46%                                       | 0%                    | 46%            | 92%                              | 8%                     | 9%                                           | \$64,044                |
| BG 2, CT 9400.01 | 14%                         | 0%                        | 1%                               | 6%    | 17%                                       | 0%                    | 61%            | 87%                              | 13%                    | 9%                                           | \$73,482                |
| BG 1, CT 9400.02 | 2%                          | 1%                        | 0%                               | 7%    | 55%                                       | 0%                    | 35%            | 84%                              | 16%                    | 4%                                           | \$81,389                |
| BG 2, CT 9400.02 | 2%                          | 1%                        | 0%                               | 2%    | 66%                                       | 1%                    | 28%            | 91%                              | 9%                     | 4%                                           | \$57,813                |
| BG 3, CT 9400.02 | 3%                          | 0%                        | 0%                               | 2%    | 61%                                       | 0%                    | 33%            | 91%                              | 9%                     | 9%                                           | \$80,750                |
| BG 4, CT 9400.02 | 5%                          | 0%                        | 0%                               | 6%    | 45%                                       | 0%                    | 44%            | 78%                              | 22%                    | 36%                                          | \$36,554                |
| BG 1, CT 9800    | 0%                          | 0%                        | 0%                               | 0%    | 100%                                      | 0%                    | 0%             | 100%                             | 0%                     | 33%                                          | ND                      |
| BG 1, CT 9802    | 15%                         | 5%                        | 1%                               | 17%   | 16%                                       | 5%                    | 41%            | 84%                              | 16%                    | ND                                           | ND                      |
| BG 1, CT 9803    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 9806    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 0%                                           | ND                      |
| BG 1, CT 9807    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 9808    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 9810    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 9811    | 91%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 79%                              | 21%                    | 0%                                           | ND                      |
| BG 1, CT 9812    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 9813    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 9814    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9900.01 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 319     | 46%                         | 0%                        | 0%                               | 18%   | 21%                                       | 3%                    | 11%            | 96%                              | 4%                     | 15%                                          | \$59,375                |
| BG 0, CT 9900    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 401.03  | 72%                         | 1%                        | 0%                               | 9%    | 3%                                        | 0%                    | 15%            | 96%                              | 4%                     | 10%                                          | \$68,281                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 401.03 | 45%                         | 0%                        | 1%                               | 28%   | 5%                                        | 1%                    | 19%            | 91%                              | 9%                     | 8%                                           | \$54,265                |
| BG 3, CT 401.03 | 88%                         | 0%                        | 1%                               | 3%    | 2%                                        | 0%                    | 5%             | 88%                              | 12%                    | 10%                                          | \$56,667                |
| BG 4, CT 401.03 | 74%                         | 0%                        | 0%                               | 2%    | 8%                                        | 0%                    | 16%            | 94%                              | 6%                     | 33%                                          | \$39,236                |
| BG 1, CT 401.04 | 80%                         | 0%                        | 1%                               | 4%    | 0%                                        | 0%                    | 15%            | 88%                              | 12%                    | 11%                                          | \$43,819                |
| BG 2, CT 401.04 | 70%                         | 0%                        | 0%                               | 12%   | 13%                                       | 0%                    | 5%             | 91%                              | 9%                     | 24%                                          | \$38,047                |
| BG 1, CT 402.04 | 47%                         | 0%                        | 0%                               | 21%   | 8%                                        | 0%                    | 24%            | 99%                              | 1%                     | 11%                                          | \$60,054                |
| BG 2, CT 402.04 | 45%                         | 0%                        | 0%                               | 29%   | 6%                                        | 0%                    | 20%            | 95%                              | 5%                     | 6%                                           | \$74,704                |
| BG 1, CT 402.05 | 33%                         | 0%                        | 1%                               | 30%   | 13%                                       | 2%                    | 22%            | 93%                              | 7%                     | 10%                                          | \$53,006                |
| BG 2, CT 402.05 | 41%                         | 0%                        | 1%                               | 44%   | 6%                                        | 0%                    | 9%             | 99%                              | 1%                     | 10%                                          | \$61,823                |
| BG 3, CT 402.05 | 48%                         | 0%                        | 0%                               | 36%   | 1%                                        | 0%                    | 15%            | 86%                              | 14%                    | 9%                                           | \$63,542                |
| BG 4, CT 402.05 | 29%                         | 0%                        | 0%                               | 40%   | 5%                                        | 2%                    | 24%            | 90%                              | 10%                    | 9%                                           | \$91,667                |
| BG 1, CT 403    | 55%                         | 0%                        | 0%                               | 14%   | 11%                                       | 0%                    | 19%            | 80%                              | 20%                    | 27%                                          | \$29,432                |
| BG 2, CT 403    | 56%                         | 0%                        | 0%                               | 29%   | 6%                                        | 0%                    | 9%             | 77%                              | 23%                    | 0%                                           | \$69,844                |
| BG 3, CT 403    | 19%                         | 3%                        | 0%                               | 45%   | 3%                                        | 1%                    | 29%            | 86%                              | 14%                    | 16%                                          | \$73,725                |
| BG 4, CT 403    | 41%                         | 0%                        | 0%                               | 39%   | 4%                                        | 0%                    | 16%            | 100%                             | 0%                     | 15%                                          | \$24,177                |
| BG 5, CT 403    | 36%                         | 0%                        | 0%                               | 19%   | 11%                                       | 0%                    | 35%            | 100%                             | 0%                     | 11%                                          | \$56,367                |
| BG 6, CT 403    | 14%                         | 0%                        | 0%                               | 41%   | 7%                                        | 0%                    | 38%            | 95%                              | 5%                     | 11%                                          | \$41,125                |
| BG 1, CT 404    | 17%                         | 0%                        | 0%                               | 53%   | 8%                                        | 2%                    | 20%            | 88%                              | 12%                    | 6%                                           | \$73,333                |
| BG 2, CT 404    | 41%                         | 0%                        | 0%                               | 27%   | 3%                                        | 0%                    | 29%            | 87%                              | 13%                    | 7%                                           | \$73,068                |
| BG 3, CT 404    | 10%                         | 0%                        | 1%                               | 61%   | 11%                                       | 2%                    | 16%            | 94%                              | 6%                     | 6%                                           | \$63,833                |
| BG 4, CT 404    | 18%                         | 0%                        | 0%                               | 49%   | 16%                                       | 1%                    | 16%            | 93%                              | 7%                     | 7%                                           | \$68,393                |
| BG 5, CT 404    | 13%                         | 6%                        | 1%                               | 53%   | 6%                                        | 0%                    | 21%            | 82%                              | 18%                    | 21%                                          | \$48,750                |
| BG 1, CT 405    | 33%                         | 0%                        | 0%                               | 67%   | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 29%                                          | \$38,281                |
| BG 2, CT 405    | 21%                         | 1%                        | 0%                               | 59%   | 4%                                        | 0%                    | 16%            | 98%                              | 2%                     | 28%                                          | \$49,400                |
| BG 3, CT 405    | 34%                         | 0%                        | 0%                               | 31%   | 12%                                       | 0%                    | 22%            | 94%                              | 6%                     | 4%                                           | \$72,105                |
| BG 4, CT 405    | 21%                         | 1%                        | 0%                               | 51%   | 16%                                       | 0%                    | 11%            | 92%                              | 8%                     | 5%                                           | \$62,143                |
| BG 5, CT 405    | 31%                         | 2%                        | 1%                               | 35%   | 16%                                       | 0%                    | 16%            | 99%                              | 1%                     | 19%                                          | \$80,278                |
| BG 1, CT 406.03 | 56%                         | 0%                        | 0%                               | 15%   | 0%                                        | 0%                    | 29%            | 96%                              | 4%                     | 10%                                          | \$62,313                |
| BG 2, CT 406.03 | 84%                         | 0%                        | 2%                               | 11%   | 1%                                        | 0%                    | 1%             | 100%                             | 0%                     | 5%                                           | \$87,083                |
| BG 3, CT 406.03 | 27%                         | 1%                        | 0%                               | 50%   | 3%                                        | 0%                    | 20%            | 90%                              | 10%                    | 4%                                           | \$61,469                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 406.04 | 52%                         | 0%                        | 0%                               | 16%   | 0%                                        | 2%                    | 30%            | 97%                              | 3%                     | 7%                                           | \$43,906                |
| BG 2, CT 406.04 | 46%                         | 0%                        | 0%                               | 11%   | 6%                                        | 2%                    | 36%            | 83%                              | 17%                    | 17%                                          | \$52,167                |
| BG 3, CT 406.04 | 41%                         | 0%                        | 0%                               | 30%   | 5%                                        | 0%                    | 24%            | 88%                              | 12%                    | 6%                                           | \$63,558                |
| BG 1, CT 407    | 50%                         | 0%                        | 0%                               | 19%   | 12%                                       | 1%                    | 18%            | 84%                              | 16%                    | 14%                                          | \$76,544                |
| BG 2, CT 407    | 28%                         | 0%                        | 0%                               | 42%   | 0%                                        | 0%                    | 30%            | 89%                              | 11%                    | 12%                                          | \$107,212               |
| BG 3, CT 407    | 13%                         | 0%                        | 0%                               | 50%   | 0%                                        | 0%                    | 37%            | 79%                              | 21%                    | 26%                                          | \$48,100                |
| BG 4, CT 407    | 48%                         | 0%                        | 0%                               | 8%    | 7%                                        | 1%                    | 36%            | 78%                              | 22%                    | 25%                                          | \$35,075                |
| BG 5, CT 407    | 11%                         | 0%                        | 0%                               | 55%   | 12%                                       | 1%                    | 21%            | 86%                              | 14%                    | 14%                                          | \$70,673                |
| BG 6, CT 407    | 52%                         | 0%                        | 0%                               | 22%   | 3%                                        | 0%                    | 23%            | 74%                              | 26%                    | 4%                                           | \$68,667                |
| BG 1, CT 408    | 6%                          | 0%                        | 1%                               | 69%   | 15%                                       | 0%                    | 9%             | 98%                              | 2%                     | 11%                                          | \$76,917                |
| BG 2, CT 408    | 23%                         | 1%                        | 0%                               | 48%   | 12%                                       | 6%                    | 10%            | 88%                              | 12%                    | 1%                                           | \$78,158                |
| BG 3, CT 408    | 25%                         | 0%                        | 1%                               | 45%   | 9%                                        | 0%                    | 19%            | 77%                              | 23%                    | 5%                                           | \$49,139                |
| BG 1, CT 409    | 40%                         | 0%                        | 0%                               | 16%   | 38%                                       | 0%                    | 6%             | 95%                              | 5%                     | 0%                                           | \$106,146               |
| BG 2, CT 409    | 21%                         | 0%                        | 0%                               | 59%   | 17%                                       | 0%                    | 3%             | 99%                              | 1%                     | 10%                                          | \$60,096                |
| BG 3, CT 409    | 17%                         | 0%                        | 0%                               | 55%   | 25%                                       | 0%                    | 3%             | 100%                             | 0%                     | 22%                                          | \$77,500                |
| BG 4, CT 409    | 45%                         | 0%                        | 0%                               | 24%   | 6%                                        | 0%                    | 25%            | 87%                              | 13%                    | 7%                                           | \$66,296                |
| BG 5, CT 409    | 25%                         | 0%                        | 0%                               | 63%   | 5%                                        | 0%                    | 7%             | 77%                              | 23%                    | 12%                                          | \$44,412                |
| BG 6, CT 409    | 14%                         | 0%                        | 0%                               | 34%   | 46%                                       | 0%                    | 6%             | 95%                              | 5%                     | 9%                                           | \$54,907                |
| BG 1, CT 412    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 2, CT 412    | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 9400   | 42%                         | 0%                        | 0%                               | 22%   | 15%                                       | 0%                    | 22%            | 89%                              | 11%                    | 11%                                          | \$54,722                |
| BG 2, CT 9400   | 19%                         | 0%                        | 0%                               | 9%    | 42%                                       | 0%                    | 31%            | 92%                              | 8%                     | 15%                                          | \$49,635                |
| BG 0, CT 9901   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9902   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9903   | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 1, CT 301    | 54%                         | 0%                        | 0%                               | 0%    | 10%                                       | 0%                    | 37%            | 92%                              | 8%                     | 16%                                          | \$60,556                |
| BG 2, CT 301    | 15%                         | 0%                        | 0%                               | 3%    | 33%                                       | 0%                    | 50%            | 95%                              | 5%                     | 5%                                           | \$62,656                |
| BG 1, CT 302.01 | 73%                         | 0%                        | 0%                               | 4%    | 1%                                        | 2%                    | 20%            | 90%                              | 10%                    | 17%                                          | \$50,189                |
| BG 2, CT 302.01 | 65%                         | 0%                        | 0%                               | 0%    | 14%                                       | 0%                    | 21%            | 93%                              | 7%                     | 4%                                           | \$58,611                |
| BG 1, CT 302.02 | 57%                         | 0%                        | 0%                               | 7%    | 0%                                        | 0%                    | 36%            | 94%                              | 6%                     | 13%                                          | \$23,785                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 302.02 | 48%                         | 0%                        | 0%                               | 10%   | 20%                                       | 1%                    | 20%            | 85%                              | 15%                    | 2%                                           | \$51,786                |
| BG 3, CT 302.02 | 60%                         | 1%                        | 0%                               | 6%    | 6%                                        | 0%                    | 27%            | 98%                              | 2%                     | 10%                                          | \$77,244                |
| BG 4, CT 302.02 | 46%                         | 0%                        | 0%                               | 8%    | 9%                                        | 4%                    | 33%            | 88%                              | 12%                    | 3%                                           | \$79,534                |
| BG 5, CT 302.02 | 41%                         | 0%                        | 0%                               | 10%   | 2%                                        | 0%                    | 47%            | 97%                              | 3%                     | 73%                                          | \$11,150                |
| BG 1, CT 303.01 | 39%                         | 0%                        | 0%                               | 8%    | 10%                                       | 0%                    | 43%            | 88%                              | 12%                    | 11%                                          | \$57,955                |
| BG 2, CT 303.01 | 60%                         | 0%                        | 0%                               | 7%    | 4%                                        | 0%                    | 29%            | 89%                              | 11%                    | 15%                                          | \$95,110                |
| BG 3, CT 303.01 | 70%                         | 0%                        | 1%                               | 14%   | 6%                                        | 1%                    | 8%             | 94%                              | 6%                     | 8%                                           | \$56,738                |
| BG 4, CT 303.01 | 56%                         | 0%                        | 0%                               | 6%    | 10%                                       | 1%                    | 28%            | 99%                              | 1%                     | 13%                                          | \$70,294                |
| BG 1, CT 303.03 | 72%                         | 1%                        | 0%                               | 9%    | 4%                                        | 1%                    | 13%            | 97%                              | 3%                     | 7%                                           | \$58,681                |
| BG 2, CT 303.03 | 91%                         | 0%                        | 0%                               | 3%    | 0%                                        | 0%                    | 6%             | 98%                              | 2%                     | 20%                                          | \$109,808               |
| BG 3, CT 303.03 | 79%                         | 0%                        | 0%                               | 1%    | 1%                                        | 0%                    | 19%            | 99%                              | 1%                     | 3%                                           | \$84,464                |
| BG 1, CT 304.02 | 39%                         | 0%                        | 0%                               | 10%   | 10%                                       | 4%                    | 37%            | 86%                              | 14%                    | 10%                                          | \$62,675                |
| BG 2, CT 304.02 | 36%                         | 0%                        | 1%                               | 36%   | 10%                                       | 0%                    | 16%            | 96%                              | 4%                     | 3%                                           | \$82,731                |
| BG 3, CT 304.02 | 36%                         | 0%                        | 0%                               | 24%   | 0%                                        | 2%                    | 38%            | 84%                              | 16%                    | 2%                                           | \$76,466                |
| BG 4, CT 304.02 | 34%                         | 0%                        | 0%                               | 27%   | 7%                                        | 0%                    | 33%            | 95%                              | 5%                     | 5%                                           | \$85,352                |
| BG 1, CT 304.03 | 64%                         | 0%                        | 0%                               | 5%    | 6%                                        | 0%                    | 24%            | 99%                              | 1%                     | 9%                                           | \$80,250                |
| BG 2, CT 304.03 | 30%                         | 0%                        | 0%                               | 29%   | 4%                                        | 0%                    | 36%            | 88%                              | 12%                    | 3%                                           | \$58,478                |
| BG 1, CT 304.04 | 22%                         | 1%                        | 0%                               | 32%   | 13%                                       | 1%                    | 31%            | 89%                              | 11%                    | 19%                                          | \$69,583                |
| BG 2, CT 304.04 | 43%                         | 0%                        | 0%                               | 11%   | 8%                                        | 0%                    | 37%            | 96%                              | 4%                     | 29%                                          | \$64,706                |
| BG 3, CT 304.04 | 36%                         | 0%                        | 0%                               | 16%   | 5%                                        | 0%                    | 42%            | 81%                              | 19%                    | 16%                                          | \$54,200                |
| BG 1, CT 305.01 | 41%                         | 0%                        | 0%                               | 26%   | 5%                                        | 1%                    | 26%            | 94%                              | 6%                     | 7%                                           | \$68,462                |
| BG 2, CT 305.01 | 60%                         | 0%                        | 0%                               | 23%   | 1%                                        | 0%                    | 16%            | 93%                              | 7%                     | 6%                                           | \$67,500                |
| BG 1, CT 307.05 | 44%                         | 0%                        | 0%                               | 37%   | 2%                                        | 0%                    | 17%            | 95%                              | 5%                     | 4%                                           | \$97,250                |
| BG 2, CT 307.05 | 15%                         | 0%                        | 0%                               | 53%   | 1%                                        | 1%                    | 30%            | 88%                              | 12%                    | 6%                                           | \$84,423                |
| BG 1, CT 307.06 | 56%                         | 2%                        | 0%                               | 14%   | 7%                                        | 0%                    | 22%            | 85%                              | 15%                    | 29%                                          | \$47,150                |
| BG 2, CT 307.06 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 0%                                           | ND                      |
| BG 1, CT 307.07 | 55%                         | 1%                        | 0%                               | 26%   | 2%                                        | 1%                    | 15%            | 87%                              | 13%                    | 6%                                           | \$65,391                |
| BG 2, CT 307.07 | 84%                         | 3%                        | 0%                               | 2%    | 8%                                        | 0%                    | 4%             | 85%                              | 15%                    | 3%                                           | \$92,588                |
| BG 3, CT 307.07 | 52%                         | 0%                        | 0%                               | 9%    | 6%                                        | 3%                    | 29%            | 81%                              | 19%                    | 9%                                           | \$64,988                |
| BG 4, CT 307.07 | 60%                         | 1%                        | 0%                               | 7%    | 1%                                        | 0%                    | 31%            | 99%                              | 1%                     | 17%                                          | \$61,847                |



| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 307.08 | 47%                         | 0%                        | 0%                               | 10%   | 25%                                       | 1%                    | 17%            | 91%                              | 9%                     | 10%                                          | \$49,091                |
| BG 2, CT 307.08 | 66%                         | 0%                        | 0%                               | 20%   | 3%                                        | 0%                    | 12%            | 95%                              | 5%                     | 2%                                           | \$42,917                |
| BG 1, CT 307.09 | 65%                         | 0%                        | 0%                               | 5%    | 0%                                        | 1%                    | 29%            | 99%                              | 1%                     | 15%                                          | \$52,600                |
| BG 2, CT 307.09 | 64%                         | 1%                        | 0%                               | 14%   | 0%                                        | 0%                    | 21%            | 93%                              | 7%                     | 1%                                           | \$73,546                |
| BG 3, CT 307.09 | 80%                         | 2%                        | 0%                               | 8%    | 0%                                        | 1%                    | 9%             | 73%                              | 27%                    | 23%                                          | \$57,656                |
| BG 1, CT 307.10 | 60%                         | 0%                        | 0%                               | 9%    | 21%                                       | 0%                    | 10%            | 95%                              | 5%                     | 34%                                          | \$53,458                |
| BG 2, CT 307.10 | 63%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 37%            | 81%                              | 19%                    | 36%                                          | \$39,656                |
| BG 1, CT 308    | 22%                         | 0%                        | 1%                               | 11%   | 23%                                       | 1%                    | 42%            | 85%                              | 15%                    | 6%                                           | \$75,278                |
| BG 2, CT 308    | 21%                         | 0%                        | 0%                               | 44%   | 2%                                        | 0%                    | 32%            | 90%                              | 10%                    | 3%                                           | \$96,204                |
| BG 1, CT 309.01 | 9%                          | 0%                        | 0%                               | 35%   | 36%                                       | 0%                    | 20%            | 90%                              | 10%                    | 12%                                          | \$39,167                |
| BG 2, CT 309.01 | 16%                         | 0%                        | 0%                               | 15%   | 45%                                       | 0%                    | 24%            | 74%                              | 26%                    | 25%                                          | \$33,750                |
| BG 3, CT 309.01 | 19%                         | 1%                        | 0%                               | 24%   | 7%                                        | 0%                    | 49%            | 87%                              | 13%                    | 11%                                          | \$40,083                |
| BG 1, CT 309.02 | 16%                         | 1%                        | 0%                               | 30%   | 14%                                       | 3%                    | 36%            | 81%                              | 19%                    | 16%                                          | \$68,214                |
| BG 2, CT 309.02 | 28%                         | 0%                        | 0%                               | 37%   | 11%                                       | 0%                    | 24%            | 80%                              | 20%                    | 11%                                          | \$63,155                |
| BG 1, CT 309.03 | 2%                          | 0%                        | 3%                               | 26%   | 56%                                       | 0%                    | 14%            | 100%                             | 0%                     | 6%                                           | \$79,904                |
| BG 2, CT 309.03 | 12%                         | 1%                        | 0%                               | 56%   | 7%                                        | 1%                    | 23%            | 93%                              | 7%                     | 5%                                           | \$105,341               |
| BG 3, CT 309.03 | 7%                          | 0%                        | 0%                               | 29%   | 27%                                       | 0%                    | 37%            | 95%                              | 5%                     | 8%                                           | \$87,750                |
| BG 4, CT 309.03 | 6%                          | 1%                        | 0%                               | 47%   | 1%                                        | 0%                    | 44%            | 84%                              | 16%                    | 8%                                           | \$76,140                |
| BG 1, CT 310    | 23%                         | 2%                        | 0%                               | 37%   | 1%                                        | 2%                    | 35%            | 90%                              | 10%                    | 3%                                           | \$87,279                |
| BG 2, CT 310    | 22%                         | 0%                        | 0%                               | 36%   | 0%                                        | 2%                    | 40%            | 79%                              | 21%                    | 19%                                          | \$52,438                |
| BG 3, CT 310    | 10%                         | 0%                        | 0%                               | 29%   | 23%                                       | 1%                    | 37%            | 84%                              | 16%                    | 14%                                          | \$51,492                |
| BG 4, CT 310    | 34%                         | 0%                        | 0%                               | 52%   | 0%                                        | 0%                    | 14%            | 81%                              | 19%                    | 6%                                           | \$85,250                |
| BG 1, CT 311.01 | 13%                         | 0%                        | 0%                               | 5%    | 59%                                       | 1%                    | 21%            | 83%                              | 17%                    | 14%                                          | \$48,750                |
| BG 2, CT 311.01 | 8%                          | 0%                        | 3%                               | 59%   | 1%                                        | 0%                    | 28%            | 83%                              | 17%                    | 5%                                           | \$99,750                |
| BG 3, CT 311.01 | 6%                          | 0%                        | 0%                               | 60%   | 7%                                        | 5%                    | 22%            | 90%                              | 10%                    | 15%                                          | \$62,188                |
| BG 4, CT 311.01 | 16%                         | 2%                        | 2%                               | 10%   | 31%                                       | 2%                    | 37%            | 82%                              | 18%                    | 18%                                          | \$47,303                |
| BG 1, CT 311.02 | 20%                         | 0%                        | 0%                               | 32%   | 2%                                        | 0%                    | 46%            | 95%                              | 5%                     | 4%                                           | \$46,389                |
| BG 2, CT 311.02 | 15%                         | 0%                        | 0%                               | 49%   | 11%                                       | 2%                    | 24%            | 79%                              | 21%                    | 8%                                           | \$62,235                |
| BG 3, CT 311.02 | 17%                         | 0%                        | 0%                               | 48%   | 6%                                        | 1%                    | 29%            | 87%                              | 13%                    | 8%                                           | \$29,491                |
| BG 1, CT 311.03 | 8%                          | 0%                        | 0%                               | 68%   | 4%                                        | 0%                    | 20%            | 100%                             | 0%                     | 11%                                          | \$54,718                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 311.03 | 7%                          | 0%                        | 0%                               | 42%   | 4%                                        | 0%                    | 47%            | 100%                             | 0%                     | 18%                                          | \$62,277                |
| BG 3, CT 311.03 | 12%                         | 0%                        | 0%                               | 62%   | 2%                                        | 0%                    | 24%            | 89%                              | 11%                    | 5%                                           | \$102,992               |
| BG 4, CT 311.03 | 5%                          | 0%                        | 0%                               | 83%   | 2%                                        | 0%                    | 10%            | 99%                              | 1%                     | 2%                                           | \$92,321                |
| BG 1, CT 314.02 | 14%                         | 0%                        | 0%                               | 23%   | 7%                                        | 0%                    | 56%            | 96%                              | 4%                     | 5%                                           | \$84,730                |
| BG 2, CT 314.02 | 36%                         | 1%                        | 0%                               | 31%   | 10%                                       | 0%                    | 22%            | 97%                              | 3%                     | 5%                                           | \$70,036                |
| BG 1, CT 314.04 | 73%                         | 3%                        | 0%                               | 11%   | 0%                                        | 0%                    | 13%            | 85%                              | 15%                    | 13%                                          | \$57,396                |
| BG 2, CT 314.04 | 71%                         | 0%                        | 0%                               | 19%   | 0%                                        | 0%                    | 10%            | 94%                              | 6%                     | 10%                                          | \$71,949                |
| BG 3, CT 314.04 | 37%                         | 2%                        | 0%                               | 20%   | 3%                                        | 2%                    | 34%            | 94%                              | 6%                     | 18%                                          | \$37,679                |
| BG 1, CT 314.05 | 24%                         | 0%                        | 0%                               | 28%   | 20%                                       | 0%                    | 28%            | 88%                              | 12%                    | 24%                                          | \$51,806                |
| BG 2, CT 314.05 | 1%                          | 0%                        | 0%                               | 74%   | 3%                                        | 0%                    | 22%            | 99%                              | 1%                     | 5%                                           | \$120,769               |
| BG 3, CT 314.05 | 36%                         | 0%                        | 1%                               | 42%   | 0%                                        | 0%                    | 21%            | 82%                              | 18%                    | 9%                                           | \$53,000                |
| BG 4, CT 314.05 | 13%                         | 0%                        | 0%                               | 58%   | 3%                                        | 0%                    | 27%            | 93%                              | 7%                     | 0%                                           | \$93,333                |
| BG 1, CT 315.01 | 22%                         | 0%                        | 0%                               | 32%   | 13%                                       | 4%                    | 29%            | 96%                              | 4%                     | 4%                                           | \$76,648                |
| BG 2, CT 315.01 | 68%                         | 0%                        | 0%                               | 21%   | 0%                                        | 0%                    | 11%            | 92%                              | 8%                     | 3%                                           | \$68,750                |
| BG 1, CT 315.02 | 98%                         | 0%                        | 0%                               | 2%    | 0%                                        | 0%                    | 0%             | 100%                             | 0%                     | 0%                                           | \$52,391                |
| BG 2, CT 315.02 | 62%                         | 0%                        | 0%                               | 23%   | 1%                                        | 0%                    | 13%            | 87%                              | 13%                    | 2%                                           | \$61,310                |
| BG 3, CT 315.02 | 69%                         | 0%                        | 0%                               | 16%   | 1%                                        | 1%                    | 13%            | 89%                              | 11%                    | 1%                                           | \$74,688                |
| BG 1, CT 315.03 | 88%                         | 0%                        | 0%                               | 3%    | 1%                                        | 1%                    | 7%             | 93%                              | 7%                     | 5%                                           | \$97,083                |
| BG 2, CT 315.03 | 53%                         | 3%                        | 0%                               | 11%   | 15%                                       | 0%                    | 18%            | 71%                              | 29%                    | 9%                                           | \$33,750                |
| BG 1, CT 316.01 | 8%                          | 0%                        | 0%                               | 55%   | 13%                                       | 1%                    | 23%            | 79%                              | 21%                    | 4%                                           | \$71,992                |
| BG 2, CT 316.01 | 19%                         | 0%                        | 0%                               | 51%   | 13%                                       | 0%                    | 17%            | 88%                              | 12%                    | 21%                                          | \$37,163                |
| BG 1, CT 317    | 23%                         | 0%                        | 0%                               | 2%    | 41%                                       | 0%                    | 35%            | 79%                              | 21%                    | 31%                                          | \$35,000                |
| BG 2, CT 317    | 22%                         | 0%                        | 1%                               | 11%   | 37%                                       | 0%                    | 29%            | 91%                              | 9%                     | 22%                                          | \$52,819                |
| BG 3, CT 317    | 29%                         | 0%                        | 1%                               | 0%    | 47%                                       | 0%                    | 23%            | 92%                              | 8%                     | 30%                                          | \$21,544                |
| BG 4, CT 317    | 11%                         | 0%                        | 0%                               | 31%   | 32%                                       | 2%                    | 23%            | 95%                              | 5%                     | 20%                                          | \$50,425                |
| BG 5, CT 317    | 21%                         | 2%                        | 0%                               | 25%   | 19%                                       | 0%                    | 34%            | 97%                              | 3%                     | 2%                                           | \$75,571                |
| BG 1, CT 318.01 | 22%                         | 0%                        | 0%                               | 4%    | 47%                                       | 0%                    | 28%            | 94%                              | 6%                     | 25%                                          | \$42,546                |
| BG 2, CT 318.01 | 6%                          | 2%                        | 0%                               | 14%   | 44%                                       | 1%                    | 32%            | 90%                              | 10%                    | 17%                                          | \$43,125                |
| BG 1, CT 319    | 74%                         | 0%                        | 0%                               | 9%    | 3%                                        | 6%                    | 8%             | 91%                              | 9%                     | 16%                                          | \$71,786                |
| BG 2, CT 319    | 8%                          | 1%                        | 0%                               | 46%   | 14%                                       | 0%                    | 30%            | 96%                              | 4%                     | 14%                                          | \$49,318                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 3, CT 319  | 10%                         | 0%                        | 0%                               | 55%   | 2%                                        | 0%                    | 33%            | 89%                              | 11%                    | 21%                                          | \$98,056                |
| BG 4, CT 319  | 6%                          | 2%                        | 1%                               | 47%   | 7%                                        | 0%                    | 38%            | 95%                              | 5%                     | 18%                                          | \$58,750                |
| BG 1, CT 320  | 89%                         | 0%                        | 0%                               | 4%    | 1%                                        | 3%                    | 3%             | 95%                              | 5%                     | 10%                                          | \$63,438                |
| BG 2, CT 320  | 79%                         | 0%                        | 0%                               | 3%    | 2%                                        | 0%                    | 16%            | 89%                              | 11%                    | 4%                                           | \$85,865                |
| BG 1, CT 9800 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9900 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9902 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| BG 0, CT 9912 | No Population               |                           |                                  |       |                                           |                       |                |                                  |                        |                                              |                         |
| Statewide     | 25%                         | 2%                        | 0%                               | 38%   | 10%                                       | 1%                    | 24%            | 9%                               | 91%                    | 11%                                          | \$67,402                |

Source: U.S. Census Bureau 2013

BG = Block Group; CT = Census Tract; ND = no data

<sup>a</sup> Totals may not add to 100 percent due to rounding.

**Table 3: Block Group Demographic Data, American Samoa, 2010**

| Block Group   | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                   |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------------|---------------------------|-------------------------------------------|---------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|               | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Samoan | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1, CT 9501 | 0%                                | 0%                        | 98%                                       | 98%                                               | 0%    | 0%                 | 0%                    | 1%             | 47.6%                                        | \$29,063                |
| BG 2, CT 9501 | 1%                                | 0%                        | 97%                                       | 97%                                               | 0%    | 0%                 | 0%                    | 2%             | 61.0%                                        | \$22,813                |
| BG 1, CT 9502 | 0%                                | 0%                        | 97%                                       | 97%                                               | 0%    | 0%                 | 0%                    | 3%             | 56.4%                                        | \$25,833                |
| BG 2, CT 9502 | 5%                                | 0%                        | 92%                                       | 90%                                               | 0%    | 0%                 | 0%                    | 2%             | 62.5%                                        | \$21,667                |
| BG 1, CT 9503 | 1%                                | 0%                        | 97%                                       | 96%                                               | 0%    | 0%                 | 0%                    | 2%             | 56.6%                                        | \$27,727                |
| BG 2, CT 9503 | 1%                                | 0%                        | 97%                                       | 96%                                               | 0%    | 0%                 | 0%                    | 1%             | 52.5%                                        | \$24,375                |
| BG 3, CT 9503 | 2%                                | 0%                        | 93%                                       | 92%                                               | 1%    | 0%                 | 0%                    | 3%             | 50.9%                                        | \$28,875                |
| BG 1, CT 9505 | 9%                                | 0%                        | 86%                                       | 83%                                               | 1%    | 0%                 | 0%                    | 4%             | 57.0%                                        | \$25,875                |
| BG 2, CT 9505 | 5%                                | 0%                        | 93%                                       | 92%                                               | 0%    | 0%                 | 0%                    | 2%             | 67.0%                                        | \$20,114                |
| BG 3, CT 9505 | 6%                                | 0%                        | 92%                                       | 91%                                               | 0%    | 0%                 | 0%                    | 2%             | 66.8%                                        | \$17,639                |
| BG 1, CT 9506 | 5%                                | 0%                        | 89%                                       | 88%                                               | 0%    | 1%                 | 0%                    | 5%             | 55.3%                                        | \$22,039                |
| BG 2, CT 9506 | 3%                                | 0%                        | 94%                                       | 92%                                               | 0%    | 0%                 | 0%                    | 3%             | 54.1%                                        | \$22,969                |
| BG 3, CT 9506 | 2%                                | 0%                        | 97%                                       | 97%                                               | 0%    | 0%                 | 0%                    | 1%             | 67.4%                                        | \$20,833                |
| BG 1, CT 9507 | 3%                                | 0%                        | 89%                                       | 88%                                               | 2%    | 0%                 | 0%                    | 5%             | 52.4%                                        | \$33,438                |
| BG 2, CT 9507 | 8%                                | 0%                        | 88%                                       | 86%                                               | 0%    | 0%                 | 0%                    | 4%             | 62.7%                                        | \$20,972                |
| BG 3, CT 9507 | 6%                                | 0%                        | 86%                                       | 82%                                               | 1%    | 1%                 | 0%                    | 6%             | 46.2%                                        | \$26,818                |
| BG 1, CT 9509 | 0%                                | 0%                        | 98%                                       | 98%                                               | 0%    | 0%                 | 0%                    | 1%             | 62.6%                                        | \$22,813                |
| BG 2, CT 9509 | 10%                               | 0%                        | 85%                                       | 81%                                               | 1%    | 0%                 | 0%                    | 5%             | 58.3%                                        | \$22,019                |
| BG 3, CT 9509 | 10%                               | 0%                        | 85%                                       | 82%                                               | 2%    | 0%                 | 0%                    | 3%             | 58.2%                                        | \$21,324                |
| BG 4, CT 9509 | 6%                                | 0%                        | 91%                                       | 90%                                               | 1%    | 0%                 | 0%                    | 2%             | 41.5%                                        | \$31,667                |
| BG 1, CT 9518 | 0%                                | 0%                        | 99%                                       | 99%                                               | 0%    | 0%                 | 0%                    | 1%             | 56.1%                                        | \$16,429                |
| BG 2, CT 9518 | 1%                                | 0%                        | 97%                                       | 97%                                               | 1%    | 0%                 | 0%                    | 1%             | 68.7%                                        | \$18,269                |
| BG 1, CT 9519 | ND                                | ND                        | ND                                        | ND                                                | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9520 | 6%                                | 0%                        | 94%                                       | 88%                                               | 0%    | 0%                 | 0%                    | 0%             | 11.8%                                        | \$27,500                |
| BG 1, CT 9510 | 4%                                | 0%                        | 91%                                       | 81%                                               | 1%    | 0%                 | 0%                    | 3%             | 68.0%                                        | \$22,273                |
| BG 2, CT 9510 | 12%                               | 0%                        | 87%                                       | 82%                                               | 0%    | 0%                 | 0%                    | 1%             | 63.4%                                        | \$21,500                |

| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                   |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|---------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Samoan | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1, CT 9511    | 3%                                | 0%                        | 95%                                       | 79%                                               | 1%    | 0%                 | 0%                    | 1%             | 58.6%                                        | \$22,833                |
| BG 2, CT 9511    | 2%                                | 0%                        | 96%                                       | 82%                                               | 0%    | 0%                 | 0%                    | 2%             | 68.9%                                        | \$19,375                |
| BG 3, CT 9511    | 1%                                | 0%                        | 95%                                       | 92%                                               | 0%    | 0%                 | 0%                    | 3%             | 68.2%                                        | \$20,481                |
| BG 1, CT 9512.01 | 6%                                | 0%                        | 76%                                       | 67%                                               | 8%    | 0%                 | 1%                    | 8%             | 23.0%                                        | \$45,625                |
| BG 2, CT 9512.01 | 3%                                | 0%                        | 95%                                       | 91%                                               | 0%    | 0%                 | 0%                    | 2%             | 64.0%                                        | \$20,000                |
| BG 1, CT 9512.02 | 5%                                | 0%                        | 88%                                       | 82%                                               | 2%    | 0%                 | 0%                    | 4%             | 47.2%                                        | \$31,488                |
| BG 2, CT 9512.02 | 6%                                | 0%                        | 90%                                       | 86%                                               | 2%    | 0%                 | 0%                    | 3%             | 49.6%                                        | \$31,528                |
| BG 1, CT 9512.03 | 4%                                | 0%                        | 91%                                       | 86%                                               | 2%    | 0%                 | 0%                    | 3%             | 50.6%                                        | \$28,750                |
| BG 2, CT 9512.03 | 3%                                | 0%                        | 90%                                       | 88%                                               | 3%    | 0%                 | 0%                    | 3%             | 50.5%                                        | \$31,346                |
| BG 3, CT 9512.03 | 1%                                | 0%                        | 93%                                       | 87%                                               | 1%    | 0%                 | 0%                    | 5%             | 59.6%                                        | \$24,479                |
| BG 1, CT 9513    | 2%                                | 0%                        | 96%                                       | 96%                                               | 0%    | 0%                 | 1%                    | 1%             | 53.6%                                        | \$23,594                |
| BG 2, CT 9513    | 1%                                | 0%                        | 96%                                       | 95%                                               | 1%    | 0%                 | 0%                    | 2%             | 62.8%                                        | \$22,917                |
| BG 1, CT 9515    | 1%                                | 0%                        | 98%                                       | 98%                                               | 0%    | 0%                 | 0%                    | 1%             | 64.8%                                        | \$22,426                |
| BG 1, CT 9516    | 2%                                | 0%                        | 96%                                       | 95%                                               | 0%    | 0%                 | 0%                    | 2%             | 56.7%                                        | \$20,417                |
| BG 2, CT 9516    | 0%                                | 0%                        | 97%                                       | 96%                                               | 0%    | 0%                 | 0%                    | 3%             | 64.8%                                        | \$25,114                |
| BG 3, CT 9516    | 2%                                | 0%                        | 95%                                       | 94%                                               | 1%    | 0%                 | 0%                    | 2%             | 47.3%                                        | \$31,500                |
| BG 4, CT 9516    | 3%                                | 0%                        | 92%                                       | 90%                                               | 1%    | 0%                 | 0%                    | 3%             | 51.7%                                        | \$26,484                |
| Territory-wide   | 1%                                | 0%                        | 0%                                        | 93%                                               | 1%    | 5%                 | 0%                    | 3%             | 57.8%                                        | \$23,892                |

Source: U.S. Census Bureau 2010

BG = Block Group; CT = Census Tract; ND = no data

<sup>a</sup> Totals may not add to 100 percent, due to rounding.

<sup>b</sup> For American Samoa, the U.S. Census Bureau did not distinguish between race and ethnicity.

**Table 4: Block Group Demographic Data, Guam, 2010**

| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1, CT 9501    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 2, CT 9501    | 6%                                | 18%                       | 1%                                        | 1%                                                  | 59%   | 11%                | 2%                    | 5%             | 0.0%                                         | \$26,250                |
| BG 3, CT 9501    | 13%                               | 7%                        | 7%                                        | 4%                                                  | 56%   | 5%                 | 1%                    | 10%            | 7.3%                                         | \$63,333                |
| BG 4, CT 9501    | 15%                               | 10%                       | 6%                                        | 5%                                                  | 53%   | 8%                 | 1%                    | 7%             | 5.8%                                         | \$52,500                |
| BG 5, CT 9501    | 14%                               | 8%                        | 6%                                        | 4%                                                  | 51%   | 9%                 | 0%                    | 11%            | 11.5%                                        | \$44,063                |
| BG 1, CT 9502    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 2, CT 9502    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 3, CT 9502    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 4, CT 9502    | 10%                               | 9%                        | 11%                                       | 7%                                                  | 49%   | 7%                 | 0%                    | 13%            | 11.7%                                        | \$40,417                |
| BG 5, CT 9502    | 5%                                | 3%                        | 9%                                        | 9%                                                  | 63%   | 6%                 | 2%                    | 13%            | 13.2%                                        | \$37,000                |
| BG 1, CT 9503    | 0%                                | 0%                        | 50%                                       | 50%                                                 | 50%   | 0%                 | 0%                    | 0%             | 100.0%                                       | \$11,250                |
| BG 2, CT 9503    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 3, CT 9503    | 0%                                | 0%                        | 60%                                       | 60%                                                 | 0%    | 0%                 | 0%                    | 40%            | 100.0%                                       | \$23,750                |
| BG 4, CT 9503    | 20%                               | 24%                       | 9%                                        | 9%                                                  | 34%   | 1%                 | 0%                    | 12%            | 5.0%                                         | \$51,250                |
| BG 5, CT 9503    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 6, CT 9503    | 0%                                | 56%                       | 0%                                        | 0%                                                  | 44%   | 0%                 | 0%                    | 0%             | 0.0%                                         | \$98,750                |
| BG 7, CT 9503    | 25%                               | 11%                       | 5%                                        | 4%                                                  | 40%   | 10%                | 2%                    | 7%             | 13.7%                                        | \$51,250                |
| BG 8, CT 9503    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 9, CT 9503    | 0%                                | 0%                        | 78%                                       | 78%                                                 | 0%    | 0%                 | 22%                   | 0%             | 50.0%                                        | \$41,250                |
| BG 1, CT 9504.01 | 71%                               | 0%                        | 20%                                       | 13%                                                 | 1%    | 0%                 | 0%                    | 7%             | 22.0%                                        | \$44,107                |
| BG 2, CT 9504.01 | 76%                               | 0%                        | 17%                                       | 12%                                                 | 1%    | 0%                 | 0%                    | 5%             | 17.9%                                        | \$46,458                |
| BG 3, CT 9504.01 | 66%                               | 1%                        | 26%                                       | 14%                                                 | 2%    | 0%                 | 0%                    | 6%             | 24.0%                                        | \$40,833                |
| BG 4, CT 9504.01 | 57%                               | 0%                        | 33%                                       | 27%                                                 | 2%    | 0%                 | 0%                    | 7%             | 24.3%                                        | \$45,000                |
| BG 5, CT 9504.01 | 51%                               | 0%                        | 35%                                       | 18%                                                 | 3%    | 0%                 | 0%                    | 10%            | 35.5%                                        | \$35,417                |
| BG 6, CT 9504.01 | 46%                               | 0%                        | 45%                                       | 24%                                                 | 1%    | 0%                 | 0%                    | 7%             | 30.0%                                        | \$37,404                |
| BG 1, CT 9504.02 | 67%                               | 0%                        | 25%                                       | 14%                                                 | 1%    | 0%                 | 0%                    | 7%             | 18.7%                                        | \$50,682                |
| BG 2, CT 9504.02 | 44%                               | 1%                        | 41%                                       | 18%                                                 | 3%    | 0%                 | 0%                    | 10%            | 29.8%                                        | \$51,094                |

| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 3, CT 9504.02 | 32%                               | 1%                        | 52%                                       | 37%                                                 | 5%    | 1%                 | 0%                    | 9%             | 31.3%                                        | \$36,607                |
| BG 1, CT 9505.01 | 19%                               | 0%                        | 67%                                       | 53%                                                 | 3%    | 0%                 | 0%                    | 11%            | 34.0%                                        | \$38,214                |
| BG 2, CT 9505.01 | 33%                               | 0%                        | 59%                                       | 14%                                                 | 2%    | 0%                 | 0%                    | 5%             | 43.7%                                        | \$33,000                |
| BG 1, CT 9505.02 | 55%                               | 0%                        | 38%                                       | 20%                                                 | 1%    | 0%                 | 1%                    | 5%             | 29.6%                                        | \$41,094                |
| BG 2, CT 9505.02 | 47%                               | 0%                        | 40%                                       | 23%                                                 | 4%    | 1%                 | 0%                    | 9%             | 23.0%                                        | \$41,875                |
| BG 3, CT 9505.02 | 51%                               | 0%                        | 37%                                       | 29%                                                 | 1%    | 1%                 | 0%                    | 9%             | 23.8%                                        | \$49,375                |
| BG 4, CT 9505.02 | 59%                               | 0%                        | 32%                                       | 21%                                                 | 3%    | 0%                 | 0%                    | 6%             | 19.2%                                        | \$46,563                |
| BG 5, CT 9505.02 | 35%                               | 0%                        | 53%                                       | 37%                                                 | 4%    | 0%                 | 0%                    | 8%             | 27.9%                                        | \$41,161                |
| BG 1, CT 9507.01 | 38%                               | 5%                        | 19%                                       | 13%                                                 | 23%   | 3%                 | 1%                    | 12%            | 10.5%                                        | \$61,250                |
| BG 2, CT 9507.01 | 51%                               | 1%                        | 29%                                       | 19%                                                 | 6%    | 0%                 | 1%                    | 13%            | 23.2%                                        | \$57,500                |
| BG 3, CT 9507.01 | 27%                               | 0%                        | 58%                                       | 49%                                                 | 5%    | 0%                 | 0%                    | 10%            | 22.8%                                        | \$49,792                |
| BG 4, CT 9507.01 | 50%                               | 0%                        | 38%                                       | 31%                                                 | 2%    | 0%                 | 0%                    | 10%            | 27.7%                                        | \$38,750                |
| BG 5, CT 9507.01 | 46%                               | 1%                        | 43%                                       | 31%                                                 | 2%    | 0%                 | 0%                    | 8%             | 25.0%                                        | \$43,125                |
| BG 6, CT 9507.01 | 52%                               | 0%                        | 34%                                       | 26%                                                 | 4%    | 1%                 | 0%                    | 10%            | 22.4%                                        | \$45,179                |
| BG 7, CT 9507.01 | 58%                               | 0%                        | 31%                                       | 21%                                                 | 2%    | 0%                 | 0%                    | 8%             | 14.7%                                        | \$56,458                |
| BG 1, CT 9507.02 | 25%                               | 0%                        | 65%                                       | 53%                                                 | 2%    | 0%                 | 0%                    | 7%             | 35.4%                                        | \$29,821                |
| BG 2, CT 9507.02 | 30%                               | 0%                        | 55%                                       | 36%                                                 | 4%    | 1%                 | 0%                    | 10%            | 29.3%                                        | \$35,625                |
| BG 3, CT 9507.02 | 50%                               | 1%                        | 35%                                       | 27%                                                 | 5%    | 0%                 | 0%                    | 8%             | 21.1%                                        | \$51,563                |
| BG 4, CT 9507.02 | 36%                               | 0%                        | 53%                                       | 31%                                                 | 2%    | 0%                 | 0%                    | 8%             | 32.2%                                        | \$42,679                |
| BG 5, CT 9507.02 | 42%                               | 1%                        | 43%                                       | 38%                                                 | 1%    | 0%                 | 0%                    | 13%            | 18.2%                                        | \$54,375                |
| BG 1, CT 9508.01 | 20%                               | 0%                        | 68%                                       | 56%                                                 | 2%    | 0%                 | 0%                    | 10%            | 41.1%                                        | \$32,708                |
| BG 2, CT 9508.01 | 40%                               | 0%                        | 52%                                       | 37%                                                 | 1%    | 0%                 | 0%                    | 6%             | 24.5%                                        | \$47,083                |
| BG 3, CT 9508.01 | 30%                               | 0%                        | 57%                                       | 44%                                                 | 3%    | 1%                 | 0%                    | 9%             | 29.4%                                        | \$41,705                |
| BG 4, CT 9508.01 | 25%                               | 0%                        | 67%                                       | 60%                                                 | 2%    | 0%                 | 0%                    | 7%             | 36.8%                                        | \$35,938                |
| BG 1, CT 9508.02 | 30%                               | 0%                        | 55%                                       | 37%                                                 | 2%    | 1%                 | 0%                    | 12%            | 34.5%                                        | \$35,000                |
| BG 2, CT 9508.02 | 44%                               | 1%                        | 42%                                       | 32%                                                 | 2%    | 0%                 | 0%                    | 11%            | 17.1%                                        | \$54,375                |
| BG 3, CT 9508.02 | 29%                               | 0%                        | 58%                                       | 25%                                                 | 2%    | 0%                 | 0%                    | 11%            | 30.9%                                        | \$36,563                |
| BG 4, CT 9508.02 | 22%                               | 0%                        | 65%                                       | 42%                                                 | 4%    | 0%                 | 0%                    | 8%             | 49.6%                                        | \$30,625                |
| BG 1, CT 9509    | 49%                               | 1%                        | 30%                                       | 17%                                                 | 9%    | 1%                 | 1%                    | 10%            | 23.1%                                        | \$39,205                |

| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 2, CT 9509    | 59%                               | 0%                        | 30%                                       | 25%                                                 | 2%    | 1%                 | 0%                    | 8%             | 16.5%                                        | \$48,889                |
| BG 3, CT 9509    | 52%                               | 0%                        | 34%                                       | 28%                                                 | 1%    | 0%                 | 0%                    | 12%            | 24.0%                                        | \$55,625                |
| BG 4, CT 9509    | 61%                               | 0%                        | 27%                                       | 22%                                                 | 2%    | 0%                 | 0%                    | 10%            | 14.0%                                        | \$62,679                |
| BG 5, CT 9509    | 55%                               | 0%                        | 33%                                       | 23%                                                 | 3%    | 0%                 | 0%                    | 7%             | 22.9%                                        | \$39,821                |
| BG 6, CT 9509    | 69%                               | 0%                        | 22%                                       | 13%                                                 | 1%    | 0%                 | 0%                    | 8%             | 19.5%                                        | \$52,750                |
| BG 7, CT 9509    | 54%                               | 0%                        | 40%                                       | 31%                                                 | 1%    | 0%                 | 0%                    | 6%             | 15.6%                                        | \$45,750                |
| BG 1, CT 9510    | 57%                               | 0%                        | 32%                                       | 23%                                                 | 1%    | 0%                 | 0%                    | 10%            | 11.8%                                        | \$47,250                |
| BG 2, CT 9510    | 45%                               | 0%                        | 48%                                       | 37%                                                 | 1%    | 0%                 | 0%                    | 6%             | 16.3%                                        | \$51,250                |
| BG 3, CT 9510    | 41%                               | 0%                        | 47%                                       | 37%                                                 | 1%    | 0%                 | 0%                    | 11%            | 21.8%                                        | \$50,000                |
| BG 4, CT 9510    | 13%                               | 0%                        | 72%                                       | 71%                                                 | 1%    | 0%                 | 0%                    | 13%            | 20.5%                                        | \$67,500                |
| BG 5, CT 9510    | 36%                               | 0%                        | 50%                                       | 31%                                                 | 1%    | 0%                 | 0%                    | 13%            | 25.9%                                        | \$37,031                |
| BG 6, CT 9510    | 61%                               | 0%                        | 32%                                       | 26%                                                 | 1%    | 0%                 | 0%                    | 6%             | 13.2%                                        | \$49,107                |
| BG 7, CT 9510    | 39%                               | 1%                        | 51%                                       | 38%                                                 | 1%    | 0%                 | 0%                    | 8%             | 37.6%                                        | \$29,167                |
| BG 8, CT 9510    | 69%                               | 0%                        | 21%                                       | 11%                                                 | 2%    | 0%                 | 0%                    | 8%             | 15.4%                                        | \$51,250                |
| BG 1, CT 9511    | 57%                               | 1%                        | 26%                                       | 17%                                                 | 5%    | 0%                 | 1%                    | 10%            | 19.0%                                        | \$47,143                |
| BG 2, CT 9511    | 57%                               | 1%                        | 26%                                       | 18%                                                 | 4%    | 1%                 | 0%                    | 11%            | 17.9%                                        | \$56,429                |
| BG 3, CT 9511    | 39%                               | 0%                        | 55%                                       | 19%                                                 | 1%    | 0%                 | 0%                    | 6%             | 31.6%                                        | \$36,944                |
| BG 4, CT 9511    | 34%                               | 0%                        | 53%                                       | 35%                                                 | 2%    | 0%                 | 0%                    | 10%            | 34.3%                                        | \$36,250                |
| BG 5, CT 9511    | 50%                               | 1%                        | 37%                                       | 25%                                                 | 2%    | 0%                 | 0%                    | 9%             | 26.2%                                        | \$39,464                |
| BG 6, CT 9511    | 48%                               | 1%                        | 40%                                       | 25%                                                 | 2%    | 1%                 | 0%                    | 8%             | 25.8%                                        | \$45,956                |
| BG 1, CT 9516    | 13%                               | 0%                        | 83%                                       | 52%                                                 | 0%    | 0%                 | 0%                    | 4%             | 30.0%                                        | \$53,750                |
| BG 2, CT 9516    | 33%                               | 7%                        | 33%                                       | 33%                                                 | 0%    | 0%                 | 0%                    | 27%            | 13.3%                                        | \$51,250                |
| BG 3, CT 9516    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9517    | 37%                               | 1%                        | 37%                                       | 31%                                                 | 12%   | 2%                 | 1%                    | 10%            | 11.1%                                        | \$91,250                |
| BG 2, CT 9517    | 45%                               | 0%                        | 39%                                       | 26%                                                 | 5%    | 0%                 | 0%                    | 10%            | 27.5%                                        | \$54,167                |
| BG 1, CT 9518    | 10%                               | 0%                        | 79%                                       | 56%                                                 | 3%    | 1%                 | 1%                    | 7%             | 20.9%                                        | \$52,917                |
| BG 1, CT 9519.01 | 43%                               | 1%                        | 42%                                       | 7%                                                  | 3%    | 0%                 | 0%                    | 11%            | 45.3%                                        | \$30,568                |
| BG 2, CT 9519.01 | 62%                               | 0%                        | 25%                                       | 13%                                                 | 4%    | 1%                 | 1%                    | 6%             | 30.6%                                        | \$30,096                |
| BG 3, CT 9519.01 | 65%                               | 1%                        | 17%                                       | 9%                                                  | 10%   | 1%                 | 0%                    | 7%             | 19.4%                                        | \$40,313                |



| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 4, CT 9519.01 | 61%                               | 1%                        | 24%                                       | 14%                                                 | 6%    | 1%                 | 0%                    | 8%             | 23.6%                                        | \$39,432                |
| BG 1, CT 9519.02 | 58%                               | 0%                        | 34%                                       | 7%                                                  | 3%    | 0%                 | 0%                    | 4%             | 32.6%                                        | \$31,000                |
| BG 2, CT 9519.02 | 56%                               | 0%                        | 38%                                       | 4%                                                  | 1%    | 0%                 | 0%                    | 4%             | 45.8%                                        | \$24,464                |
| BG 3, CT 9519.02 | 53%                               | 1%                        | 19%                                       | 15%                                                 | 16%   | 3%                 | 1%                    | 7%             | 17.5%                                        | \$46,111                |
| BG 4, CT 9519.02 | 54%                               | 2%                        | 15%                                       | 12%                                                 | 18%   | 1%                 | 1%                    | 9%             | 15.5%                                        | \$52,500                |
| BG 5, CT 9519.02 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9522    | 53%                               | 0%                        | 34%                                       | 21%                                                 | 2%    | 0%                 | 1%                    | 10%            | 24.5%                                        | \$39,375                |
| BG 2, CT 9522    | 50%                               | 0%                        | 30%                                       | 20%                                                 | 6%    | 0%                 | 1%                    | 13%            | 23.7%                                        | \$37,500                |
| BG 3, CT 9522    | 56%                               | 1%                        | 29%                                       | 17%                                                 | 3%    | 1%                 | 0%                    | 9%             | 18.6%                                        | \$47,321                |
| BG 4, CT 9522    | 55%                               | 1%                        | 31%                                       | 18%                                                 | 3%    | 0%                 | 0%                    | 10%            | 20.9%                                        | \$42,500                |
| BG 1, CT 9523    | 50%                               | 1%                        | 27%                                       | 17%                                                 | 10%   | 1%                 | 1%                    | 10%            | 15.7%                                        | \$49,167                |
| BG 2, CT 9523    | 44%                               | 1%                        | 27%                                       | 18%                                                 | 12%   | 1%                 | 2%                    | 13%            | 12.5%                                        | \$62,045                |
| BG 3, CT 9523    | 26%                               | 0%                        | 57%                                       | 22%                                                 | 4%    | 0%                 | 0%                    | 12%            | 42.5%                                        | \$35,417                |
| BG 1, CT 9524    | 42%                               | 1%                        | 38%                                       | 20%                                                 | 5%    | 0%                 | 1%                    | 12%            | 32.5%                                        | \$31,518                |
| BG 2, CT 9524    | 30%                               | 1%                        | 52%                                       | 16%                                                 | 7%    | 1%                 | 0%                    | 8%             | 37.0%                                        | \$32,188                |
| BG 1, CT 9527    | 18%                               | 0%                        | 68%                                       | 65%                                                 | 3%    | 0%                 | 0%                    | 10%            | 21.2%                                        | \$61,500                |
| BG 2, CT 9527    | 18%                               | 0%                        | 68%                                       | 60%                                                 | 4%    | 0%                 | 0%                    | 10%            | 14.2%                                        | \$53,594                |
| BG 3, CT 9527    | 14%                               | 0%                        | 70%                                       | 62%                                                 | 5%    | 0%                 | 1%                    | 10%            | 18.0%                                        | \$62,857                |
| BG 4, CT 9527    | 17%                               | 0%                        | 62%                                       | 52%                                                 | 12%   | 0%                 | 0%                    | 8%             | 17.3%                                        | \$65,000                |
| BG 5, CT 9527    | 35%                               | 0%                        | 50%                                       | 32%                                                 | 6%    | 0%                 | 0%                    | 8%             | 28.6%                                        | \$45,000                |
| BG 1, CT 9528    | 0%                                | 0%                        | 67%                                       | 67%                                                 | 17%   | 0%                 | 0%                    | 17%            | 50.0%                                        | \$98,750                |
| BG 2, CT 9528    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9529    | 13%                               | 4%                        | 57%                                       | 43%                                                 | 15%   | 2%                 | 0%                    | 10%            | 18.2%                                        | \$51,324                |
| BG 2, CT 9529    | 12%                               | 1%                        | 75%                                       | 47%                                                 | 3%    | 0%                 | 0%                    | 9%             | 35.4%                                        | \$35,288                |
| BG 3, CT 9529    | 25%                               | 0%                        | 64%                                       | 22%                                                 | 4%    | 0%                 | 1%                    | 6%             | 31.7%                                        | \$52,500                |
| BG 4, CT 9529    | 17%                               | 1%                        | 68%                                       | 57%                                                 | 5%    | 0%                 | 0%                    | 9%             | 19.7%                                        | \$56,406                |
| BG 5, CT 9529    | 12%                               | 0%                        | 73%                                       | 54%                                                 | 3%    | 0%                 | 0%                    | 12%            | 27.7%                                        | \$54,375                |
| BG 6, CT 9529    | 29%                               | 0%                        | 59%                                       | 47%                                                 | 2%    | 0%                 | 0%                    | 10%            | 21.5%                                        | \$56,071                |
| BG 1, CT 9530    | 15%                               | 1%                        | 65%                                       | 40%                                                 | 6%    | 0%                 | 0%                    | 12%            | 31.4%                                        | \$44,167                |

| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 2, CT 9530    | 16%                               | 1%                        | 65%                                       | 39%                                                 | 8%    | 0%                 | 0%                    | 11%            | 20.2%                                        | \$60,750                |
| BG 3, CT 9530    | 12%                               | 1%                        | 70%                                       | 60%                                                 | 3%    | 1%                 | 0%                    | 13%            | 19.6%                                        | \$60,417                |
| BG 4, CT 9530    | 20%                               | 0%                        | 63%                                       | 48%                                                 | 4%    | 1%                 | 1%                    | 11%            | 29.5%                                        | \$40,147                |
| BG 5, CT 9530    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9531.01 | 14%                               | 0%                        | 65%                                       | 58%                                                 | 9%    | 1%                 | 0%                    | 12%            | 11.2%                                        | \$65,893                |
| BG 2, CT 9531.01 | 13%                               | 1%                        | 69%                                       | 61%                                                 | 7%    | 0%                 | 0%                    | 10%            | 14.6%                                        | \$61,438                |
| BG 3, CT 9531.01 | 21%                               | 0%                        | 64%                                       | 55%                                                 | 4%    | 1%                 | 0%                    | 10%            | 23.1%                                        | \$51,625                |
| BG 1, CT 9531.02 | 12%                               | 1%                        | 69%                                       | 63%                                                 | 5%    | 1%                 | 0%                    | 11%            | 19.2%                                        | \$58,000                |
| BG 2, CT 9531.02 | 15%                               | 0%                        | 64%                                       | 57%                                                 | 9%    | 1%                 | 0%                    | 10%            | 21.5%                                        | \$45,682                |
| BG 3, CT 9531.02 | 26%                               | 0%                        | 63%                                       | 46%                                                 | 2%    | 0%                 | 0%                    | 8%             | 18.6%                                        | \$57,813                |
| BG 1, CT 9532    | 15%                               | 1%                        | 66%                                       | 58%                                                 | 6%    | 0%                 | 0%                    | 11%            | 16.1%                                        | \$58,125                |
| BG 2, CT 9532    | 11%                               | 0%                        | 76%                                       | 69%                                                 | 2%    | 0%                 | 0%                    | 10%            | 12.9%                                        | \$60,156                |
| BG 3, CT 9532    | 14%                               | 0%                        | 72%                                       | 62%                                                 | 5%    | 0%                 | 0%                    | 9%             | 27.4%                                        | \$43,750                |
| BG 1, CT 9533    | 16%                               | 0%                        | 68%                                       | 60%                                                 | 4%    | 0%                 | 0%                    | 11%            | 20.4%                                        | \$45,714                |
| BG 2, CT 9533    | 40%                               | 0%                        | 44%                                       | 35%                                                 | 2%    | 0%                 | 0%                    | 14%            | 17.6%                                        | \$45,000                |
| BG 3, CT 9533    | 23%                               | 0%                        | 64%                                       | 54%                                                 | 2%    | 1%                 | 1%                    | 9%             | 23.9%                                        | \$40,208                |
| BG 4, CT 9533    | 20%                               | 1%                        | 61%                                       | 41%                                                 | 6%    | 0%                 | 0%                    | 11%            | 33.6%                                        | \$34,015                |
| BG 1, CT 9534    | 21%                               | 1%                        | 60%                                       | 42%                                                 | 3%    | 0%                 | 0%                    | 15%            | 26.2%                                        | \$42,188                |
| BG 2, CT 9534    | 19%                               | 0%                        | 62%                                       | 35%                                                 | 5%    | 1%                 | 0%                    | 13%            | 35.3%                                        | \$33,393                |
| BG 1, CT 9535    | 23%                               | 9%                        | 12%                                       | 12%                                                 | 48%   | 6%                 | 1%                    | 1%             | 10.2%                                        | \$31,250                |
| BG 1, CT 9536    | 11%                               | 0%                        | 77%                                       | 63%                                                 | 2%    | 0%                 | 0%                    | 9%             | 25.9%                                        | \$56,667                |
| BG 2, CT 9536    | 8%                                | 1%                        | 76%                                       | 57%                                                 | 4%    | 0%                 | 0%                    | 10%            | 26.2%                                        | \$44,286                |
| BG 3, CT 9536    | 12%                               | 1%                        | 72%                                       | 62%                                                 | 6%    | 0%                 | 0%                    | 8%             | 14.2%                                        | \$57,500                |
| BG 4, CT 9536    | 6%                                | 0%                        | 78%                                       | 74%                                                 | 6%    | 1%                 | 0%                    | 8%             | 16.2%                                        | \$63,125                |
| BG 5, CT 9536    | 11%                               | 1%                        | 63%                                       | 59%                                                 | 9%    | 1%                 | 0%                    | 14%            | 10.4%                                        | \$48,125                |
| BG 1, CT 9539    | 7%                                | 0%                        | 81%                                       | 68%                                                 | 4%    | 0%                 | 0%                    | 8%             | 38.6%                                        | \$40,750                |
| BG 2, CT 9539    | 7%                                | 0%                        | 79%                                       | 71%                                                 | 4%    | 2%                 | 0%                    | 8%             | 15.5%                                        | \$57,417                |
| BG 3, CT 9539    | 6%                                | 0%                        | 85%                                       | 73%                                                 | 1%    | 1%                 | 0%                    | 6%             | 25.0%                                        | \$52,614                |
| BG 4, CT 9539    | 8%                                | 0%                        | 75%                                       | 69%                                                 | 9%    | 0%                 | 0%                    | 8%             | 20.1%                                        | \$57,917                |

| Block Group   | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|               | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1, CT 9540 | 10%                               | 1%                        | 66%                                       | 60%                                                 | 12%   | 1%                 | 0%                    | 10%            | 20.3%                                        | \$70,536                |
| BG 2, CT 9540 | 15%                               | 1%                        | 59%                                       | 52%                                                 | 12%   | 0%                 | 1%                    | 13%            | 10.1%                                        | \$81,250                |
| BG 1, CT 9543 | 16%                               | 3%                        | 45%                                       | 42%                                                 | 22%   | 1%                 | 0%                    | 14%            | 11.0%                                        | \$75,000                |
| BG 2, CT 9543 | 6%                                | 1%                        | 75%                                       | 63%                                                 | 7%    | 0%                 | 0%                    | 10%            | 24.2%                                        | \$50,500                |
| BG 1, CT 9544 | 3%                                | 5%                        | 56%                                       | 46%                                                 | 21%   | 6%                 | 0%                    | 10%            | 20.6%                                        | \$43,750                |
| BG 2, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 3, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 4, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 5, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 6, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 7, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9545 | 8%                                | 16%                       | 1%                                        | 0%                                                  | 59%   | 7%                 | 1%                    | 8%             | 16.0%                                        | \$38,750                |
| BG 2, CT 9545 | 10%                               | 8%                        | 9%                                        | 5%                                                  | 61%   | 6%                 | 0%                    | 6%             | 10.2%                                        | \$68,125                |
| BG 3, CT 9545 | 6%                                | 13%                       | 9%                                        | 7%                                                  | 54%   | 9%                 | 1%                    | 8%             | 12.3%                                        | \$44,643                |
| BG 4, CT 9545 | 3%                                | 7%                        | 0%                                        | 0%                                                  | 83%   | 2%                 | 2%                    | 4%             | ND                                           | ND                      |
| BG 5, CT 9545 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9547 | 16%                               | 1%                        | 68%                                       | 63%                                                 | 4%    | 0%                 | 0%                    | 11%            | 22.9%                                        | \$59,375                |
| BG 2, CT 9547 | 22%                               | 0%                        | 69%                                       | 62%                                                 | 1%    | 0%                 | 0%                    | 8%             | 20.0%                                        | \$50,000                |
| BG 3, CT 9547 | 34%                               | 1%                        | 49%                                       | 45%                                                 | 2%    | 1%                 | 0%                    | 13%            | 16.7%                                        | \$46,477                |
| BG 1, CT 9548 | 15%                               | 3%                        | 69%                                       | 65%                                                 | 5%    | 0%                 | 0%                    | 7%             | 38.0%                                        | \$35,000                |
| BG 2, CT 9548 | 13%                               | 0%                        | 76%                                       | 53%                                                 | 3%    | 0%                 | 1%                    | 7%             | 55.8%                                        | \$26,023                |
| BG 3, CT 9548 | 40%                               | 1%                        | 43%                                       | 42%                                                 | 3%    | 1%                 | 0%                    | 12%            | 14.3%                                        | \$52,656                |
| BG 4, CT 9548 | 22%                               | 1%                        | 64%                                       | 62%                                                 | 2%    | 0%                 | 0%                    | 10%            | 22.0%                                        | \$50,250                |
| BG 1, CT 9551 | 8%                                | 1%                        | 61%                                       | 53%                                                 | 17%   | 2%                 | 0%                    | 11%            | 14.1%                                        | \$67,500                |
| BG 2, CT 9551 | 5%                                | 1%                        | 77%                                       | 75%                                                 | 8%    | 0%                 | 0%                    | 10%            | 17.3%                                        | \$65,625                |
| BG 3, CT 9551 | 7%                                | 0%                        | 81%                                       | 70%                                                 | 6%    | 1%                 | 0%                    | 5%             | 29.4%                                        | \$53,438                |
| BG 4, CT 9551 | 7%                                | 0%                        | 73%                                       | 70%                                                 | 8%    | 1%                 | 1%                    | 11%            | 16.9%                                        | \$64,375                |
| BG 1, CT 9552 | 2%                                | 0%                        | 84%                                       | 81%                                                 | 8%    | 0%                 | 0%                    | 6%             | 13.8%                                        | \$60,000                |
| BG 2, CT 9552 | 3%                                | 0%                        | 87%                                       | 81%                                                 | 4%    | 0%                 | 0%                    | 5%             | 20.2%                                        | \$56,944                |

| Block Group   | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|               | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 3, CT 9552 | 5%                                | 0%                        | 84%                                       | 81%                                                 | 3%    | 0%                 | 0%                    | 8%             | 17.1%                                        | \$52,308                |
| BG 1, CT 9553 | 3%                                | 0%                        | 85%                                       | 81%                                                 | 2%    | 0%                 | 0%                    | 10%            | 26.6%                                        | \$55,114                |
| BG 2, CT 9553 | 5%                                | 0%                        | 78%                                       | 74%                                                 | 4%    | 0%                 | 0%                    | 12%            | 22.1%                                        | \$58,000                |
| BG 1, CT 9554 | 2%                                | 1%                        | 80%                                       | 75%                                                 | 2%    | 0%                 | 0%                    | 15%            | 28.9%                                        | \$48,750                |
| BG 1, CT 9556 | 26%                               | 1%                        | 60%                                       | 52%                                                 | 4%    | 0%                 | 0%                    | 9%             | 17.3%                                        | \$68,333                |
| BG 2, CT 9556 | 11%                               | 0%                        | 76%                                       | 65%                                                 | 2%    | 0%                 | 0%                    | 11%            | 30.2%                                        | \$48,750                |
| BG 1, CT 9557 | 19%                               | 0%                        | 68%                                       | 41%                                                 | 3%    | 0%                 | 0%                    | 9%             | 34.1%                                        | \$41,161                |
| BG 2, CT 9557 | 15%                               | 0%                        | 79%                                       | 74%                                                 | 0%    | 0%                 | 0%                    | 5%             | 66.7%                                        | \$16,250                |
| BG 3, CT 9557 | 47%                               | 1%                        | 35%                                       | 25%                                                 | 6%    | 0%                 | 0%                    | 11%            | 17.8%                                        | \$53,611                |
| BG 4, CT 9557 | 39%                               | 1%                        | 39%                                       | 27%                                                 | 7%    | 1%                 | 0%                    | 13%            | 15.2%                                        | \$69,583                |
| BG 5, CT 9557 | 59%                               | 1%                        | 30%                                       | 15%                                                 | 3%    | 0%                 | 0%                    | 7%             | 17.6%                                        | \$50,938                |
| BG 6, CT 9557 | 32%                               | 0%                        | 57%                                       | 51%                                                 | 2%    | 0%                 | 0%                    | 9%             | 28.1%                                        | \$41,625                |
| BG 7, CT 9557 | 57%                               | 0%                        | 21%                                       | 14%                                                 | 7%    | 0%                 | 0%                    | 14%            | 7.1%                                         | \$103,750               |
| BG 1, CT 9558 | 47%                               | 1%                        | 43%                                       | 27%                                                 | 3%    | 0%                 | 0%                    | 7%             | 29.5%                                        | \$40,417                |
| BG 2, CT 9558 | 50%                               | 0%                        | 41%                                       | 9%                                                  | 2%    | 0%                 | 0%                    | 7%             | 35.6%                                        | \$50,000                |
| BG 3, CT 9558 | 50%                               | 1%                        | 36%                                       | 29%                                                 | 5%    | 0%                 | 0%                    | 7%             | 8.1%                                         | \$61,458                |
| BG 4, CT 9558 | 39%                               | 1%                        | 39%                                       | 32%                                                 | 10%   | 1%                 | 1%                    | 10%            | 8.0%                                         | \$65,000                |
| BG 5, CT 9558 | 53%                               | 2%                        | 34%                                       | 16%                                                 | 5%    | 0%                 | 0%                    | 7%             | 21.8%                                        | \$41,071                |
| BG 6, CT 9558 | 33%                               | 1%                        | 53%                                       | 40%                                                 | 2%    | 0%                 | 1%                    | 10%            | 18.7%                                        | \$51,563                |
| BG 7, CT 9558 | 39%                               | 1%                        | 47%                                       | 33%                                                 | 3%    | 0%                 | 0%                    | 11%            | 22.3%                                        | \$50,938                |
| BG 8, CT 9558 | 57%                               | 1%                        | 31%                                       | 17%                                                 | 3%    | 0%                 | 0%                    | 9%             | 20.4%                                        | \$50,000                |
| BG 9, CT 9558 | 54%                               | 2%                        | 24%                                       | 22%                                                 | 11%   | 0%                 | 0%                    | 8%             | 14.2%                                        | \$57,045                |
| BG 1, CT 9559 | 38%                               | 3%                        | 27%                                       | 23%                                                 | 20%   | 1%                 | 1%                    | 9%             | 16.7%                                        | \$61,250                |
| BG 2, CT 9559 | 44%                               | 1%                        | 26%                                       | 20%                                                 | 15%   | 2%                 | 2%                    | 10%            | 7.8%                                         | \$72,159                |
| BG 3, CT 9559 | 39%                               | 3%                        | 30%                                       | 14%                                                 | 19%   | 2%                 | 1%                    | 6%             | 14.9%                                        | \$54,196                |
| BG 1, CT 9560 | 15%                               | 1%                        | 70%                                       | 53%                                                 | 4%    | 0%                 | 0%                    | 10%            | 22.9%                                        | \$46,625                |
| BG 2, CT 9560 | 14%                               | 0%                        | 71%                                       | 42%                                                 | 3%    | 1%                 | 0%                    | 10%            | 46.6%                                        | \$33,000                |
| BG 1, CT 9561 | 8%                                | 0%                        | 73%                                       | 67%                                                 | 6%    | 1%                 | 0%                    | 12%            | 18.7%                                        | \$53,250                |
| BG 2, CT 9561 | 10%                               | 3%                        | 18%                                       | 18%                                                 | 50%   | 3%                 | 0%                    | 15%            | 6.6%                                         | \$76,250                |

| Block Group   | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|               | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 3, CT 9561 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 4, CT 9561 | 10%                               | 0%                        | 61%                                       | 54%                                                 | 13%   | 1%                 | 1%                    | 14%            | 19.7%                                        | \$59,107                |
| BG 1, CT 9562 | 26%                               | 1%                        | 56%                                       | 54%                                                 | 9%    | 1%                 | 0%                    | 8%             | 15.7%                                        | \$61,389                |
| BG 2, CT 9562 | 25%                               | 0%                        | 58%                                       | 56%                                                 | 8%    | 0%                 | 1%                    | 7%             | 13.1%                                        | \$64,063                |
| BG 3, CT 9562 | 13%                               | 5%                        | 6%                                        | 5%                                                  | 63%   | 0%                 | 1%                    | 12%            | 1.1%                                         | \$96,250                |
| BG 4, CT 9562 | 33%                               | 0%                        | 50%                                       | 46%                                                 | 3%    | 0%                 | 0%                    | 13%            | 17.9%                                        | \$56,250                |
| BG 5, CT 9562 | 14%                               | 0%                        | 66%                                       | 63%                                                 | 6%    | 0%                 | 0%                    | 13%            | 21.3%                                        | \$53,438                |
| BG 6, CT 9562 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9563 | 11%                               | 0%                        | 63%                                       | 33%                                                 | 7%    | 0%                 | 0%                    | 19%            | 51.9%                                        | \$23,750                |
| BG 2, CT 9563 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 3, CT 9563 | 100%                              | 0%                        | 0%                                        | 0%                                                  | 0%    | 0%                 | 0%                    | 0%             | 9.7%                                         | \$-                     |
| BG 4, CT 9563 | 34%                               | 1%                        | 50%                                       | 38%                                                 | 4%    | 0%                 | 1%                    | 10%            | 12.7%                                        | \$56,094                |
| BG 5, CT 9563 | 26%                               | 0%                        | 59%                                       | 28%                                                 | 3%    | 1%                 | 0%                    | 11%            | 36.9%                                        | \$40,893                |
| BG 1, CT 9801 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9802 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9803 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9804 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 0, CT 9900 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9501 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 2, CT 9501 | 6%                                | 18%                       | 1%                                        | 1%                                                  | 59%   | 11%                | 2%                    | 5%             | 0.0%                                         | \$26,250                |
| BG 3, CT 9501 | 13%                               | 7%                        | 7%                                        | 4%                                                  | 56%   | 5%                 | 1%                    | 10%            | 7.3%                                         | \$63,333                |
| BG 4, CT 9501 | 15%                               | 10%                       | 6%                                        | 5%                                                  | 53%   | 8%                 | 1%                    | 7%             | 5.8%                                         | \$52,500                |
| BG 5, CT 9501 | 14%                               | 8%                        | 6%                                        | 4%                                                  | 51%   | 9%                 | 0%                    | 11%            | 11.5%                                        | \$44,063                |
| BG 1, CT 9502 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 2, CT 9502 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 3, CT 9502 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 4, CT 9502 | 10%                               | 9%                        | 11%                                       | 7%                                                  | 49%   | 7%                 | 0%                    | 13%            | 11.7%                                        | \$40,417                |
| BG 5, CT 9502 | 5%                                | 3%                        | 9%                                        | 9%                                                  | 63%   | 6%                 | 2%                    | 13%            | 13.2%                                        | \$37,000                |
| BG 1, CT 9503 | 0%                                | 0%                        | 50%                                       | 50%                                                 | 50%   | 0%                 | 0%                    | 0%             | 100.0%                                       | \$11,250                |

| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 2, CT 9503    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 3, CT 9503    | 0%                                | 0%                        | 60%                                       | 60%                                                 | 0%    | 0%                 | 0%                    | 40%            | 100.0%                                       | \$23,750                |
| BG 4, CT 9503    | 20%                               | 24%                       | 9%                                        | 9%                                                  | 34%   | 1%                 | 0%                    | 12%            | 5.0%                                         | \$51,250                |
| BG 5, CT 9503    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 6, CT 9503    | 0%                                | 56%                       | 0%                                        | 0%                                                  | 44%   | 0%                 | 0%                    | 0%             | 0.0%                                         | \$98,750                |
| BG 7, CT 9503    | 25%                               | 11%                       | 5%                                        | 4%                                                  | 40%   | 10%                | 2%                    | 7%             | 13.7%                                        | \$51,250                |
| BG 8, CT 9503    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 9, CT 9503    | 0%                                | 0%                        | 78%                                       | 78%                                                 | 0%    | 0%                 | 22%                   | 0%             | 50.0%                                        | \$41,250                |
| BG 1, CT 9504.01 | 71%                               | 0%                        | 20%                                       | 13%                                                 | 1%    | 0%                 | 0%                    | 7%             | 22.0%                                        | \$44,107                |
| BG 2, CT 9504.01 | 76%                               | 0%                        | 17%                                       | 12%                                                 | 1%    | 0%                 | 0%                    | 5%             | 17.9%                                        | \$46,458                |
| BG 3, CT 9504.01 | 66%                               | 1%                        | 26%                                       | 14%                                                 | 2%    | 0%                 | 0%                    | 6%             | 24.0%                                        | \$40,833                |
| BG 4, CT 9504.01 | 57%                               | 0%                        | 33%                                       | 27%                                                 | 2%    | 0%                 | 0%                    | 7%             | 24.3%                                        | \$45,000                |
| BG 5, CT 9504.01 | 51%                               | 0%                        | 35%                                       | 18%                                                 | 3%    | 0%                 | 0%                    | 10%            | 35.5%                                        | \$35,417                |
| BG 6, CT 9504.01 | 46%                               | 0%                        | 45%                                       | 24%                                                 | 1%    | 0%                 | 0%                    | 7%             | 30.0%                                        | \$37,404                |
| BG 1, CT 9504.02 | 67%                               | 0%                        | 25%                                       | 14%                                                 | 1%    | 0%                 | 0%                    | 7%             | 18.7%                                        | \$50,682                |
| BG 2, CT 9504.02 | 44%                               | 1%                        | 41%                                       | 18%                                                 | 3%    | 0%                 | 0%                    | 10%            | 29.8%                                        | \$51,094                |
| BG 3, CT 9504.02 | 32%                               | 1%                        | 52%                                       | 37%                                                 | 5%    | 1%                 | 0%                    | 9%             | 31.3%                                        | \$36,607                |
| BG 1, CT 9505.01 | 19%                               | 0%                        | 67%                                       | 53%                                                 | 3%    | 0%                 | 0%                    | 11%            | 34.0%                                        | \$38,214                |
| BG 2, CT 9505.01 | 33%                               | 0%                        | 59%                                       | 14%                                                 | 2%    | 0%                 | 0%                    | 5%             | 43.7%                                        | \$33,000                |
| BG 1, CT 9505.02 | 55%                               | 0%                        | 38%                                       | 20%                                                 | 1%    | 0%                 | 1%                    | 5%             | 29.6%                                        | \$41,094                |
| BG 2, CT 9505.02 | 47%                               | 0%                        | 40%                                       | 23%                                                 | 4%    | 1%                 | 0%                    | 9%             | 23.0%                                        | \$41,875                |
| BG 3, CT 9505.02 | 51%                               | 0%                        | 37%                                       | 29%                                                 | 1%    | 1%                 | 0%                    | 9%             | 23.8%                                        | \$49,375                |
| BG 4, CT 9505.02 | 59%                               | 0%                        | 32%                                       | 21%                                                 | 3%    | 0%                 | 0%                    | 6%             | 19.2%                                        | \$46,563                |
| BG 5, CT 9505.02 | 35%                               | 0%                        | 53%                                       | 37%                                                 | 4%    | 0%                 | 0%                    | 8%             | 27.9%                                        | \$41,161                |
| BG 1, CT 9507.01 | 38%                               | 5%                        | 19%                                       | 13%                                                 | 23%   | 3%                 | 1%                    | 12%            | 10.5%                                        | \$61,250                |
| BG 2, CT 9507.01 | 51%                               | 1%                        | 29%                                       | 19%                                                 | 6%    | 0%                 | 1%                    | 13%            | 23.2%                                        | \$57,500                |
| BG 3, CT 9507.01 | 27%                               | 0%                        | 58%                                       | 49%                                                 | 5%    | 0%                 | 0%                    | 10%            | 22.8%                                        | \$49,792                |
| BG 4, CT 9507.01 | 50%                               | 0%                        | 38%                                       | 31%                                                 | 2%    | 0%                 | 0%                    | 10%            | 27.7%                                        | \$38,750                |
| BG 5, CT 9507.01 | 46%                               | 1%                        | 43%                                       | 31%                                                 | 2%    | 0%                 | 0%                    | 8%             | 25.0%                                        | \$43,125                |

| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 6, CT 9507.01 | 52%                               | 0%                        | 34%                                       | 26%                                                 | 4%    | 1%                 | 0%                    | 10%            | 22.4%                                        | \$45,179                |
| BG 7, CT 9507.01 | 58%                               | 0%                        | 31%                                       | 21%                                                 | 2%    | 0%                 | 0%                    | 8%             | 14.7%                                        | \$56,458                |
| BG 1, CT 9507.02 | 25%                               | 0%                        | 65%                                       | 53%                                                 | 2%    | 0%                 | 0%                    | 7%             | 35.4%                                        | \$29,821                |
| BG 2, CT 9507.02 | 30%                               | 0%                        | 55%                                       | 36%                                                 | 4%    | 1%                 | 0%                    | 10%            | 29.3%                                        | \$35,625                |
| BG 3, CT 9507.02 | 50%                               | 1%                        | 35%                                       | 27%                                                 | 5%    | 0%                 | 0%                    | 8%             | 21.1%                                        | \$51,563                |
| BG 4, CT 9507.02 | 36%                               | 0%                        | 53%                                       | 31%                                                 | 2%    | 0%                 | 0%                    | 8%             | 32.2%                                        | \$42,679                |
| BG 5, CT 9507.02 | 42%                               | 1%                        | 43%                                       | 38%                                                 | 1%    | 0%                 | 0%                    | 13%            | 18.2%                                        | \$54,375                |
| BG 1, CT 9508.01 | 20%                               | 0%                        | 68%                                       | 56%                                                 | 2%    | 0%                 | 0%                    | 10%            | 41.1%                                        | \$32,708                |
| BG 2, CT 9508.01 | 40%                               | 0%                        | 52%                                       | 37%                                                 | 1%    | 0%                 | 0%                    | 6%             | 24.5%                                        | \$47,083                |
| BG 3, CT 9508.01 | 30%                               | 0%                        | 57%                                       | 44%                                                 | 3%    | 1%                 | 0%                    | 9%             | 29.4%                                        | \$41,705                |
| BG 4, CT 9508.01 | 25%                               | 0%                        | 67%                                       | 60%                                                 | 2%    | 0%                 | 0%                    | 7%             | 36.8%                                        | \$35,938                |
| BG 1, CT 9508.02 | 30%                               | 0%                        | 55%                                       | 37%                                                 | 2%    | 1%                 | 0%                    | 12%            | 34.5%                                        | \$35,000                |
| BG 2, CT 9508.02 | 44%                               | 1%                        | 42%                                       | 32%                                                 | 2%    | 0%                 | 0%                    | 11%            | 17.1%                                        | \$54,375                |
| BG 3, CT 9508.02 | 29%                               | 0%                        | 58%                                       | 25%                                                 | 2%    | 0%                 | 0%                    | 11%            | 30.9%                                        | \$36,563                |
| BG 4, CT 9508.02 | 22%                               | 0%                        | 65%                                       | 42%                                                 | 4%    | 0%                 | 0%                    | 8%             | 49.6%                                        | \$30,625                |
| BG 1, CT 9509    | 49%                               | 1%                        | 30%                                       | 17%                                                 | 9%    | 1%                 | 1%                    | 10%            | 23.1%                                        | \$39,205                |
| BG 2, CT 9509    | 59%                               | 0%                        | 30%                                       | 25%                                                 | 2%    | 1%                 | 0%                    | 8%             | 16.5%                                        | \$48,889                |
| BG 3, CT 9509    | 52%                               | 0%                        | 34%                                       | 28%                                                 | 1%    | 0%                 | 0%                    | 12%            | 24.0%                                        | \$55,625                |
| BG 4, CT 9509    | 61%                               | 0%                        | 27%                                       | 22%                                                 | 2%    | 0%                 | 0%                    | 10%            | 14.0%                                        | \$62,679                |
| BG 5, CT 9509    | 55%                               | 0%                        | 33%                                       | 23%                                                 | 3%    | 0%                 | 0%                    | 7%             | 22.9%                                        | \$39,821                |
| BG 6, CT 9509    | 69%                               | 0%                        | 22%                                       | 13%                                                 | 1%    | 0%                 | 0%                    | 8%             | 19.5%                                        | \$52,750                |
| BG 7, CT 9509    | 54%                               | 0%                        | 40%                                       | 31%                                                 | 1%    | 0%                 | 0%                    | 6%             | 15.6%                                        | \$45,750                |
| BG 1, CT 9510    | 57%                               | 0%                        | 32%                                       | 23%                                                 | 1%    | 0%                 | 0%                    | 10%            | 11.8%                                        | \$47,250                |
| BG 2, CT 9510    | 45%                               | 0%                        | 48%                                       | 37%                                                 | 1%    | 0%                 | 0%                    | 6%             | 16.3%                                        | \$51,250                |
| BG 3, CT 9510    | 41%                               | 0%                        | 47%                                       | 37%                                                 | 1%    | 0%                 | 0%                    | 11%            | 21.8%                                        | \$50,000                |
| BG 4, CT 9510    | 13%                               | 0%                        | 72%                                       | 71%                                                 | 1%    | 0%                 | 0%                    | 13%            | 20.5%                                        | \$67,500                |
| BG 5, CT 9510    | 36%                               | 0%                        | 50%                                       | 31%                                                 | 1%    | 0%                 | 0%                    | 13%            | 25.9%                                        | \$37,031                |
| BG 6, CT 9510    | 61%                               | 0%                        | 32%                                       | 26%                                                 | 1%    | 0%                 | 0%                    | 6%             | 13.2%                                        | \$49,107                |
| BG 7, CT 9510    | 39%                               | 1%                        | 51%                                       | 38%                                                 | 1%    | 0%                 | 0%                    | 8%             | 37.6%                                        | \$29,167                |

| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 8, CT 9510    | 69%                               | 0%                        | 21%                                       | 11%                                                 | 2%    | 0%                 | 0%                    | 8%             | 15.4%                                        | \$51,250                |
| BG 1, CT 9511    | 57%                               | 1%                        | 26%                                       | 17%                                                 | 5%    | 0%                 | 1%                    | 10%            | 19.0%                                        | \$47,143                |
| BG 2, CT 9511    | 57%                               | 1%                        | 26%                                       | 18%                                                 | 4%    | 1%                 | 0%                    | 11%            | 17.9%                                        | \$56,429                |
| BG 3, CT 9511    | 39%                               | 0%                        | 55%                                       | 19%                                                 | 1%    | 0%                 | 0%                    | 6%             | 31.6%                                        | \$36,944                |
| BG 4, CT 9511    | 34%                               | 0%                        | 53%                                       | 35%                                                 | 2%    | 0%                 | 0%                    | 10%            | 34.3%                                        | \$36,250                |
| BG 5, CT 9511    | 50%                               | 1%                        | 37%                                       | 25%                                                 | 2%    | 0%                 | 0%                    | 9%             | 26.2%                                        | \$39,464                |
| BG 6, CT 9511    | 48%                               | 1%                        | 40%                                       | 25%                                                 | 2%    | 1%                 | 0%                    | 8%             | 25.8%                                        | \$45,956                |
| BG 1, CT 9516    | 13%                               | 0%                        | 83%                                       | 52%                                                 | 0%    | 0%                 | 0%                    | 4%             | 30.0%                                        | \$53,750                |
| BG 2, CT 9516    | 33%                               | 7%                        | 33%                                       | 33%                                                 | 0%    | 0%                 | 0%                    | 27%            | 13.3%                                        | \$51,250                |
| BG 3, CT 9516    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9517    | 37%                               | 1%                        | 37%                                       | 31%                                                 | 12%   | 2%                 | 1%                    | 10%            | 11.1%                                        | \$91,250                |
| BG 2, CT 9517    | 45%                               | 0%                        | 39%                                       | 26%                                                 | 5%    | 0%                 | 0%                    | 10%            | 27.5%                                        | \$54,167                |
| BG 1, CT 9518    | 10%                               | 0%                        | 79%                                       | 56%                                                 | 3%    | 1%                 | 1%                    | 7%             | 20.9%                                        | \$52,917                |
| BG 1, CT 9519.01 | 43%                               | 1%                        | 42%                                       | 7%                                                  | 3%    | 0%                 | 0%                    | 11%            | 45.3%                                        | \$30,568                |
| BG 2, CT 9519.01 | 62%                               | 0%                        | 25%                                       | 13%                                                 | 4%    | 1%                 | 1%                    | 6%             | 30.6%                                        | \$30,096                |
| BG 3, CT 9519.01 | 65%                               | 1%                        | 17%                                       | 9%                                                  | 10%   | 1%                 | 0%                    | 7%             | 19.4%                                        | \$40,313                |
| BG 4, CT 9519.01 | 61%                               | 1%                        | 24%                                       | 14%                                                 | 6%    | 1%                 | 0%                    | 8%             | 23.6%                                        | \$39,432                |
| BG 1, CT 9519.02 | 58%                               | 0%                        | 34%                                       | 7%                                                  | 3%    | 0%                 | 0%                    | 4%             | 32.6%                                        | \$31,000                |
| BG 2, CT 9519.02 | 56%                               | 0%                        | 38%                                       | 4%                                                  | 1%    | 0%                 | 0%                    | 4%             | 45.8%                                        | \$24,464                |
| BG 3, CT 9519.02 | 53%                               | 1%                        | 19%                                       | 15%                                                 | 16%   | 3%                 | 1%                    | 7%             | 17.5%                                        | \$46,111                |
| BG 4, CT 9519.02 | 54%                               | 2%                        | 15%                                       | 12%                                                 | 18%   | 1%                 | 1%                    | 9%             | 15.5%                                        | \$52,500                |
| BG 5, CT 9519.02 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9522    | 53%                               | 0%                        | 34%                                       | 21%                                                 | 2%    | 0%                 | 1%                    | 10%            | 24.5%                                        | \$39,375                |
| BG 2, CT 9522    | 50%                               | 0%                        | 30%                                       | 20%                                                 | 6%    | 0%                 | 1%                    | 13%            | 23.7%                                        | \$37,500                |
| BG 3, CT 9522    | 56%                               | 1%                        | 29%                                       | 17%                                                 | 3%    | 1%                 | 0%                    | 9%             | 18.6%                                        | \$47,321                |
| BG 4, CT 9522    | 55%                               | 1%                        | 31%                                       | 18%                                                 | 3%    | 0%                 | 0%                    | 10%            | 20.9%                                        | \$42,500                |
| BG 1, CT 9523    | 50%                               | 1%                        | 27%                                       | 17%                                                 | 10%   | 1%                 | 1%                    | 10%            | 15.7%                                        | \$49,167                |
| BG 2, CT 9523    | 44%                               | 1%                        | 27%                                       | 18%                                                 | 12%   | 1%                 | 2%                    | 13%            | 12.5%                                        | \$62,045                |
| BG 3, CT 9523    | 26%                               | 0%                        | 57%                                       | 22%                                                 | 4%    | 0%                 | 0%                    | 12%            | 42.5%                                        | \$35,417                |



| Block Group      | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                  | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1, CT 9524    | 42%                               | 1%                        | 38%                                       | 20%                                                 | 5%    | 0%                 | 1%                    | 12%            | 32.5%                                        | \$31,518                |
| BG 2, CT 9524    | 30%                               | 1%                        | 52%                                       | 16%                                                 | 7%    | 1%                 | 0%                    | 8%             | 37.0%                                        | \$32,188                |
| BG 1, CT 9527    | 18%                               | 0%                        | 68%                                       | 65%                                                 | 3%    | 0%                 | 0%                    | 10%            | 21.2%                                        | \$61,500                |
| BG 2, CT 9527    | 18%                               | 0%                        | 68%                                       | 60%                                                 | 4%    | 0%                 | 0%                    | 10%            | 14.2%                                        | \$53,594                |
| BG 3, CT 9527    | 14%                               | 0%                        | 70%                                       | 62%                                                 | 5%    | 0%                 | 1%                    | 10%            | 18.0%                                        | \$62,857                |
| BG 4, CT 9527    | 17%                               | 0%                        | 62%                                       | 52%                                                 | 12%   | 0%                 | 0%                    | 8%             | 17.3%                                        | \$65,000                |
| BG 5, CT 9527    | 35%                               | 0%                        | 50%                                       | 32%                                                 | 6%    | 0%                 | 0%                    | 8%             | 28.6%                                        | \$45,000                |
| BG 1, CT 9528    | 0%                                | 0%                        | 67%                                       | 67%                                                 | 17%   | 0%                 | 0%                    | 17%            | 50.0%                                        | \$98,750                |
| BG 2, CT 9528    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9529    | 13%                               | 4%                        | 57%                                       | 43%                                                 | 15%   | 2%                 | 0%                    | 10%            | 18.2%                                        | \$51,324                |
| BG 2, CT 9529    | 12%                               | 1%                        | 75%                                       | 47%                                                 | 3%    | 0%                 | 0%                    | 9%             | 35.4%                                        | \$35,288                |
| BG 3, CT 9529    | 25%                               | 0%                        | 64%                                       | 22%                                                 | 4%    | 0%                 | 1%                    | 6%             | 31.7%                                        | \$52,500                |
| BG 4, CT 9529    | 17%                               | 1%                        | 68%                                       | 57%                                                 | 5%    | 0%                 | 0%                    | 9%             | 19.7%                                        | \$56,406                |
| BG 5, CT 9529    | 12%                               | 0%                        | 73%                                       | 54%                                                 | 3%    | 0%                 | 0%                    | 12%            | 27.7%                                        | \$54,375                |
| BG 6, CT 9529    | 29%                               | 0%                        | 59%                                       | 47%                                                 | 2%    | 0%                 | 0%                    | 10%            | 21.5%                                        | \$56,071                |
| BG 1, CT 9530    | 15%                               | 1%                        | 65%                                       | 40%                                                 | 6%    | 0%                 | 0%                    | 12%            | 31.4%                                        | \$44,167                |
| BG 2, CT 9530    | 16%                               | 1%                        | 65%                                       | 39%                                                 | 8%    | 0%                 | 0%                    | 11%            | 20.2%                                        | \$60,750                |
| BG 3, CT 9530    | 12%                               | 1%                        | 70%                                       | 60%                                                 | 3%    | 1%                 | 0%                    | 13%            | 19.6%                                        | \$60,417                |
| BG 4, CT 9530    | 20%                               | 0%                        | 63%                                       | 48%                                                 | 4%    | 1%                 | 1%                    | 11%            | 29.5%                                        | \$40,147                |
| BG 5, CT 9530    | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9531.01 | 14%                               | 0%                        | 65%                                       | 58%                                                 | 9%    | 1%                 | 0%                    | 12%            | 11.2%                                        | \$65,893                |
| BG 2, CT 9531.01 | 13%                               | 1%                        | 69%                                       | 61%                                                 | 7%    | 0%                 | 0%                    | 10%            | 14.6%                                        | \$61,438                |
| BG 3, CT 9531.01 | 21%                               | 0%                        | 64%                                       | 55%                                                 | 4%    | 1%                 | 0%                    | 10%            | 23.1%                                        | \$51,625                |
| BG 1, CT 9531.02 | 12%                               | 1%                        | 69%                                       | 63%                                                 | 5%    | 1%                 | 0%                    | 11%            | 19.2%                                        | \$58,000                |
| BG 2, CT 9531.02 | 15%                               | 0%                        | 64%                                       | 57%                                                 | 9%    | 1%                 | 0%                    | 10%            | 21.5%                                        | \$45,682                |
| BG 3, CT 9531.02 | 26%                               | 0%                        | 63%                                       | 46%                                                 | 2%    | 0%                 | 0%                    | 8%             | 18.6%                                        | \$57,813                |
| BG 1, CT 9532    | 15%                               | 1%                        | 66%                                       | 58%                                                 | 6%    | 0%                 | 0%                    | 11%            | 16.1%                                        | \$58,125                |
| BG 2, CT 9532    | 11%                               | 0%                        | 76%                                       | 69%                                                 | 2%    | 0%                 | 0%                    | 10%            | 12.9%                                        | \$60,156                |
| BG 3, CT 9532    | 14%                               | 0%                        | 72%                                       | 62%                                                 | 5%    | 0%                 | 0%                    | 9%             | 27.4%                                        | \$43,750                |

| Block Group   | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|               | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1, CT 9533 | 16%                               | 0%                        | 68%                                       | 60%                                                 | 4%    | 0%                 | 0%                    | 11%            | 20.4%                                        | \$45,714                |
| BG 2, CT 9533 | 40%                               | 0%                        | 44%                                       | 35%                                                 | 2%    | 0%                 | 0%                    | 14%            | 17.6%                                        | \$45,000                |
| BG 3, CT 9533 | 23%                               | 0%                        | 64%                                       | 54%                                                 | 2%    | 1%                 | 1%                    | 9%             | 23.9%                                        | \$40,208                |
| BG 4, CT 9533 | 20%                               | 1%                        | 61%                                       | 41%                                                 | 6%    | 0%                 | 0%                    | 11%            | 33.6%                                        | \$34,015                |
| BG 1, CT 9534 | 21%                               | 1%                        | 60%                                       | 42%                                                 | 3%    | 0%                 | 0%                    | 15%            | 26.2%                                        | \$42,188                |
| BG 2, CT 9534 | 19%                               | 0%                        | 62%                                       | 35%                                                 | 5%    | 1%                 | 0%                    | 13%            | 35.3%                                        | \$33,393                |
| BG 1, CT 9535 | 23%                               | 9%                        | 12%                                       | 12%                                                 | 48%   | 6%                 | 1%                    | 1%             | 10.2%                                        | \$31,250                |
| BG 1, CT 9536 | 11%                               | 0%                        | 77%                                       | 63%                                                 | 2%    | 0%                 | 0%                    | 9%             | 25.9%                                        | \$56,667                |
| BG 2, CT 9536 | 8%                                | 1%                        | 76%                                       | 57%                                                 | 4%    | 0%                 | 0%                    | 10%            | 26.2%                                        | \$44,286                |
| BG 3, CT 9536 | 12%                               | 1%                        | 72%                                       | 62%                                                 | 6%    | 0%                 | 0%                    | 8%             | 14.2%                                        | \$57,500                |
| BG 4, CT 9536 | 6%                                | 0%                        | 78%                                       | 74%                                                 | 6%    | 1%                 | 0%                    | 8%             | 16.2%                                        | \$63,125                |
| BG 5, CT 9536 | 11%                               | 1%                        | 63%                                       | 59%                                                 | 9%    | 1%                 | 0%                    | 14%            | 10.4%                                        | \$48,125                |
| BG 1, CT 9539 | 7%                                | 0%                        | 81%                                       | 68%                                                 | 4%    | 0%                 | 0%                    | 8%             | 38.6%                                        | \$40,750                |
| BG 2, CT 9539 | 7%                                | 0%                        | 79%                                       | 71%                                                 | 4%    | 2%                 | 0%                    | 8%             | 15.5%                                        | \$57,417                |
| BG 3, CT 9539 | 6%                                | 0%                        | 85%                                       | 73%                                                 | 1%    | 1%                 | 0%                    | 6%             | 25.0%                                        | \$52,614                |
| BG 4, CT 9539 | 8%                                | 0%                        | 75%                                       | 69%                                                 | 9%    | 0%                 | 0%                    | 8%             | 20.1%                                        | \$57,917                |
| BG 1, CT 9540 | 10%                               | 1%                        | 66%                                       | 60%                                                 | 12%   | 1%                 | 0%                    | 10%            | 20.3%                                        | \$70,536                |
| BG 2, CT 9540 | 15%                               | 1%                        | 59%                                       | 52%                                                 | 12%   | 0%                 | 1%                    | 13%            | 10.1%                                        | \$81,250                |
| BG 1, CT 9543 | 16%                               | 3%                        | 45%                                       | 42%                                                 | 22%   | 1%                 | 0%                    | 14%            | 11.0%                                        | \$75,000                |
| BG 2, CT 9543 | 6%                                | 1%                        | 75%                                       | 63%                                                 | 7%    | 0%                 | 0%                    | 10%            | 24.2%                                        | \$50,500                |
| BG 1, CT 9544 | 3%                                | 5%                        | 56%                                       | 46%                                                 | 21%   | 6%                 | 0%                    | 10%            | 20.6%                                        | \$43,750                |
| BG 2, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 3, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 4, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 5, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 6, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 7, CT 9544 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9545 | 8%                                | 16%                       | 1%                                        | 0%                                                  | 59%   | 7%                 | 1%                    | 8%             | 16.0%                                        | \$38,750                |
| BG 2, CT 9545 | 10%                               | 8%                        | 9%                                        | 5%                                                  | 61%   | 6%                 | 0%                    | 6%             | 10.2%                                        | \$68,125                |

| Block Group   | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|               | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 3, CT 9545 | 6%                                | 13%                       | 9%                                        | 7%                                                  | 54%   | 9%                 | 1%                    | 8%             | 12.3%                                        | \$44,643                |
| BG 4, CT 9545 | 3%                                | 7%                        | 0%                                        | 0%                                                  | 83%   | 2%                 | 2%                    | 4%             | ND                                           | ND                      |
| BG 5, CT 9545 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9547 | 16%                               | 1%                        | 68%                                       | 63%                                                 | 4%    | 0%                 | 0%                    | 11%            | 22.9%                                        | \$59,375                |
| BG 2, CT 9547 | 22%                               | 0%                        | 69%                                       | 62%                                                 | 1%    | 0%                 | 0%                    | 8%             | 20.0%                                        | \$50,000                |
| BG 3, CT 9547 | 34%                               | 1%                        | 49%                                       | 45%                                                 | 2%    | 1%                 | 0%                    | 13%            | 16.7%                                        | \$46,477                |
| BG 1, CT 9548 | 15%                               | 3%                        | 69%                                       | 65%                                                 | 5%    | 0%                 | 0%                    | 7%             | 38.0%                                        | \$35,000                |
| BG 2, CT 9548 | 13%                               | 0%                        | 76%                                       | 53%                                                 | 3%    | 0%                 | 1%                    | 7%             | 55.8%                                        | \$26,023                |
| BG 3, CT 9548 | 40%                               | 1%                        | 43%                                       | 42%                                                 | 3%    | 1%                 | 0%                    | 12%            | 14.3%                                        | \$52,656                |
| BG 4, CT 9548 | 22%                               | 1%                        | 64%                                       | 62%                                                 | 2%    | 0%                 | 0%                    | 10%            | 22.0%                                        | \$50,250                |
| BG 1, CT 9551 | 8%                                | 1%                        | 61%                                       | 53%                                                 | 17%   | 2%                 | 0%                    | 11%            | 14.1%                                        | \$67,500                |
| BG 2, CT 9551 | 5%                                | 1%                        | 77%                                       | 75%                                                 | 8%    | 0%                 | 0%                    | 10%            | 17.3%                                        | \$65,625                |
| BG 3, CT 9551 | 7%                                | 0%                        | 81%                                       | 70%                                                 | 6%    | 1%                 | 0%                    | 5%             | 29.4%                                        | \$53,438                |
| BG 4, CT 9551 | 7%                                | 0%                        | 73%                                       | 70%                                                 | 8%    | 1%                 | 1%                    | 11%            | 16.9%                                        | \$64,375                |
| BG 1, CT 9552 | 2%                                | 0%                        | 84%                                       | 81%                                                 | 8%    | 0%                 | 0%                    | 6%             | 13.8%                                        | \$60,000                |
| BG 2, CT 9552 | 3%                                | 0%                        | 87%                                       | 81%                                                 | 4%    | 0%                 | 0%                    | 5%             | 20.2%                                        | \$56,944                |
| BG 3, CT 9552 | 5%                                | 0%                        | 84%                                       | 81%                                                 | 3%    | 0%                 | 0%                    | 8%             | 17.1%                                        | \$52,308                |
| BG 1, CT 9553 | 3%                                | 0%                        | 85%                                       | 81%                                                 | 2%    | 0%                 | 0%                    | 10%            | 26.6%                                        | \$55,114                |
| BG 2, CT 9553 | 5%                                | 0%                        | 78%                                       | 74%                                                 | 4%    | 0%                 | 0%                    | 12%            | 22.1%                                        | \$58,000                |
| BG 1, CT 9554 | 2%                                | 1%                        | 80%                                       | 75%                                                 | 2%    | 0%                 | 0%                    | 15%            | 28.9%                                        | \$48,750                |
| BG 1, CT 9556 | 26%                               | 1%                        | 60%                                       | 52%                                                 | 4%    | 0%                 | 0%                    | 9%             | 17.3%                                        | \$68,333                |
| BG 2, CT 9556 | 11%                               | 0%                        | 76%                                       | 65%                                                 | 2%    | 0%                 | 0%                    | 11%            | 30.2%                                        | \$48,750                |
| BG 1, CT 9557 | 19%                               | 0%                        | 68%                                       | 41%                                                 | 3%    | 0%                 | 0%                    | 9%             | 34.1%                                        | \$41,161                |
| BG 2, CT 9557 | 15%                               | 0%                        | 79%                                       | 74%                                                 | 0%    | 0%                 | 0%                    | 5%             | 66.7%                                        | \$16,250                |
| BG 3, CT 9557 | 47%                               | 1%                        | 35%                                       | 25%                                                 | 6%    | 0%                 | 0%                    | 11%            | 17.8%                                        | \$53,611                |
| BG 4, CT 9557 | 39%                               | 1%                        | 39%                                       | 27%                                                 | 7%    | 1%                 | 0%                    | 13%            | 15.2%                                        | \$69,583                |
| BG 5, CT 9557 | 59%                               | 1%                        | 30%                                       | 15%                                                 | 3%    | 0%                 | 0%                    | 7%             | 17.6%                                        | \$50,938                |
| BG 6, CT 9557 | 32%                               | 0%                        | 57%                                       | 51%                                                 | 2%    | 0%                 | 0%                    | 9%             | 28.1%                                        | \$41,625                |
| BG 7, CT 9557 | 57%                               | 0%                        | 21%                                       | 14%                                                 | 7%    | 0%                 | 0%                    | 14%            | 7.1%                                         | \$103,750               |

| Block Group   | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|               | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1, CT 9558 | 47%                               | 1%                        | 43%                                       | 27%                                                 | 3%    | 0%                 | 0%                    | 7%             | 29.5%                                        | \$40,417                |
| BG 2, CT 9558 | 50%                               | 0%                        | 41%                                       | 9%                                                  | 2%    | 0%                 | 0%                    | 7%             | 35.6%                                        | \$50,000                |
| BG 3, CT 9558 | 50%                               | 1%                        | 36%                                       | 29%                                                 | 5%    | 0%                 | 0%                    | 7%             | 8.1%                                         | \$61,458                |
| BG 4, CT 9558 | 39%                               | 1%                        | 39%                                       | 32%                                                 | 10%   | 1%                 | 1%                    | 10%            | 8.0%                                         | \$65,000                |
| BG 5, CT 9558 | 53%                               | 2%                        | 34%                                       | 16%                                                 | 5%    | 0%                 | 0%                    | 7%             | 21.8%                                        | \$41,071                |
| BG 6, CT 9558 | 33%                               | 1%                        | 53%                                       | 40%                                                 | 2%    | 0%                 | 1%                    | 10%            | 18.7%                                        | \$51,563                |
| BG 7, CT 9558 | 39%                               | 1%                        | 47%                                       | 33%                                                 | 3%    | 0%                 | 0%                    | 11%            | 22.3%                                        | \$50,938                |
| BG 8, CT 9558 | 57%                               | 1%                        | 31%                                       | 17%                                                 | 3%    | 0%                 | 0%                    | 9%             | 20.4%                                        | \$50,000                |
| BG 9, CT 9558 | 54%                               | 2%                        | 24%                                       | 22%                                                 | 11%   | 0%                 | 0%                    | 8%             | 14.2%                                        | \$57,045                |
| BG 1, CT 9559 | 38%                               | 3%                        | 27%                                       | 23%                                                 | 20%   | 1%                 | 1%                    | 9%             | 16.7%                                        | \$61,250                |
| BG 2, CT 9559 | 44%                               | 1%                        | 26%                                       | 20%                                                 | 15%   | 2%                 | 2%                    | 10%            | 7.8%                                         | \$72,159                |
| BG 3, CT 9559 | 39%                               | 3%                        | 30%                                       | 14%                                                 | 19%   | 2%                 | 1%                    | 6%             | 14.9%                                        | \$54,196                |
| BG 1, CT 9560 | 15%                               | 1%                        | 70%                                       | 53%                                                 | 4%    | 0%                 | 0%                    | 10%            | 22.9%                                        | \$46,625                |
| BG 2, CT 9560 | 14%                               | 0%                        | 71%                                       | 42%                                                 | 3%    | 1%                 | 0%                    | 10%            | 46.6%                                        | \$33,000                |
| BG 1, CT 9561 | 8%                                | 0%                        | 73%                                       | 67%                                                 | 6%    | 1%                 | 0%                    | 12%            | 18.7%                                        | \$53,250                |
| BG 2, CT 9561 | 10%                               | 3%                        | 18%                                       | 18%                                                 | 50%   | 3%                 | 0%                    | 15%            | 6.6%                                         | \$76,250                |
| BG 3, CT 9561 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 4, CT 9561 | 10%                               | 0%                        | 61%                                       | 54%                                                 | 13%   | 1%                 | 1%                    | 14%            | 19.7%                                        | \$59,107                |
| BG 1, CT 9562 | 26%                               | 1%                        | 56%                                       | 54%                                                 | 9%    | 1%                 | 0%                    | 8%             | 15.7%                                        | \$61,389                |
| BG 2, CT 9562 | 25%                               | 0%                        | 58%                                       | 56%                                                 | 8%    | 0%                 | 1%                    | 7%             | 13.1%                                        | \$64,063                |
| BG 3, CT 9562 | 13%                               | 5%                        | 6%                                        | 5%                                                  | 63%   | 0%                 | 1%                    | 12%            | 1.1%                                         | \$96,250                |
| BG 4, CT 9562 | 33%                               | 0%                        | 50%                                       | 46%                                                 | 3%    | 0%                 | 0%                    | 13%            | 17.9%                                        | \$56,250                |
| BG 5, CT 9562 | 14%                               | 0%                        | 66%                                       | 63%                                                 | 6%    | 0%                 | 0%                    | 13%            | 21.3%                                        | \$53,438                |
| BG 6, CT 9562 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9563 | 11%                               | 0%                        | 63%                                       | 33%                                                 | 7%    | 0%                 | 0%                    | 19%            | 51.9%                                        | \$23,750                |
| BG 2, CT 9563 | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 3, CT 9563 | 100%                              | 0%                        | 0%                                        | 0%                                                  | 0%    | 0%                 | 0%                    | 0%             | 9.7%                                         | \$-                     |
| BG 4, CT 9563 | 34%                               | 1%                        | 50%                                       | 38%                                                 | 4%    | 0%                 | 1%                    | 10%            | 12.7%                                        | \$56,094                |
| BG 5, CT 9563 | 26%                               | 0%                        | 59%                                       | 28%                                                 | 3%    | 1%                 | 0%                    | 11%            | 36.9%                                        | \$40,893                |

| Block Group    | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1, CT 9801  | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9802  | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9803  | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1, CT 9804  | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 0, CT 9900  | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| Territory-wide | 32%                               | 1%                        | 49%                                       | 37%                                                 | 7%    | 1%                 | 0%                    | 9%             | 22.9%                                        | \$48,274                |

Source: U.S. Census Bureau 2010

BG = Block Group; CT = Census Tract; ND = no data

<sup>a</sup> Totals may not add to 100 percent, due to rounding.

<sup>b</sup> For Guam, the U.S. Census Bureau did not distinguish between race and ethnicity.

**Table 5: Block Group Demographic Data, Northern Mariana Islands, 2010**

| Block Group  | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|--------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|              | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 1 CT 9501 | 32%                               | 0%                        | 55%                                       | 52%                                                 | 4%    | 0%                 | 0%                    | 9%             | 42%                                          | \$22,083                |
| BG 2 CT 9501 | 31%                               | 0%                        | 59%                                       | 56%                                                 | 1%    | 0%                 | 0%                    | 9%             | 44%                                          | \$25,962                |
| BG 3 CT 9501 | 43%                               | 0%                        | 47%                                       | 45%                                                 | 1%    | 0%                 | 0%                    | 9%             | 47%                                          | \$21,167                |
| BG 1 CT 1    | 27%                               | 0%                        | 40%                                       | 30%                                                 | 8%    | 1%                 | 0%                    | 24%            | 40%                                          | \$31,591                |
| BG 2 CT 1    | 54%                               | 0%                        | 31%                                       | 27%                                                 | 2%    | 0%                 | 0%                    | 13%            | 53%                                          | \$21,094                |
| BG 1 CT 2    | 27%                               | 0%                        | 45%                                       | 21%                                                 | 1%    | 0%                 | 0%                    | 28%            | 56%                                          | \$19,609                |
| BG 2 CT 2    | 39%                               | 0%                        | 33%                                       | 22%                                                 | 4%    | 0%                 | 0%                    | 23%            | 48%                                          | \$24,750                |
| BG 1 CT 3    | 46%                               | 0%                        | 32%                                       | 20%                                                 | 5%    | 0%                 | 0%                    | 17%            | 40%                                          | \$23,864                |
| BG 2 CT 3    | 62%                               | 0%                        | 21%                                       | 16%                                                 | 8%    | 0%                 | 0%                    | 8%             | 42%                                          | \$28,229                |
| BG 1 CT 4    | 83%                               | 0%                        | 11%                                       | 6%                                                  | 1%    | 0%                 | 0%                    | 5%             | 65%                                          | \$14,127                |
| BG 2 CT 4    | 73%                               | 0%                        | 15%                                       | 9%                                                  | 2%    | 0%                 | 0%                    | 11%            | 50%                                          | \$18,542                |
| BG 1 CT 5    | 77%                               | 0%                        | 16%                                       | 8%                                                  | 0%    | 0%                 | 0%                    | 6%             | 60%                                          | \$18,000                |
| BG 2 CT 5    | 42%                               | 0%                        | 39%                                       | 18%                                                 | 3%    | 0%                 | 0%                    | 16%            | 50%                                          | \$21,793                |
| BG 1 CT 6    | 65%                               | 0%                        | 22%                                       | 14%                                                 | 3%    | 0%                 | 0%                    | 10%            | 56%                                          | \$17,083                |
| BG 2 CT 6    | 76%                               | 0%                        | 15%                                       | 8%                                                  | 3%    | 0%                 | 0%                    | 5%             | 53%                                          | \$17,422                |
| BG 3 CT 6    | 59%                               | 0%                        | 31%                                       | 22%                                                 | 3%    | 0%                 | 0%                    | 8%             | 36%                                          | \$27,292                |
| BG 1 CT 7    | 56%                               | 0%                        | 26%                                       | 5%                                                  | 1%    | 0%                 | 0%                    | 17%            | 55%                                          | \$18,333                |
| BG 2 CT 7    | 59%                               | 0%                        | 31%                                       | 16%                                                 | 1%    | 0%                 | 0%                    | 8%             | 49%                                          | \$21,667                |
| BG 3 CT 7    | 73%                               | 0%                        | 18%                                       | 5%                                                  | 0%    | 0%                 | 0%                    | 8%             | 69%                                          | \$14,783                |
| BG 1 CT 8    | 25%                               | 0%                        | 60%                                       | 8%                                                  | 1%    | 0%                 | 0%                    | 14%            | 69%                                          | \$14,500                |
| BG 2 CT 8    | 70%                               | 0%                        | 20%                                       | 15%                                                 | 1%    | 0%                 | 0%                    | 8%             | 61%                                          | \$16,875                |
| BG 1 CT 9    | 63%                               | 0%                        | 24%                                       | 16%                                                 | 1%    | 0%                 | 1%                    | 11%            | 63%                                          | \$14,293                |
| BG 2 CT 9    | 61%                               | 0%                        | 26%                                       | 12%                                                 | 0%    | 0%                 | 1%                    | 12%            | 67%                                          | \$14,201                |
| BG 3 CT 9    | 67%                               | 0%                        | 22%                                       | 15%                                                 | 0%    | 0%                 | 1%                    | 10%            | 61%                                          | \$15,156                |
| BG 1 CT 10   | 46%                               | 0%                        | 41%                                       | 25%                                                 | 1%    | 0%                 | 0%                    | 12%            | 61%                                          | \$18,750                |
| BG 2 CT 10   | 64%                               | 0%                        | 25%                                       | 20%                                                 | 1%    | 0%                 | 0%                    | 10%            | 51%                                          | \$20,089                |
| BG 1 CT 11   | 69%                               | 0%                        | 19%                                       | 16%                                                 | 1%    | 0%                 | 1%                    | 10%            | 62%                                          | \$15,603                |
| BG 1 CT 12   | 58%                               | 0%                        | 27%                                       | 16%                                                 | 3%    | 0%                 | 0%                    | 12%            | 68%                                          | \$12,414                |

| Block Group       | Race and Ethnicity <sup>a,b</sup> |                           |                                           |                                                     |       |                    |                       |                | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------------|-----------------------------------|---------------------------|-------------------------------------------|-----------------------------------------------------|-------|--------------------|-----------------------|----------------|----------------------------------------------|-------------------------|
|                   | Asian                             | Black or African American | Native Hawaiian or Other Pacific Islander | Native Hawaiian or Other Pacific Islander--Chamorro | White | Hispanic or Latino | Some Other Race Alone | Multiple Races |                                              |                         |
| BG 2 CT 12        | 62%                               | 0%                        | 29%                                       | 21%                                                 | 0%    | 0%                 | 0%                    | 8%             | 68%                                          | \$14,549                |
| BG 1 CT 13        | 40%                               | 0%                        | 43%                                       | 21%                                                 | 1%    | 0%                 | 0%                    | 16%            | 60%                                          | \$19,922                |
| BG 2 CT 13        | 44%                               | 0%                        | 38%                                       | 18%                                                 | 1%    | 0%                 | 0%                    | 17%            | 60%                                          | \$17,321                |
| BG 3 CT 13        | 40%                               | 0%                        | 48%                                       | 34%                                                 | 0%    | 0%                 | 0%                    | 11%            | 43%                                          | \$24,000                |
| BG 1 CT 14        | 47%                               | 0%                        | 40%                                       | 26%                                                 | 1%    | 0%                 | 0%                    | 11%            | 49%                                          | \$25,750                |
| BG 2 CT 14        | 29%                               | 0%                        | 53%                                       | 36%                                                 | 1%    | 0%                 | 0%                    | 17%            | 42%                                          | \$24,464                |
| BG 3 CT 14        | 28%                               | 0%                        | 54%                                       | 34%                                                 | 1%    | 0%                 | 0%                    | 17%            | 52%                                          | \$24,145                |
| BG 1 CT 15        | 35%                               | 1%                        | 35%                                       | 31%                                                 | 13%   | 0%                 | 1%                    | 15%            | 34%                                          | \$36,250                |
| BG 2 CT 15        | 61%                               | 0%                        | 28%                                       | 24%                                                 | 1%    | 0%                 | 0%                    | 10%            | 51%                                          | \$21,467                |
| BG 3 CT 15        | 52%                               | 0%                        | 34%                                       | 32%                                                 | 3%    | 0%                 | 0%                    | 10%            | 36%                                          | \$31,389                |
| BG 4 CT 15        | 37%                               | 0%                        | 50%                                       | 36%                                                 | 4%    | 0%                 | 0%                    | 9%             | 44%                                          | \$27,917                |
| BG 5 CT 15        | 56%                               | 0%                        | 30%                                       | 23%                                                 | 4%    | 0%                 | 0%                    | 10%            | 53%                                          | \$22,321                |
| BG 1 CT 16        | 14%                               | 0%                        | 65%                                       | 43%                                                 | 0%    | 0%                 | 0%                    | 21%            | 45%                                          | \$26,500                |
| BG 2 CT 16        | 13%                               | 0%                        | 61%                                       | 42%                                                 | 1%    | 0%                 | 0%                    | 25%            | 50%                                          | \$27,552                |
| BG 1 CT 17        | 34%                               | 0%                        | 39%                                       | 29%                                                 | 8%    | 0%                 | 0%                    | 19%            | 47%                                          | \$19,444                |
| BG 2 CT 17        | 19%                               | 0%                        | 55%                                       | 45%                                                 | 8%    | 1%                 | 0%                    | 18%            | 34%                                          | \$41,667                |
| BG 3 CT 17        | 30%                               | 1%                        | 40%                                       | 35%                                                 | 13%   | 0%                 | 0%                    | 16%            | 27%                                          | \$47,500                |
| BG 4 CT 17        | 36%                               | 1%                        | 42%                                       | 25%                                                 | 8%    | 0%                 | 0%                    | 14%            | 32%                                          | \$35,125                |
| BG 1 CT 9502.01   | 64%                               | 0%                        | 24%                                       | 23%                                                 | 1%    | 0%                 | 1%                    | 10%            | 55%                                          | \$22,750                |
| BG 2 CT 9502.01   | 59%                               | 0%                        | 29%                                       | 28%                                                 | 2%    | 0%                 | 0%                    | 9%             | 45%                                          | \$18,750                |
| BG 3 CT 9502.01   | 54%                               | 1%                        | 32%                                       | 31%                                                 | 3%    | 0%                 | 0%                    | 10%            | 41%                                          | \$22,857                |
| BG 1 CT 9501.02   | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| BG 1 CT 9502      | 22%                               | 0%                        | 64%                                       | 64%                                                 | 1%    | 0%                 | 0%                    | 13%            | 40%                                          | \$28,250                |
| BG 2 CT 9502      | 29%                               | 0%                        | 50%                                       | 48%                                                 | 3%    | 1%                 | 0%                    | 17%            | 36%                                          | \$33,056                |
| BG 3 CT 9502      | ND                                | ND                        | ND                                        | ND                                                  | ND    | ND                 | ND                    | ND             | ND                                           | ND                      |
| Commonwealth-wide | 50%                               | 0%                        | 35%                                       |                                                     | 2%    | 0%                 | 0%                    | 13%            | 52%                                          | \$19,958                |

Source: U.S. Census Bureau 2010

BG = Block Group; CT = Census Tract; ND = no data

<sup>a</sup> Totals may not add to 100 percent, due to rounding.

<sup>b</sup> For Commonwealth of North Mariana Islands, the U.S. Census Bureau did not distinguish between race and ethnicity.

**Table 6: Block Group Demographic Data, Puerto Rico**

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 9563    | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 2%                               | 98%                | 64.0%                                        | \$9,288                 |
| BG 2, CT 9563    | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 1%                               | 99%                | 60.7%                                        | \$11,406                |
| BG 1, CT 9564    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 1%                               | 99%                | 65.1%                                        | \$10,083                |
| BG 2, CT 9564    | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 1%                               | 99%                | 60.5%                                        | \$11,750                |
| BG 1, CT 9565    | 97%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 62.1%                                        | \$8,071                 |
| BG 2, CT 9565    | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 1%                               | 99%                | 62.4%                                        | \$13,000                |
| BG 1, CT 9566    | 91%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 2%             | 0%                               | 100%               | 56.8%                                        | \$13,030                |
| BG 2, CT 9566    | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 16%                   | 3%             | 0%                               | 100%               | 64.6%                                        | \$9,428                 |
| BG 1, CT 9567    | 94%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 56.8%                                        | \$14,375                |
| BG 2, CT 9567    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 47.8%                                        | \$11,786                |
| BG 1, CT 9568    | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 53.9%                                        | \$17,614                |
| BG 2, CT 9568    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 61.8%                                        | \$11,693                |
| BG 1, CT 4301    | 66%                         | 12%                       | 0%                               | 0%    | 0%                                        | 3%                    | 19%            | 3%                               | 97%                | 47.8%                                        | \$18,882                |
| BG 2, CT 4301    | 68%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 27%            | 6%                               | 94%                | 51.7%                                        | \$18,278                |
| BG 3, CT 4301    | 61%                         | 10%                       | 1%                               | 0%    | 0%                                        | 0%                    | 28%            | 0%                               | 100%               | 29.4%                                        | \$26,719                |
| BG 1, CT 4302    | 70%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 28%            | 0%                               | 100%               | 64.1%                                        | \$16,597                |
| BG 2, CT 4302    | 70%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 18%            | 0%                               | 100%               | 35.9%                                        | \$15,625                |
| BG 3, CT 4302    | 96%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 9.6%                                         | \$34,261                |
| BG 4, CT 4302    | 49%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 51%            | 5%                               | 95%                | 66.4%                                        | \$13,050                |
| BG 1, CT 4303    | 58%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 42%            | 5%                               | 95%                | 45.0%                                        | \$15,972                |
| BG 2, CT 4303    | 54%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 38%            | 11%                              | 89%                | 74.2%                                        | \$5,833                 |
| BG 3, CT 4303    | 61%                         | 4%                        | 0%                               | 0%    | 0%                                        | 4%                    | 30%            | 2%                               | 98%                | 71.4%                                        | \$6,313                 |
| BG 1, CT 4304.01 | 57%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 37%            | 6%                               | 94%                | 77.0%                                        | \$11,279                |
| BG 2, CT 4304.01 | 57%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 37%            | 11%                              | 89%                | 48.4%                                        | \$15,516                |
| BG 3, CT 4304.01 | 60%                         | 9%                        | 0%                               | 0%    | 0%                                        | 4%                    | 27%            | 7%                               | 93%                | 63.3%                                        | \$15,703                |
| BG 1, CT 4304.02 | 60%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 35%            | 4%                               | 96%                | 66.0%                                        | \$12,386                |
| BG 2, CT 4304.02 | 70%                         | 4%                        | 0%                               | 0%    | 0%                                        | 7%                    | 20%            | 1%                               | 99%                | 68.7%                                        | \$12,572                |



| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 4304.02 | 81%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 11%            | 8%                               | 92%                | 63.5%                                        | \$16,098                |
| BG 1, CT 4305.01 | 66%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 29%            | 9%                               | 91%                | 74.0%                                        | \$14,894                |
| BG 2, CT 4305.01 | 39%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 56%            | 15%                              | 85%                | 63.1%                                        | \$14,226                |
| BG 3, CT 4305.01 | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 20%            | 5%                               | 95%                | 22.8%                                        | \$30,474                |
| BG 4, CT 4305.01 | 50%                         | 3%                        | 1%                               | 0%    | 0%                                        | 4%                    | 42%            | 16%                              | 84%                | 35.0%                                        | \$19,770                |
| BG 1, CT 4305.02 | 58%                         | 4%                        | 0%                               | 0%    | 0%                                        | 7%                    | 31%            | 10%                              | 90%                | 52.0%                                        | \$20,962                |
| BG 2, CT 4305.02 | 54%                         | 4%                        | 0%                               | 3%    | 0%                                        | 7%                    | 33%            | 6%                               | 94%                | 50.4%                                        | \$14,074                |
| BG 1, CT 4306.01 | 78%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 22%            | 1%                               | 99%                | 58.6%                                        | \$14,131                |
| BG 2, CT 4306.01 | 78%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 18%            | 6%                               | 94%                | 50.4%                                        | \$16,838                |
| BG 3, CT 4306.01 | 88%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 5%             | 3%                               | 97%                | 66.0%                                        | \$14,406                |
| BG 4, CT 4306.01 | 68%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 27%            | 16%                              | 84%                | 80.9%                                        | \$9,028                 |
| BG 1, CT 4306.02 | 69%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 30%            | 4%                               | 96%                | 73.5%                                        | \$10,000                |
| BG 2, CT 4306.02 | 56%                         | 2%                        | 0%                               | 1%    | 0%                                        | 5%                    | 36%            | 14%                              | 86%                | 21.6%                                        | \$33,875                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 4001    | 92%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 2%                               | 98%                | 24.2%                                        | \$23,678                |
| BG 2, CT 4001    | 48%                         | 0%                        | 0%                               | 1%    | 0%                                        | 2%                    | 49%            | 1%                               | 99%                | 87.1%                                        | \$6,830                 |
| BG 3, CT 4001    | 76%                         | 6%                        | 0%                               | 0%    | 0%                                        | 4%                    | 13%            | 7%                               | 93%                | 27.4%                                        | \$23,897                |
| BG 4, CT 4001    | 70%                         | 6%                        | 0%                               | 0%    | 0%                                        | 8%                    | 16%            | 5%                               | 95%                | 70.0%                                        | \$12,222                |
| BG 5, CT 4001    | 69%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 27%            | 7%                               | 93%                | 62.4%                                        | \$11,295                |
| BG 1, CT 4003    | 86%                         | 6%                        | 0%                               | 0%    | 0%                                        | 6%                    | 2%             | 3%                               | 97%                | 24.6%                                        | \$46,544                |
| BG 2, CT 4003    | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 4%             | 22%                              | 78%                | 23.0%                                        | \$31,959                |
| BG 1, CT 4004    | 80%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 18%            | 0%                               | 100%               | 70.4%                                        | \$12,644                |
| BG 2, CT 4004    | 89%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 10%            | 1%                               | 99%                | 20.7%                                        | \$29,167                |
| BG 3, CT 4004    | 91%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 7%             | 3%                               | 97%                | 51.1%                                        | \$15,399                |
| BG 1, CT 4005.01 | 86%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 8%             | 2%                               | 98%                | 44.2%                                        | \$20,847                |
| BG 2, CT 4005.01 | 87%                         | 5%                        | 0%                               | 0%    | 0%                                        | 5%                    | 3%             | 0%                               | 100%               | 68.4%                                        | \$9,821                 |
| BG 1, CT 4005.02 | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 7%             | 1%                               | 99%                | 26.2%                                        | \$27,895                |
| BG 2, CT 4005.02 | 72%                         | 0%                        | 0%                               | 11%   | 0%                                        | 10%                   | 7%             | 4%                               | 96%                | 34.8%                                        | \$18,750                |
| BG 3, CT 4005.02 | 73%                         | 2%                        | 0%                               | 5%    | 0%                                        | 3%                    | 16%            | 7%                               | 93%                | 84.7%                                        | \$7,805                 |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 4006    | 82%                         | 4%                        | 1%                               | 0%    | 0%                                        | 1%                    | 12%            | 5%                               | 95%                | 84.6%                                        | \$5,346                 |
| BG 2, CT 4006    | 92%                         | 3%                        | 0%                               | 1%    | 0%                                        | 4%                    | 0%             | 1%                               | 99%                | 40.6%                                        | \$16,302                |
| BG 3, CT 4006    | 82%                         | 2%                        | 0%                               | 0%    | 0%                                        | 8%                    | 8%             | 3%                               | 97%                | 61.0%                                        | \$11,615                |
| BG 1, CT 4007    | 90%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 7%             | 3%                               | 97%                | 31.6%                                        | \$22,766                |
| BG 2, CT 4007    | 95%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 0%                               | 100%               | 67.2%                                        | \$4,706                 |
| BG 3, CT 4007    | 81%                         | 12%                       | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 1%                               | 99%                | 14.7%                                        | \$29,097                |
| BG 1, CT 4008    | 84%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 9%             | 3%                               | 97%                | 69.6%                                        | \$10,968                |
| BG 2, CT 4008    | 64%                         | 6%                        | 0%                               | 0%    | 0%                                        | 29%                   | 0%             | 4%                               | 96%                | 81.1%                                        | \$8,824                 |
| BG 1, CT 4009    | 85%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 10%            | 1%                               | 99%                | 74.3%                                        | \$9,728                 |
| BG 2, CT 4009    | 41%                         | 3%                        | 0%                               | 0%    | 0%                                        | 48%                   | 7%             | 12%                              | 88%                | 72.3%                                        | \$16,346                |
| BG 1, CT 4010    | 79%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 20%            | 0%                               | 100%               | 59.9%                                        | \$9,198                 |
| BG 2, CT 4010    | 88%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 9%             | 2%                               | 98%                | 78.0%                                        | \$10,408                |
| BG 1, CT 4011    | 77%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 19%            | 0%                               | 100%               | 71.5%                                        | \$8,100                 |
| BG 1, CT 4012    | 71%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 27%            | 7%                               | 93%                | 59.7%                                        | \$17,448                |
| BG 2, CT 4012    | 55%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 43%            | 5%                               | 95%                | 54.6%                                        | \$13,922                |
| BG 1, CT 4013.01 | 63%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 36%            | 4%                               | 96%                | 52.1%                                        | \$14,883                |
| BG 2, CT 4013.01 | 78%                         | 7%                        | 1%                               | 0%    | 0%                                        | 2%                    | 12%            | 3%                               | 97%                | 50.2%                                        | \$12,879                |
| BG 3, CT 4013.01 | 67%                         | 5%                        | 0%                               | 3%    | 0%                                        | 2%                    | 23%            | 8%                               | 92%                | 63.6%                                        | \$9,363                 |
| BG 1, CT 4013.02 | 79%                         | 1%                        | 0%                               | 5%    | 0%                                        | 2%                    | 14%            | 5%                               | 95%                | 48.2%                                        | \$15,481                |
| BG 2, CT 4013.02 | 58%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 35%            | 4%                               | 96%                | 42.6%                                        | \$24,550                |
| BG 3, CT 4013.02 | 55%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 39%            | 2%                               | 98%                | 32.9%                                        | \$14,889                |
| BG 4, CT 4013.02 | 74%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 20%            | 3%                               | 97%                | 44.4%                                        | \$22,041                |
| BG 1, CT 4014.01 | 79%                         | 3%                        | 0%                               | 0%    | 0%                                        | 7%                    | 12%            | 0%                               | 100%               | 38.0%                                        | \$22,784                |
| BG 2, CT 4014.01 | 65%                         | 3%                        | 0%                               | 0%    | 0%                                        | 12%                   | 21%            | 18%                              | 82%                | 54.8%                                        | \$14,896                |
| BG 3, CT 4014.01 | 80%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 11%                              | 89%                | 23.6%                                        | \$28,333                |
| BG 1, CT 4014.02 | 45%                         | 20%                       | 0%                               | 0%    | 0%                                        | 0%                    | 35%            | 1%                               | 99%                | 62.4%                                        | \$14,295                |
| BG 2, CT 4014.02 | 75%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 24%            | 1%                               | 99%                | 54.8%                                        | \$14,708                |
| BG 3, CT 4014.02 | 69%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 24%            | 0%                               | 100%               | 22.2%                                        | \$38,750                |
| BG 4, CT 4014.02 | 87%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 13%            | 3%                               | 97%                | 44.8%                                        | \$15,096                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 2301    | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 8%             | 0%                               | 100%               | 48.5%                                        | \$17,958                |
| BG 2, CT 2301    | 95%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 0%                               | 100%               | 64.3%                                        | \$9,365                 |
| BG 3, CT 2301    | 89%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 7%                               | 93%                | 29.7%                                        | \$21,094                |
| BG 1, CT 2302    | 89%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 9%             | 2%                               | 98%                | 40.0%                                        | \$19,229                |
| BG 2, CT 2302    | 67%                         | 10%                       | 0%                               | 0%    | 0%                                        | 2%                    | 21%            | 2%                               | 98%                | 68.5%                                        | \$13,958                |
| BG 3, CT 2302    | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 45.4%                                        | \$13,887                |
| BG 1, CT 2303    | 84%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 10%            | 0%                               | 100%               | 68.8%                                        | \$7,500                 |
| BG 2, CT 2303    | 91%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 6%             | 0%                               | 100%               | 38.6%                                        | \$15,385                |
| BG 1, CT 2304    | 84%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 9%             | 0%                               | 100%               | 72.7%                                        | \$8,115                 |
| BG 2, CT 2304    | 86%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 5%             | 0%                               | 100%               | 62.3%                                        | \$15,670                |
| BG 3, CT 2304    | 86%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 13%            | 0%                               | 100%               | 55.3%                                        | \$12,692                |
| BG 1, CT 2305.01 | 66%                         | 7%                        | 0%                               | 0%    | 0%                                        | 4%                    | 23%            | 1%                               | 99%                | 46.4%                                        | \$15,801                |
| BG 2, CT 2305.01 | 65%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 29%            | 0%                               | 100%               | 59.7%                                        | \$15,662                |
| BG 1, CT 2305.02 | 81%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 16%            | 0%                               | 100%               | 53.9%                                        | \$22,661                |
| BG 2, CT 2305.02 | 74%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 24%            | 1%                               | 99%                | 38.6%                                        | \$21,765                |
| BG 3, CT 2305.02 | 88%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 1%                               | 99%                | 78.7%                                        | \$8,319                 |
| BG 1, CT 2501    | 77%                         | 13%                       | 0%                               | 0%    | 0%                                        | 6%                    | 3%             | 0%                               | 100%               | 38.7%                                        | \$19,128                |
| BG 2, CT 2501    | 73%                         | 12%                       | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 1%                               | 99%                | 38.2%                                        | \$14,334                |
| BG 3, CT 2501    | 85%                         | 8%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 31.6%                                        | \$18,977                |
| BG 1, CT 2502    | 93%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 0%                               | 100%               | 47.1%                                        | \$16,944                |
| BG 2, CT 2502    | 86%                         | 5%                        | 0%                               | 0%    | 0%                                        | 8%                    | 1%             | 0%                               | 100%               | 38.3%                                        | \$26,004                |
| BG 1, CT 2503    | 81%                         | 13%                       | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 1%                               | 99%                | 61.3%                                        | \$14,050                |
| BG 2, CT 2503    | 84%                         | 10%                       | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 53.2%                                        | \$14,784                |
| BG 1, CT 2504    | 78%                         | 7%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 0%                               | 100%               | 72.7%                                        | \$8,566                 |
| BG 2, CT 2504    | 88%                         | 4%                        | 0%                               | 0%    | 0%                                        | 7%                    | 2%             | 0%                               | 100%               | 51.0%                                        | \$14,063                |
| BG 1, CT 2505    | 89%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 2%             | 0%                               | 100%               | 32.8%                                        | \$21,397                |
| BG 2, CT 2505    | 81%                         | 7%                        | 0%                               | 0%    | 0%                                        | 10%                   | 2%             | 0%                               | 100%               | 42.4%                                        | \$19,572                |
| BG 3, CT 2505    | 64%                         | 17%                       | 0%                               | 0%    | 0%                                        | 20%                   | 0%             | 0%                               | 100%               | 80.6%                                        | \$11,013                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 2506    | 84%                         | 6%                        | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 1%                               | 99%                | 64.8%                                        | \$10,225                |
| BG 2, CT 2506    | 81%                         | 2%                        | 1%                               | 2%    | 0%                                        | 13%                   | 0%             | 1%                               | 99%                | 46.0%                                        | \$15,372                |
| BG 3, CT 2506    | 56%                         | 10%                       | 0%                               | 0%    | 0%                                        | 34%                   | 0%             | 1%                               | 99%                | 56.5%                                        | \$13,931                |
| BG 1, CT 8101    | 65%                         | 7%                        | 0%                               | 0%    | 0%                                        | 24%                   | 4%             | 0%                               | 100%               | 76.6%                                        | \$12,050                |
| BG 2, CT 8101    | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 9%                    | 2%             | 0%                               | 100%               | 60.2%                                        | \$21,667                |
| BG 3, CT 8101    | 82%                         | 7%                        | 0%                               | 0%    | 0%                                        | 6%                    | 5%             | 0%                               | 100%               | 53.6%                                        | \$14,315                |
| BG 1, CT 8102    | 62%                         | 4%                        | 0%                               | 0%    | 0%                                        | 25%                   | 9%             | 1%                               | 99%                | 35.3%                                        | \$28,750                |
| BG 2, CT 8102    | 92%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 2%             | 0%                               | 100%               | 60.3%                                        | \$15,241                |
| BG 3, CT 8102    | 73%                         | 7%                        | 0%                               | 0%    | 0%                                        | 20%                   | 0%             | 0%                               | 100%               | 55.8%                                        | \$12,365                |
| BG 4, CT 8102    | 78%                         | 5%                        | 0%                               | 0%    | 0%                                        | 16%                   | 1%             | 1%                               | 99%                | 52.1%                                        | \$15,985                |
| BG 1, CT 8103    | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 14%                   | 6%             | 0%                               | 100%               | 26.2%                                        | \$22,688                |
| BG 2, CT 8103    | 66%                         | 11%                       | 0%                               | 0%    | 0%                                        | 14%                   | 9%             | 0%                               | 100%               | 80.5%                                        | \$9,167                 |
| BG 1, CT 8104    | 60%                         | 7%                        | 0%                               | 0%    | 0%                                        | 25%                   | 7%             | 0%                               | 100%               | 49.3%                                        | \$15,417                |
| BG 2, CT 8104    | 84%                         | 6%                        | 0%                               | 0%    | 0%                                        | 10%                   | 0%             | 0%                               | 100%               | 58.8%                                        | \$14,226                |
| BG 1, CT 8105    | 69%                         | 0%                        | 0%                               | 3%    | 0%                                        | 28%                   | 0%             | 0%                               | 100%               | 56.0%                                        | \$9,899                 |
| BG 2, CT 8105    | 70%                         | 0%                        | 0%                               | 0%    | 0%                                        | 15%                   | 15%            | 0%                               | 100%               | 46.3%                                        | \$17,330                |
| BG 3, CT 8105    | 73%                         | 2%                        | 0%                               | 0%    | 0%                                        | 25%                   | 0%             | 2%                               | 98%                | 46.4%                                        | \$22,833                |
| BG 4, CT 8105    | 69%                         | 0%                        | 0%                               | 0%    | 0%                                        | 22%                   | 9%             | 1%                               | 99%                | 31.7%                                        | \$22,256                |
| BG 1, CT 8106    | 70%                         | 3%                        | 0%                               | 0%    | 0%                                        | 18%                   | 9%             | 2%                               | 98%                | 53.1%                                        | \$15,799                |
| BG 2, CT 8106    | 83%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 9%             | 1%                               | 99%                | 46.4%                                        | \$16,064                |
| BG 1, CT 8107    | 82%                         | 7%                        | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 0%                               | 100%               | 24.0%                                        | \$23,750                |
| BG 2, CT 8107    | 64%                         | 0%                        | 0%                               | 0%    | 0%                                        | 25%                   | 11%            | 0%                               | 100%               | 56.3%                                        | \$12,736                |
| BG 3, CT 8107    | 66%                         | 4%                        | 0%                               | 0%    | 0%                                        | 21%                   | 10%            | 2%                               | 98%                | 58.2%                                        | \$15,278                |
| BG 4, CT 8107    | 74%                         | 3%                        | 0%                               | 0%    | 0%                                        | 15%                   | 9%             | 3%                               | 97%                | 58.6%                                        | \$14,808                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 3001.01 | 96%                         | 2%                        | 0%                               | 2%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 55.9%                                        | \$7,274                 |
| BG 2, CT 3001.01 | 86%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 3%             | 0%                               | 100%               | 45.5%                                        | \$18,929                |
| BG 3, CT 3001.01 | 73%                         | 15%                       | 0%                               | 1%    | 0%                                        | 11%                   | 0%             | 2%                               | 98%                | 38.8%                                        | \$28,393                |
| BG 1, CT 3001.02 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 53.9%                                        | \$12,667                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 3001.02 | 92%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 33.4%                                        | \$19,050                |
| BG 3, CT 3001.02 | 94%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 51.3%                                        | \$21,055                |
| BG 4, CT 3001.02 | 95%                         | 0%                        | 0%                               | 1%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 27.5%                                        | \$34,018                |
| BG 1, CT 3002    | 80%                         | 0%                        | 4%                               | 9%    | 0%                                        | 5%                    | 1%             | 0%                               | 100%               | 69.3%                                        | \$15,682                |
| BG 2, CT 3002    | 59%                         | 12%                       | 0%                               | 4%    | 0%                                        | 14%                   | 11%            | 0%                               | 100%               | 36.5%                                        | \$23,233                |
| BG 3, CT 3002    | 76%                         | 7%                        | 0%                               | 4%    | 0%                                        | 13%                   | 1%             | 0%                               | 100%               | 36.7%                                        | \$27,841                |
| BG 1, CT 3003.01 | 87%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 8%             | 0%                               | 100%               | 60.3%                                        | \$13,292                |
| BG 2, CT 3003.01 | 87%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 5%             | 0%                               | 100%               | 47.7%                                        | \$21,905                |
| BG 3, CT 3003.01 | 90%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 3%             | 0%                               | 100%               | 42.3%                                        | \$20,568                |
| BG 1, CT 3003.02 | 92%                         | 1%                        | 0%                               | 1%    | 0%                                        | 1%                    | 4%             | 0%                               | 100%               | 17.1%                                        | \$47,841                |
| BG 2, CT 3003.02 | 86%                         | 12%                       | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 29.1%                                        | \$25,938                |
| BG 3, CT 3003.02 | 83%                         | 5%                        | 0%                               | 5%    | 0%                                        | 6%                    | 1%             | 0%                               | 100%               | 58.5%                                        | \$12,372                |
| BG 1, CT 3004    | 63%                         | 10%                       | 0%                               | 6%    | 0%                                        | 18%                   | 3%             | 0%                               | 100%               | 53.0%                                        | \$14,250                |
| BG 2, CT 3004    | 57%                         | 21%                       | 0%                               | 0%    | 0%                                        | 10%                   | 12%            | 5%                               | 95%                | 56.7%                                        | \$15,750                |
| BG 3, CT 3004    | 67%                         | 20%                       | 0%                               | 0%    | 0%                                        | 10%                   | 3%             | 0%                               | 100%               | 55.4%                                        | \$9,940                 |
| BG 1, CT 3005    | 66%                         | 1%                        | 0%                               | 0%    | 0%                                        | 20%                   | 12%            | 0%                               | 100%               | 80.2%                                        | \$7,880                 |
| BG 2, CT 3005    | 80%                         | 7%                        | 0%                               | 1%    | 0%                                        | 10%                   | 2%             | 0%                               | 100%               | 67.1%                                        | \$9,341                 |
| BG 1, CT 3007    | 84%                         | 4%                        | 1%                               | 0%    | 0%                                        | 12%                   | 0%             | 0%                               | 100%               | 56.3%                                        | \$13,750                |
| BG 2, CT 3007    | 75%                         | 1%                        | 0%                               | 0%    | 0%                                        | 11%                   | 13%            | 0%                               | 100%               | 51.7%                                        | \$11,518                |
| BG 1, CT 3008    | 87%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 0%                               | 100%               | 69.7%                                        | \$11,250                |
| BG 2, CT 3008    | 85%                         | 8%                        | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 0%                               | 100%               | 66.3%                                        | \$11,268                |
| BG 3, CT 3008    | 78%                         | 6%                        | 0%                               | 4%    | 0%                                        | 6%                    | 6%             | 0%                               | 100%               | 53.8%                                        | \$8,415                 |
| BG 4, CT 3008    | 84%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 9%             | 1%                               | 99%                | 35.9%                                        | \$21,269                |
| BG 1, CT 3010    | 89%                         | 0%                        | 3%                               | 0%    | 0%                                        | 8%                    | 0%             | 0%                               | 100%               | 25.7%                                        | \$25,462                |
| BG 2, CT 3010    | 89%                         | 3%                        | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 0%                               | 100%               | 22.4%                                        | \$35,852                |
| BG 3, CT 3010    | 92%                         | 0%                        | 1%                               | 2%    | 0%                                        | 3%                    | 2%             | 0%                               | 100%               | 39.6%                                        | \$20,694                |
| BG 4, CT 3010    | 84%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 10%            | 0%                               | 100%               | 32.1%                                        | \$24,943                |
| BG 1, CT 3011    | 86%                         | 5%                        | 0%                               | 2%    | 0%                                        | 3%                    | 4%             | 0%                               | 100%               | 28.3%                                        | \$35,938                |
| BG 2, CT 3011    | 76%                         | 0%                        | 0%                               | 1%    | 0%                                        | 11%                   | 12%            | 0%                               | 100%               | 39.7%                                        | \$19,115                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 3011 | 88%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 8%             | 4%                               | 96%                | 51.0%                                        | \$21,424                |
| BG 4, CT 3011 | 79%                         | 7%                        | 0%                               | 1%    | 0%                                        | 7%                    | 5%             | 1%                               | 99%                | 24.1%                                        | \$31,406                |
| BG 5, CT 3011 | 81%                         | 11%                       | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 0%                               | 100%               | 39.2%                                        | \$18,397                |
| BG 1, CT 3012 | 89%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 2%             | 0%                               | 100%               | 20.5%                                        | \$30,313                |
| BG 2, CT 3012 | 87%                         | 6%                        | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 2%                               | 98%                | 60.7%                                        | \$10,000                |
| BG 3, CT 3012 | 86%                         | 4%                        | 0%                               | 3%    | 0%                                        | 6%                    | 1%             | 1%                               | 99%                | 46.0%                                        | \$16,108                |
| BG 1, CT 3013 | 86%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 5%             | 1%                               | 99%                | 43.9%                                        | \$22,550                |
| BG 2, CT 3013 | 84%                         | 5%                        | 0%                               | 1%    | 0%                                        | 9%                    | 1%             | 0%                               | 100%               | 96.4%                                        | ND                      |
| BG 3, CT 3013 | 82%                         | 3%                        | 0%                               | 0%    | 0%                                        | 5%                    | 9%             | 0%                               | 100%               | 100.0%                                       | ND                      |
| BG 1, CT 3014 | 70%                         | 11%                       | 0%                               | 3%    | 0%                                        | 13%                   | 3%             | 1%                               | 99%                | 58.9%                                        | \$15,625                |
| BG 1, CT 3015 | 70%                         | 8%                        | 2%                               | 2%    | 0%                                        | 18%                   | 1%             | 0%                               | 100%               | 50.9%                                        | \$18,384                |
| BG 2, CT 3015 | 79%                         | 2%                        | 0%                               | 0%    | 0%                                        | 18%                   | 1%             | 0%                               | 100%               | 27.8%                                        | \$21,953                |
| BG 3, CT 3015 | 86%                         | 9%                        | 0%                               | 0%    | 0%                                        | 4%                    | 1%             | 1%                               | 99%                | 33.7%                                        | \$24,762                |
| BG 1, CT 3016 | 76%                         | 6%                        | 1%                               | 0%    | 0%                                        | 16%                   | 1%             | 1%                               | 99%                | 49.5%                                        | \$14,358                |
| BG 2, CT 3016 | 72%                         | 5%                        | 0%                               | 2%    | 0%                                        | 14%                   | 8%             | 0%                               | 100%               | 54.8%                                        | \$17,031                |
| BG 3, CT 3016 | 85%                         | 1%                        | 0%                               | 1%    | 0%                                        | 8%                    | 5%             | 0%                               | 100%               | 18.2%                                        | \$42,273                |
| BG 4, CT 3016 | 67%                         | 6%                        | 0%                               | 8%    | 0%                                        | 18%                   | 0%             | 7%                               | 93%                | 60.9%                                        | \$11,483                |
| BG 1, CT 3017 | 81%                         | 2%                        | 1%                               | 0%    | 0%                                        | 12%                   | 4%             | 2%                               | 98%                | 65.2%                                        | \$11,927                |
| BG 2, CT 3017 | 84%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 12%            | 0%                               | 100%               | 49.1%                                        | \$14,396                |
| BG 3, CT 3017 | 98%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 43.8%                                        | \$16,315                |
| BG 4, CT 3017 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 30.8%                                        | \$26,731                |
| BG 1, CT 3018 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 58.2%                                        | \$12,470                |
| BG 2, CT 3018 | 95%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 2%                               | 98%                | 57.9%                                        | \$15,625                |
| BG 1, CT 3019 | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 59.2%                                        | \$14,574                |
| BG 2, CT 3019 | 95%                         | 0%                        | 2%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 71.0%                                        | \$9,369                 |
| BG 3, CT 3019 | 84%                         | 5%                        | 0%                               | 0%    | 0%                                        | 10%                   | 1%             | 0%                               | 100%               | 73.6%                                        | \$8,423                 |
| BG 4, CT 3019 | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 54.8%                                        | \$10,438                |
| BG 1, CT 3020 | 91%                         | 0%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 1%                               | 99%                | 43.8%                                        | \$17,857                |
| BG 2, CT 3020 | 85%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 7%             | 0%                               | 100%               | 47.4%                                        | \$16,688                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 3020    | 94%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 2%                               | 98%                | 19.6%                                        | \$16,250                |
| BG 1, CT 3021    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 51.6%                                        | \$15,457                |
| BG 2, CT 3021    | 95%                         | 4%                        | 1%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 39.9%                                        | \$16,212                |
| BG 3, CT 3021    | 97%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 74.8%                                        | \$11,667                |
| BG 4, CT 3021    | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 2%                               | 98%                | 61.2%                                        | \$15,714                |
| BG 1, CT 3022.01 | 92%                         | 1%                        | 0%                               | 2%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 74.1%                                        | \$9,123                 |
| BG 2, CT 3022.01 | 90%                         | 1%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 1%                               | 99%                | 61.2%                                        | \$18,452                |
| BG 1, CT 3022.02 | 85%                         | 10%                       | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 3%                               | 97%                | 65.6%                                        | \$9,049                 |
| BG 2, CT 3022.02 | 97%                         | 0%                        | 1%                               | 0%    | 0%                                        | 1%                    | 1%             | 2%                               | 98%                | 43.4%                                        | \$19,240                |
| BG 3, CT 3022.02 | 95%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 3%                               | 97%                | 52.3%                                        | \$15,172                |
| BG 1, CT 3023    | 82%                         | 4%                        | 0%                               | 0%    | 0%                                        | 10%                   | 3%             | 2%                               | 98%                | 56.2%                                        | \$13,611                |
| BG 2, CT 3023    | 91%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 2%             | 0%                               | 100%               | 60.2%                                        | \$12,917                |
| BG 0, CT 9929    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 2801.01 | 24%                         | 28%                       | 0%                               | 0%    | 0%                                        | 4%                    | 44%            | 0%                               | 100%               | 69.3%                                        | \$13,133                |
| BG 2, CT 2801.01 | 44%                         | 32%                       | 0%                               | 0%    | 0%                                        | 0%                    | 24%            | 0%                               | 100%               | 68.2%                                        | \$10,119                |
| BG 1, CT 2801.02 | 45%                         | 31%                       | 0%                               | 0%    | 0%                                        | 6%                    | 18%            | 0%                               | 100%               | 43.1%                                        | \$23,011                |
| BG 2, CT 2801.02 | 64%                         | 15%                       | 0%                               | 0%    | 0%                                        | 8%                    | 13%            | 0%                               | 100%               | 45.1%                                        | \$17,324                |
| BG 3, CT 2801.02 | 49%                         | 13%                       | 0%                               | 0%    | 0%                                        | 16%                   | 23%            | 0%                               | 100%               | 73.0%                                        | \$13,517                |
| BG 1, CT 2802.01 | 32%                         | 20%                       | 0%                               | 0%    | 0%                                        | 11%                   | 37%            | 0%                               | 100%               | 28.1%                                        | \$26,087                |
| BG 2, CT 2802.01 | 58%                         | 18%                       | 0%                               | 0%    | 0%                                        | 8%                    | 17%            | 0%                               | 100%               | 50.5%                                        | \$16,639                |
| BG 3, CT 2802.01 | 31%                         | 41%                       | 0%                               | 0%    | 0%                                        | 13%                   | 15%            | 0%                               | 100%               | 30.9%                                        | \$22,734                |
| BG 4, CT 2802.01 | 52%                         | 33%                       | 0%                               | 0%    | 0%                                        | 1%                    | 13%            | 0%                               | 100%               | 80.2%                                        | \$7,778                 |
| BG 1, CT 2802.02 | 51%                         | 12%                       | 0%                               | 0%    | 0%                                        | 12%                   | 25%            | 5%                               | 95%                | 56.9%                                        | \$12,764                |
| BG 2, CT 2802.02 | 60%                         | 29%                       | 0%                               | 0%    | 0%                                        | 0%                    | 11%            | 0%                               | 100%               | 33.0%                                        | \$21,464                |
| BG 3, CT 2802.02 | 50%                         | 33%                       | 0%                               | 0%    | 0%                                        | 9%                    | 8%             | 1%                               | 99%                | 63.9%                                        | \$14,712                |
| BG 4, CT 2802.02 | 51%                         | 22%                       | 0%                               | 0%    | 0%                                        | 14%                   | 13%            | 0%                               | 100%               | 40.3%                                        | \$30,041                |
| BG 0, CT 9915    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 5901    | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 6%             | 0%                               | 100%               | 65.3%                                        | \$14,714                |
| BG 2, CT 5901    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 62.4%                                        | \$10,461                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 5901    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 59.2%                                        | \$10,145                |
| BG 4, CT 5901    | 98%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 30.8%                                        | \$21,389                |
| BG 1, CT 5902    | 87%                         | 6%                        | 2%                               | 2%    | 0%                                        | 3%                    | 0%             | 1%                               | 99%                | 69.8%                                        | \$8,778                 |
| BG 2, CT 5902    | 88%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 11%            | 3%                               | 97%                | 84.1%                                        | \$8,818                 |
| BG 3, CT 5902    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 47.6%                                        | \$20,893                |
| BG 4, CT 5902    | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 0%                               | 100%               | 76.7%                                        | \$7,237                 |
| BG 1, CT 5903    | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 3%                               | 97%                | 34.4%                                        | \$22,128                |
| BG 2, CT 5903    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 62.0%                                        | \$14,186                |
| BG 3, CT 5903    | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 1%                               | 99%                | 68.1%                                        | \$12,264                |
| BG 4, CT 5903    | 97%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 57.8%                                        | \$11,838                |
| BG 1, CT 5904    | 95%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 9%                               | 91%                | 46.3%                                        | \$13,607                |
| BG 2, CT 5904    | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 35.3%                                        | \$28,098                |
| BG 3, CT 5904    | 97%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 47.2%                                        | \$20,577                |
| BG 4, CT 5904    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 3%             | 0%                               | 100%               | 62.8%                                        | \$9,695                 |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9522.01 | 42%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 54%            | 1%                               | 99%                | 50.1%                                        | \$18,798                |
| BG 2, CT 9522.01 | 31%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 65%            | 0%                               | 100%               | 57.3%                                        | \$16,735                |
| BG 1, CT 9522.02 | 32%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 64%            | 2%                               | 98%                | 71.9%                                        | \$14,556                |
| BG 2, CT 9522.02 | 31%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 63%            | 0%                               | 100%               | 64.4%                                        | \$12,960                |
| BG 3, CT 9522.02 | 41%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 54%            | 0%                               | 100%               | 57.4%                                        | \$16,676                |
| BG 1, CT 9523.01 | 42%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 58%            | 0%                               | 100%               | 43.4%                                        | \$19,083                |
| BG 2, CT 9523.01 | 42%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 53%            | 0%                               | 100%               | 62.8%                                        | \$9,716                 |
| BG 1, CT 9523.02 | 37%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 61%            | 0%                               | 100%               | 78.5%                                        | \$13,016                |
| BG 2, CT 9523.02 | 37%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 58%            | 0%                               | 100%               | 50.6%                                        | \$18,292                |
| BG 3, CT 9523.02 | 12%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 85%            | 3%                               | 97%                | 67.3%                                        | \$11,131                |
| BG 1, CT 9524    | 41%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 56%            | 0%                               | 100%               | 80.8%                                        | \$6,865                 |
| BG 2, CT 9524    | 56%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 36%            | 0%                               | 100%               | 61.9%                                        | \$8,138                 |
| BG 1, CT 9525    | 22%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 78%            | 0%                               | 100%               | 37.7%                                        | \$20,197                |
| BG 2, CT 9525    | 37%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 51%            | 0%                               | 100%               | 63.9%                                        | \$13,365                |



| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 9525   | 41%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 54%            | 0%                               | 100%               | 55.1%                                        | \$11,402                |
| BG 4, CT 9525   | 46%                         | 5%                        | 2%                               | 0%    | 0%                                        | 0%                    | 47%            | 0%                               | 100%               | 47.7%                                        | \$18,625                |
| BG 1, CT 301.01 | 39%                         | 9%                        | 2%                               | 0%    | 0%                                        | 10%                   | 40%            | 1%                               | 99%                | 69.5%                                        | \$12,885                |
| BG 2, CT 301.01 | 64%                         | 9%                        | 0%                               | 0%    | 0%                                        | 9%                    | 18%            | 0%                               | 100%               | 8.7%                                         | \$58,250                |
| BG 3, CT 301.01 | 54%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 41%            | 3%                               | 97%                | 37.7%                                        | \$23,750                |
| BG 4, CT 301.01 | 40%                         | 60%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 60%                              | 40%                | 0.0%                                         | ND                      |
| BG 1, CT 301.03 | 47%                         | 11%                       | 6%                               | 1%    | 0%                                        | 1%                    | 35%            | 0%                               | 100%               | 50.4%                                        | \$20,341                |
| BG 2, CT 301.03 | 53%                         | 12%                       | 3%                               | 0%    | 0%                                        | 0%                    | 32%            | 0%                               | 100%               | 57.3%                                        | \$12,880                |
| BG 1, CT 301.04 | 81%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 14%            | 0%                               | 100%               | 3.2%                                         | \$72,179                |
| BG 2, CT 301.04 | 65%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 30%            | 3%                               | 97%                | 20.6%                                        | \$46,012                |
| BG 3, CT 301.04 | 69%                         | 4%                        | 0%                               | 3%    | 0%                                        | 0%                    | 24%            | 4%                               | 96%                | 3.6%                                         | \$58,772                |
| BG 1, CT 301.05 | 70%                         | 4%                        | 1%                               | 0%    | 0%                                        | 2%                    | 24%            | 0%                               | 100%               | 23.8%                                        | \$26,354                |
| BG 2, CT 301.05 | 56%                         | 18%                       | 0%                               | 0%    | 0%                                        | 2%                    | 23%            | 29%                              | 71%                | 17.3%                                        | \$31,146                |
| BG 1, CT 302    | 86%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 9%             | 3%                               | 97%                | 52.0%                                        | \$15,156                |
| BG 2, CT 302    | 73%                         | 6%                        | 11%                              | 0%    | 0%                                        | 0%                    | 9%             | 0%                               | 100%               | 4.9%                                         | \$48,750                |
| BG 3, CT 302    | 62%                         | 7%                        | 0%                               | 0%    | 0%                                        | 2%                    | 29%            | 0%                               | 100%               | 23.6%                                        | \$32,656                |
| BG 4, CT 302    | 81%                         | 9%                        | 1%                               | 0%    | 0%                                        | 0%                    | 9%             | 6%                               | 94%                | 26.5%                                        | \$25,417                |
| BG 1, CT 303    | 27%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 69%            | 0%                               | 100%               | 4.7%                                         | \$39,537                |
| BG 2, CT 303    | 22%                         | 20%                       | 0%                               | 0%    | 0%                                        | 14%                   | 44%            | 0%                               | 100%               | 43.8%                                        | \$16,917                |
| BG 3, CT 303    | 62%                         | 5%                        | 2%                               | 0%    | 0%                                        | 2%                    | 30%            | 0%                               | 100%               | 75.6%                                        | \$7,555                 |
| BG 4, CT 303    | 69%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 20%            | 1%                               | 99%                | 18.5%                                        | \$34,813                |
| BG 1, CT 307    | 42%                         | 16%                       | 3%                               | 0%    | 0%                                        | 4%                    | 35%            | 0%                               | 100%               | 60.3%                                        | \$14,940                |
| BG 2, CT 307    | 51%                         | 9%                        | 1%                               | 0%    | 0%                                        | 7%                    | 32%            | 1%                               | 99%                | 81.8%                                        | \$6,736                 |
| BG 1, CT 308    | 66%                         | 5%                        | 4%                               | 1%    | 0%                                        | 9%                    | 14%            | 0%                               | 100%               | 29.0%                                        | \$22,443                |
| BG 1, CT 309.01 | 67%                         | 10%                       | 0%                               | 0%    | 0%                                        | 1%                    | 23%            | 0%                               | 100%               | 17.6%                                        | \$24,962                |
| BG 2, CT 309.01 | 69%                         | 4%                        | 0%                               | 0%    | 0%                                        | 3%                    | 23%            | 0%                               | 100%               | 26.9%                                        | \$21,875                |
| BG 1, CT 309.02 | 75%                         | 7%                        | 0%                               | 0%    | 0%                                        | 9%                    | 9%             | 2%                               | 98%                | 25.6%                                        | \$31,750                |
| BG 2, CT 309.02 | 64%                         | 4%                        | 0%                               | 0%    | 0%                                        | 14%                   | 17%            | 0%                               | 100%               | 31.6%                                        | \$24,196                |
| BG 1, CT 309.03 | 70%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 22%            | 3%                               | 97%                | 34.0%                                        | \$19,815                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 309.03 | 68%                         | 3%                        | 0%                               | 2%    | 0%                                        | 0%                    | 27%            | 2%                               | 98%                | 20.9%                                        | \$39,414                |
| BG 1, CT 309.04 | 70%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 20%            | 0%                               | 100%               | 41.4%                                        | \$18,508                |
| BG 2, CT 309.04 | 87%                         | 7%                        | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 1%                               | 99%                | 48.6%                                        | \$23,438                |
| BG 1, CT 310.04 | 73%                         | 3%                        | 0%                               | 0%    | 0%                                        | 5%                    | 20%            | 5%                               | 95%                | 27.1%                                        | \$27,826                |
| BG 2, CT 310.04 | 51%                         | 9%                        | 1%                               | 0%    | 0%                                        | 1%                    | 38%            | 1%                               | 99%                | 16.4%                                        | \$36,210                |
| BG 1, CT 310.05 | 52%                         | 4%                        | 3%                               | 1%    | 0%                                        | 2%                    | 39%            | 3%                               | 97%                | 57.4%                                        | \$10,256                |
| BG 2, CT 310.05 | 67%                         | 6%                        | 0%                               | 0%    | 0%                                        | 4%                    | 23%            | 2%                               | 98%                | 25.5%                                        | \$26,964                |
| BG 1, CT 310.11 | 58%                         | 8%                        | 1%                               | 0%    | 0%                                        | 2%                    | 30%            | 0%                               | 100%               | 1.3%                                         | \$50,714                |
| BG 2, CT 310.11 | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 13%            | 2%                               | 98%                | 3.0%                                         | \$31,658                |
| BG 3, CT 310.11 | 75%                         | 2%                        | 0%                               | 1%    | 0%                                        | 3%                    | 19%            | 1%                               | 99%                | 6.8%                                         | \$60,100                |
| BG 4, CT 310.11 | 46%                         | 13%                       | 0%                               | 0%    | 0%                                        | 1%                    | 41%            | 0%                               | 100%               | 25.0%                                        | \$33,500                |
| BG 1, CT 310.13 | 38%                         | 17%                       | 0%                               | 0%    | 0%                                        | 0%                    | 45%            | 0%                               | 100%               | 54.0%                                        | \$10,583                |
| BG 2, CT 310.13 | 61%                         | 8%                        | 0%                               | 0%    | 0%                                        | 8%                    | 23%            | 4%                               | 96%                | 34.8%                                        | \$31,213                |
| BG 3, CT 310.13 | 41%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 52%            | 0%                               | 100%               | 28.1%                                        | \$26,415                |
| BG 4, CT 310.13 | 47%                         | 9%                        | 0%                               | 0%    | 0%                                        | 6%                    | 38%            | 2%                               | 98%                | 19.4%                                        | \$36,845                |
| BG 5, CT 310.13 | 46%                         | 13%                       | 0%                               | 0%    | 0%                                        | 5%                    | 36%            | 0%                               | 100%               | 23.9%                                        | \$30,488                |
| BG 1, CT 310.21 | 57%                         | 8%                        | 1%                               | 0%    | 0%                                        | 2%                    | 31%            | 1%                               | 99%                | 45.2%                                        | \$21,200                |
| BG 2, CT 310.21 | 82%                         | 10%                       | 0%                               | 0%    | 0%                                        | 3%                    | 5%             | 0%                               | 100%               | 13.6%                                        | \$55,078                |
| BG 3, CT 310.21 | 53%                         | 11%                       | 0%                               | 0%    | 0%                                        | 11%                   | 25%            | 0%                               | 100%               | 35.5%                                        | \$28,382                |
| BG 1, CT 310.23 | 74%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 21%            | 0%                               | 100%               | 31.8%                                        | \$31,336                |
| BG 2, CT 310.23 | 57%                         | 4%                        | 1%                               | 0%    | 0%                                        | 7%                    | 32%            | 0%                               | 100%               | 31.0%                                        | \$33,413                |
| BG 1, CT 310.31 | 61%                         | 7%                        | 1%                               | 0%    | 0%                                        | 6%                    | 25%            | 0%                               | 100%               | 18.0%                                        | \$32,667                |
| BG 2, CT 310.31 | 54%                         | 10%                       | 0%                               | 10%   | 0%                                        | 10%                   | 16%            | 10%                              | 90%                | 18.2%                                        | \$28,676                |
| BG 3, CT 310.31 | 27%                         | 15%                       | 0%                               | 0%    | 0%                                        | 0%                    | 58%            | 0%                               | 100%               | 90.7%                                        | \$4,470                 |
| BG 4, CT 310.31 | 67%                         | 0%                        | 0%                               | 1%    | 0%                                        | 0%                    | 32%            | 0%                               | 100%               | 18.8%                                        | \$53,409                |
| BG 1, CT 310.32 | 49%                         | 15%                       | 2%                               | 0%    | 0%                                        | 3%                    | 31%            | 4%                               | 96%                | 20.4%                                        | \$56,667                |
| BG 1, CT 310.33 | 46%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 51%            | 3%                               | 97%                | 25.1%                                        | \$34,469                |
| BG 2, CT 310.33 | 49%                         | 3%                        | 0%                               | 0%    | 0%                                        | 13%                   | 35%            | 0%                               | 100%               | 30.3%                                        | \$42,885                |
| BG 3, CT 310.33 | 73%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 23%            | 0%                               | 100%               | 50.9%                                        | \$21,500                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 4, CT 310.33 | 60%                         | 13%                       | 0%                               | 0%    | 0%                                        | 0%                    | 28%            | 3%                               | 97%                | 26.5%                                        | \$31,292                |
| BG 1, CT 311.01 | 59%                         | 6%                        | 0%                               | 0%    | 0%                                        | 12%                   | 23%            | 3%                               | 97%                | 29.8%                                        | \$27,969                |
| BG 2, CT 311.01 | 63%                         | 23%                       | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 0%                               | 100%               | 8.5%                                         | \$55,921                |
| BG 1, CT 311.13 | 68%                         | 13%                       | 0%                               | 2%    | 0%                                        | 2%                    | 14%            | 1%                               | 99%                | 48.4%                                        | \$19,246                |
| BG 2, CT 311.13 | 71%                         | 7%                        | 0%                               | 1%    | 0%                                        | 13%                   | 7%             | 3%                               | 97%                | 20.9%                                        | \$34,034                |
| BG 3, CT 311.13 | 71%                         | 8%                        | 0%                               | 0%    | 0%                                        | 16%                   | 6%             | 2%                               | 98%                | 49.5%                                        | \$23,047                |
| BG 1, CT 311.14 | 68%                         | 5%                        | 0%                               | 0%    | 0%                                        | 16%                   | 11%            | 0%                               | 100%               | 95.5%                                        | \$7,209                 |
| BG 2, CT 311.14 | 67%                         | 12%                       | 3%                               | 0%    | 0%                                        | 6%                    | 12%            | 0%                               | 100%               | 47.3%                                        | \$19,683                |
| BG 3, CT 311.14 | 68%                         | 15%                       | 0%                               | 0%    | 0%                                        | 13%                   | 3%             | 0%                               | 100%               | 33.8%                                        | \$24,028                |
| BG 1, CT 311.21 | 66%                         | 18%                       | 11%                              | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 38.1%                                        | \$30,645                |
| BG 2, CT 311.21 | 65%                         | 16%                       | 0%                               | 0%    | 0%                                        | 16%                   | 3%             | 1%                               | 99%                | 28.8%                                        | \$35,179                |
| BG 3, CT 311.21 | 59%                         | 1%                        | 2%                               | 0%    | 0%                                        | 7%                    | 31%            | 0%                               | 100%               | 78.6%                                        | \$10,840                |
| BG 1, CT 311.22 | 66%                         | 11%                       | 0%                               | 0%    | 0%                                        | 17%                   | 5%             | 0%                               | 100%               | 31.8%                                        | \$26,289                |
| BG 2, CT 311.22 | 69%                         | 5%                        | 0%                               | 0%    | 0%                                        | 10%                   | 16%            | 0%                               | 100%               | 24.0%                                        | \$22,475                |
| BG 1, CT 311.23 | 61%                         | 9%                        | 2%                               | 0%    | 0%                                        | 9%                    | 19%            | 1%                               | 99%                | 36.0%                                        | \$19,738                |
| BG 2, CT 311.23 | 64%                         | 7%                        | 0%                               | 0%    | 0%                                        | 25%                   | 4%             | 0%                               | 100%               | 41.2%                                        | \$16,630                |
| BG 1, CT 311.24 | 40%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 54%            | 0%                               | 100%               | 56.6%                                        | \$14,353                |
| BG 1, CT 311.25 | 55%                         | 5%                        | 0%                               | 1%    | 0%                                        | 1%                    | 38%            | 1%                               | 99%                | 22.2%                                        | \$34,528                |
| BG 2, CT 311.25 | 62%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 33%            | 2%                               | 98%                | 53.3%                                        | \$14,861                |
| BG 1, CT 312.01 | 63%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 30%            | 6%                               | 94%                | 48.8%                                        | \$18,086                |
| BG 2, CT 312.01 | 50%                         | 13%                       | 5%                               | 0%    | 0%                                        | 8%                    | 25%            | 0%                               | 100%               | 49.0%                                        | \$22,112                |
| BG 3, CT 312.01 | 29%                         | 5%                        | 3%                               | 0%    | 0%                                        | 5%                    | 58%            | 0%                               | 100%               | 93.7%                                        | \$2,546                 |
| BG 1, CT 312.02 | 72%                         | 14%                       | 0%                               | 0%    | 0%                                        | 1%                    | 13%            | 0%                               | 100%               | 47.1%                                        | \$20,893                |
| BG 2, CT 312.02 | 53%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 43%            | 0%                               | 100%               | 21.8%                                        | \$31,701                |
| BG 3, CT 312.02 | 47%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 50%            | 2%                               | 98%                | 42.2%                                        | \$18,920                |
| BG 1, CT 312.03 | 72%                         | 11%                       | 0%                               | 0%    | 0%                                        | 5%                    | 11%            | 0%                               | 100%               | 16.6%                                        | \$31,786                |
| BG 2, CT 312.03 | 69%                         | 8%                        | 0%                               | 0%    | 0%                                        | 11%                   | 13%            | 1%                               | 99%                | 29.9%                                        | \$27,083                |
| BG 1, CT 313.01 | 56%                         | 14%                       | 0%                               | 0%    | 0%                                        | 12%                   | 17%            | 0%                               | 100%               | 28.0%                                        | \$22,017                |
| BG 2, CT 313.01 | 67%                         | 4%                        | 0%                               | 0%    | 0%                                        | 19%                   | 9%             | 0%                               | 100%               | 18.1%                                        | \$34,395                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 313.01 | 56%                         | 11%                       | 0%                               | 0%    | 0%                                        | 19%                   | 15%            | 0%                               | 100%               | 39.6%                                        | \$21,100                |
| BG 1, CT 313.04 | 46%                         | 1%                        | 0%                               | 0%    | 0%                                        | 10%                   | 43%            | 0%                               | 100%               | 33.7%                                        | \$23,214                |
| BG 1, CT 313.05 | 77%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 18%            | 0%                               | 100%               | 24.4%                                        | \$32,500                |
| BG 2, CT 313.05 | 63%                         | 13%                       | 0%                               | 0%    | 0%                                        | 6%                    | 18%            | 0%                               | 100%               | 35.4%                                        | \$25,644                |
| BG 3, CT 313.05 | 56%                         | 5%                        | 0%                               | 0%    | 0%                                        | 15%                   | 23%            | 0%                               | 100%               | 41.4%                                        | \$19,904                |
| BG 4, CT 313.05 | 49%                         | 3%                        | 2%                               | 0%    | 0%                                        | 17%                   | 28%            | 0%                               | 100%               | 43.6%                                        | \$24,018                |
| BG 1, CT 313.06 | 55%                         | 8%                        | 0%                               | 5%    | 0%                                        | 9%                    | 23%            | 5%                               | 95%                | 13.8%                                        | \$38,618                |
| BG 2, CT 313.06 | 49%                         | 10%                       | 0%                               | 0%    | 0%                                        | 7%                    | 35%            | 0%                               | 100%               | 42.7%                                        | \$22,045                |
| BG 1, CT 313.07 | 66%                         | 9%                        | 1%                               | 0%    | 0%                                        | 4%                    | 20%            | 2%                               | 98%                | 22.7%                                        | \$32,889                |
| BG 2, CT 313.07 | 59%                         | 2%                        | 2%                               | 0%    | 0%                                        | 13%                   | 23%            | 0%                               | 100%               | 22.2%                                        | \$39,083                |
| BG 1, CT 314.01 | 65%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 32%            | 2%                               | 98%                | 39.9%                                        | \$20,197                |
| BG 2, CT 314.01 | 57%                         | 18%                       | 0%                               | 0%    | 0%                                        | 12%                   | 14%            | 3%                               | 97%                | 41.8%                                        | \$20,144                |
| BG 3, CT 314.01 | 62%                         | 12%                       | 0%                               | 0%    | 0%                                        | 4%                    | 22%            | 0%                               | 100%               | 22.7%                                        | \$24,654                |
| BG 1, CT 314.02 | 65%                         | 5%                        | 0%                               | 0%    | 0%                                        | 9%                    | 21%            | 5%                               | 95%                | 34.0%                                        | \$22,819                |
| BG 2, CT 314.02 | 55%                         | 31%                       | 0%                               | 0%    | 0%                                        | 9%                    | 5%             | 0%                               | 100%               | 56.6%                                        | \$16,453                |
| BG 3, CT 314.02 | 33%                         | 19%                       | 0%                               | 0%    | 0%                                        | 3%                    | 45%            | 0%                               | 100%               | 65.7%                                        | \$11,111                |
| BG 1, CT 314.03 | 81%                         | 10%                       | 0%                               | 0%    | 0%                                        | 7%                    | 3%             | 0%                               | 100%               | 25.4%                                        | \$28,750                |
| BG 2, CT 314.03 | 79%                         | 5%                        | 0%                               | 0%    | 0%                                        | 10%                   | 7%             | 1%                               | 99%                | 64.0%                                        | \$21,055                |
| BG 3, CT 314.03 | 68%                         | 10%                       | 0%                               | 0%    | 0%                                        | 22%                   | 0%             | 0%                               | 100%               | 32.5%                                        | \$25,139                |
| BG 1, CT 315.01 | 61%                         | 8%                        | 0%                               | 0%    | 0%                                        | 1%                    | 30%            | 2%                               | 98%                | 25.4%                                        | \$24,688                |
| BG 2, CT 315.01 | 56%                         | 13%                       | 4%                               | 0%    | 0%                                        | 5%                    | 22%            | 0%                               | 100%               | 34.6%                                        | \$22,344                |
| BG 1, CT 315.02 | 67%                         | 7%                        | 2%                               | 0%    | 0%                                        | 0%                    | 23%            | 0%                               | 100%               | 44.3%                                        | \$18,813                |
| BG 2, CT 315.02 | 59%                         | 10%                       | 2%                               | 0%    | 0%                                        | 6%                    | 23%            | 0%                               | 100%               | 41.9%                                        | \$17,339                |
| BG 1, CT 315.03 | 58%                         | 11%                       | 0%                               | 0%    | 0%                                        | 7%                    | 24%            | 2%                               | 98%                | 55.3%                                        | \$13,953                |
| BG 2, CT 315.03 | 71%                         | 6%                        | 2%                               | 0%    | 0%                                        | 0%                    | 21%            | 1%                               | 99%                | 43.5%                                        | \$21,622                |
| BG 1, CT 316.11 | 62%                         | 16%                       | 0%                               | 0%    | 0%                                        | 19%                   | 4%             | 0%                               | 100%               | 29.3%                                        | \$26,406                |
| BG 2, CT 316.11 | 71%                         | 4%                        | 4%                               | 0%    | 0%                                        | 8%                    | 13%            | 0%                               | 100%               | 36.2%                                        | \$21,611                |
| BG 3, CT 316.11 | 72%                         | 12%                       | 0%                               | 2%    | 0%                                        | 5%                    | 10%            | 2%                               | 98%                | 45.5%                                        | \$19,300                |
| BG 1, CT 316.12 | 66%                         | 5%                        | 0%                               | 0%    | 0%                                        | 15%                   | 15%            | 0%                               | 100%               | 31.6%                                        | \$18,056                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 316.12 | 74%                         | 17%                       | 0%                               | 2%    | 0%                                        | 4%                    | 3%             | 0%                               | 100%               | 38.4%                                        | \$25,938                |
| BG 3, CT 316.12 | 59%                         | 17%                       | 3%                               | 0%    | 0%                                        | 13%                   | 8%             | 0%                               | 100%               | 92.7%                                        | \$6,071                 |
| BG 4, CT 316.12 | 54%                         | 13%                       | 0%                               | 0%    | 0%                                        | 30%                   | 3%             | 0%                               | 100%               | 43.8%                                        | \$15,956                |
| BG 1, CT 316.21 | 61%                         | 9%                        | 0%                               | 0%    | 0%                                        | 5%                    | 26%            | 1%                               | 99%                | 26.6%                                        | \$30,742                |
| BG 1, CT 316.22 | 56%                         | 15%                       | 1%                               | 0%    | 0%                                        | 6%                    | 22%            | 1%                               | 99%                | 54.3%                                        | \$15,250                |
| BG 2, CT 316.22 | 74%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 19%            | 0%                               | 100%               | 15.3%                                        | \$35,156                |
| BG 3, CT 316.22 | 56%                         | 9%                        | 0%                               | 0%    | 0%                                        | 17%                   | 19%            | 0%                               | 100%               | 33.8%                                        | \$20,978                |
| BG 1, CT 316.31 | 71%                         | 7%                        | 0%                               | 0%    | 0%                                        | 9%                    | 13%            | 2%                               | 98%                | 27.7%                                        | \$33,942                |
| BG 2, CT 316.31 | 57%                         | 3%                        | 2%                               | 0%    | 0%                                        | 3%                    | 35%            | 5%                               | 95%                | 32.5%                                        | \$28,500                |
| BG 1, CT 316.32 | 51%                         | 8%                        | 4%                               | 0%    | 0%                                        | 6%                    | 31%            | 0%                               | 100%               | 48.4%                                        | \$18,403                |
| BG 2, CT 316.32 | 69%                         | 6%                        | 1%                               | 0%    | 0%                                        | 18%                   | 6%             | 1%                               | 99%                | 37.1%                                        | \$21,000                |
| BG 3, CT 316.32 | 75%                         | 9%                        | 1%                               | 0%    | 0%                                        | 15%                   | 0%             | 0%                               | 100%               | 38.9%                                        | \$17,198                |
| BG 1, CT 316.41 | 63%                         | 12%                       | 0%                               | 0%    | 0%                                        | 10%                   | 16%            | 0%                               | 100%               | 35.4%                                        | \$22,701                |
| BG 2, CT 316.41 | 63%                         | 11%                       | 0%                               | 0%    | 0%                                        | 4%                    | 22%            | 0%                               | 100%               | 29.4%                                        | \$24,928                |
| BG 1, CT 316.51 | 56%                         | 11%                       | 1%                               | 0%    | 0%                                        | 21%                   | 12%            | 2%                               | 98%                | 50.8%                                        | \$15,662                |
| BG 2, CT 316.51 | 71%                         | 6%                        | 0%                               | 0%    | 0%                                        | 20%                   | 2%             | 1%                               | 99%                | 41.4%                                        | \$19,900                |
| BG 1, CT 317.01 | 87%                         | 3%                        | 0%                               | 0%    | 0%                                        | 8%                    | 2%             | 0%                               | 100%               | 14.3%                                        | \$35,926                |
| BG 2, CT 317.01 | 60%                         | 10%                       | 0%                               | 0%    | 0%                                        | 18%                   | 12%            | 0%                               | 100%               | 64.2%                                        | \$13,250                |
| BG 3, CT 317.01 | 67%                         | 12%                       | 4%                               | 0%    | 0%                                        | 7%                    | 10%            | 0%                               | 100%               | 19.6%                                        | \$33,958                |
| BG 1, CT 317.02 | 69%                         | 6%                        | 0%                               | 0%    | 0%                                        | 20%                   | 5%             | 0%                               | 100%               | 35.4%                                        | \$23,967                |
| BG 2, CT 317.02 | 75%                         | 1%                        | 0%                               | 0%    | 0%                                        | 23%                   | 0%             | 0%                               | 100%               | 44.4%                                        | \$17,083                |
| BG 3, CT 317.02 | 83%                         | 8%                        | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 0%                               | 100%               | 54.9%                                        | \$21,679                |
| BG 4, CT 317.02 | 67%                         | 7%                        | 0%                               | 0%    | 0%                                        | 12%                   | 13%            | 0%                               | 100%               | 43.0%                                        | \$16,420                |
| BG 1, CT 317.03 | 74%                         | 8%                        | 1%                               | 3%    | 0%                                        | 10%                   | 5%             | 1%                               | 99%                | 32.9%                                        | \$22,576                |
| BG 2, CT 317.03 | 59%                         | 8%                        | 0%                               | 1%    | 0%                                        | 27%                   | 5%             | 0%                               | 100%               | 21.5%                                        | \$22,066                |
| BG 1, CT 317.04 | 78%                         | 13%                       | 0%                               | 0%    | 0%                                        | 2%                    | 7%             | 0%                               | 100%               | 44.9%                                        | \$25,000                |
| BG 2, CT 317.04 | 57%                         | 8%                        | 0%                               | 1%    | 0%                                        | 10%                   | 24%            | 0%                               | 100%               | 27.9%                                        | \$25,608                |
| BG 3, CT 317.04 | 72%                         | 22%                       | 0%                               | 0%    | 0%                                        | 2%                    | 4%             | 0%                               | 100%               | 21.8%                                        | \$28,676                |
| BG 4, CT 317.04 | 84%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 9%             | 1%                               | 99%                | 35.5%                                        | \$20,208                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 318     | 66%                         | 4%                        | 0%                               | 0%    | 0%                                        | 23%                   | 7%             | 0%                               | 100%               | 19.4%                                        | \$39,583                |
| BG 2, CT 318     | 73%                         | 22%                       | 0%                               | 0%    | 0%                                        | 0%                    | 5%             | 0%                               | 100%               | 0.0%                                         | \$59,688                |
| BG 3, CT 318     | 39%                         | 2%                        | 0%                               | 0%    | 0%                                        | 45%                   | 13%            | 0%                               | 100%               | 53.1%                                        | \$12,670                |
| BG 4, CT 318     | 52%                         | 11%                       | 0%                               | 0%    | 0%                                        | 2%                    | 36%            | 0%                               | 100%               | 67.0%                                        | \$15,250                |
| BG 1, CT 319     | 70%                         | 1%                        | 0%                               | 0%    | 0%                                        | 19%                   | 11%            | 1%                               | 99%                | 33.7%                                        | \$23,221                |
| BG 2, CT 319     | 69%                         | 2%                        | 0%                               | 0%    | 0%                                        | 17%                   | 12%            | 0%                               | 100%               | 33.3%                                        | \$24,087                |
| BG 3, CT 319     | 62%                         | 4%                        | 0%                               | 0%    | 0%                                        | 25%                   | 9%             | 0%                               | 100%               | 32.4%                                        | \$19,500                |
| BG 4, CT 319     | 57%                         | 0%                        | 1%                               | 0%    | 0%                                        | 28%                   | 14%            | 0%                               | 100%               | 53.6%                                        | \$20,325                |
| BG 1, CT 320     | 52%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 42%            | 0%                               | 100%               | 55.4%                                        | \$14,353                |
| BG 2, CT 320     | 62%                         | 1%                        | 4%                               | 0%    | 0%                                        | 4%                    | 29%            | 0%                               | 100%               | 59.4%                                        | \$20,896                |
| BG 1, CT 321     | 40%                         | 1%                        | 1%                               | 0%    | 0%                                        | 1%                    | 57%            | 0%                               | 100%               | 57.0%                                        | \$16,866                |
| BG 2, CT 321     | 26%                         | 2%                        | 4%                               | 0%    | 0%                                        | 13%                   | 55%            | 0%                               | 100%               | 39.6%                                        | \$22,143                |
| BG 1, CT 322     | 50%                         | 4%                        | 0%                               | 0%    | 0%                                        | 25%                   | 21%            | 0%                               | 100%               | 69.5%                                        | \$14,261                |
| BG 2, CT 322     | 64%                         | 12%                       | 2%                               | 0%    | 0%                                        | 3%                    | 18%            | 0%                               | 100%               | 50.6%                                        | \$18,125                |
| BG 1, CT 323.01  | 67%                         | 6%                        | 1%                               | 0%    | 0%                                        | 11%                   | 15%            | 0%                               | 100%               | 17.0%                                        | \$38,203                |
| BG 2, CT 323.01  | 57%                         | 3%                        | 0%                               | 1%    | 0%                                        | 15%                   | 24%            | 0%                               | 100%               | 10.3%                                        | \$46,410                |
| BG 1, CT 323.02  | 61%                         | 4%                        | 0%                               | 0%    | 0%                                        | 25%                   | 10%            | 0%                               | 100%               | 37.9%                                        | \$23,452                |
| BG 2, CT 323.02  | 60%                         | 7%                        | 5%                               | 0%    | 0%                                        | 8%                    | 21%            | 0%                               | 100%               | 51.2%                                        | \$23,586                |
| BG 1, CT 8301.01 | 94%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 1%                               | 99%                | 48.0%                                        | \$17,342                |
| BG 2, CT 8301.01 | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 55.3%                                        | \$13,073                |
| BG 3, CT 8301.01 | 98%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 47.0%                                        | \$12,986                |
| BG 1, CT 8301.02 | 93%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 43.5%                                        | \$14,555                |
| BG 2, CT 8301.02 | 92%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 47.2%                                        | \$18,421                |
| BG 3, CT 8301.02 | 90%                         | 8%                        | 0%                               | 1%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 44.0%                                        | \$17,386                |
| BG 1, CT 8302    | 88%                         | 10%                       | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 43.2%                                        | \$17,356                |
| BG 2, CT 8302    | 98%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 16.6%                                        | \$37,983                |
| BG 3, CT 8302    | 92%                         | 6%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 51.9%                                        | \$16,563                |
| BG 1, CT 8303    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 17.4%                                        | \$38,566                |
| BG 2, CT 8303    | 90%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 8%             | 0%                               | 100%               | 31.2%                                        | \$25,114                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 8303    | 82%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 7%             | 0%                               | 100%               | 22.3%                                        | \$17,768                |
| BG 4, CT 8303    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 1%                               | 99%                | 34.7%                                        | \$23,606                |
| BG 1, CT 8304    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 42.7%                                        | \$22,083                |
| BG 2, CT 8304    | 91%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 48.6%                                        | \$17,008                |
| BG 3, CT 8304    | 98%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 94.1%                                        | \$6,699                 |
| BG 4, CT 8304    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 67.6%                                        | \$10,182                |
| BG 1, CT 8305.02 | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 48.0%                                        | \$20,484                |
| BG 2, CT 8305.02 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 4%                               | 96%                | 28.3%                                        | \$32,955                |
| BG 3, CT 8305.02 | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 3%             | 0%                               | 100%               | 69.2%                                        | \$9,818                 |
| BG 4, CT 8305.02 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 64.1%                                        | \$15,909                |
| BG 1, CT 8305.03 | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 53.3%                                        | \$19,898                |
| BG 2, CT 8305.03 | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 48.7%                                        | \$18,947                |
| BG 1, CT 8305.04 | 96%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 52.8%                                        | \$14,049                |
| BG 2, CT 8305.04 | 98%                         | 1%                        | 1%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 61.7%                                        | \$15,211                |
| BG 1, CT 8306.03 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 63.6%                                        | \$12,220                |
| BG 2, CT 8306.03 | 95%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 0%                               | 100%               | 76.2%                                        | \$7,852                 |
| BG 3, CT 8306.03 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 5%                               | 95%                | 36.6%                                        | \$21,214                |
| BG 1, CT 8306.04 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 41.0%                                        | \$18,576                |
| BG 2, CT 8306.04 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 65.2%                                        | \$19,049                |
| BG 3, CT 8306.04 | 84%                         | 0%                        | 0%                               | 0%    | 0%                                        | 12%                   | 3%             | 0%                               | 100%               | 58.0%                                        | \$13,262                |
| BG 4, CT 8306.04 | 79%                         | 0%                        | 0%                               | 0%    | 0%                                        | 21%                   | 0%             | 0%                               | 100%               | 54.2%                                        | \$14,773                |
| BG 1, CT 9800    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 2001    | 61%                         | 3%                        | 0%                               | 5%    | 0%                                        | 18%                   | 13%            | 1%                               | 99%                | 41.7%                                        | \$20,317                |
| BG 2, CT 2001    | 83%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 14%            | 2%                               | 98%                | 24.5%                                        | \$46,853                |
| BG 3, CT 2001    | 84%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 0%                               | 100%               | 56.1%                                        | \$15,221                |
| BG 4, CT 2001    | 74%                         | 9%                        | 0%                               | 3%    | 0%                                        | 8%                    | 7%             | 0%                               | 100%               | 18.3%                                        | \$62,566                |
| BG 5, CT 2001    | 69%                         | 11%                       | 0%                               | 0%    | 0%                                        | 4%                    | 16%            | 7%                               | 93%                | 55.6%                                        | \$22,939                |
| BG 1, CT 2002    | 52%                         | 3%                        | 0%                               | 1%    | 0%                                        | 18%                   | 25%            | 0%                               | 100%               | 41.6%                                        | \$20,664                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 2002    | 53%                         | 3%                        | 0%                               | 1%    | 0%                                        | 17%                   | 26%            | 2%                               | 98%                | 51.9%                                        | \$17,041                |
| BG 3, CT 2002    | 67%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 30%            | 0%                               | 100%               | 33.6%                                        | \$18,576                |
| BG 4, CT 2002    | 77%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 20%            | 4%                               | 96%                | 15.9%                                        | \$23,594                |
| BG 1, CT 2003.02 | 76%                         | 4%                        | 0%                               | 0%    | 0%                                        | 12%                   | 8%             | 0%                               | 100%               | 7.6%                                         | \$56,591                |
| BG 2, CT 2003.02 | 78%                         | 7%                        | 0%                               | 0%    | 0%                                        | 8%                    | 6%             | 2%                               | 98%                | 14.8%                                        | \$35,300                |
| BG 3, CT 2003.02 | 86%                         | 2%                        | 0%                               | 0%    | 0%                                        | 10%                   | 2%             | 0%                               | 100%               | 11.1%                                        | \$51,321                |
| BG 4, CT 2003.02 | 37%                         | 3%                        | 4%                               | 1%    | 0%                                        | 22%                   | 33%            | 0%                               | 100%               | 58.1%                                        | \$14,898                |
| BG 5, CT 2003.02 | 82%                         | 2%                        | 0%                               | 0%    | 0%                                        | 6%                    | 10%            | 0%                               | 100%               | 10.7%                                        | \$66,971                |
| BG 6, CT 2003.02 | 68%                         | 0%                        | 0%                               | 0%    | 0%                                        | 22%                   | 10%            | 0%                               | 100%               | 11.2%                                        | \$76,818                |
| BG 1, CT 2003.03 | 68%                         | 9%                        | 0%                               | 0%    | 0%                                        | 17%                   | 6%             | 0%                               | 100%               | 28.0%                                        | \$22,647                |
| BG 2, CT 2003.03 | 82%                         | 9%                        | 0%                               | 0%    | 0%                                        | 5%                    | 5%             | 1%                               | 99%                | 3.9%                                         | \$80,593                |
| BG 3, CT 2003.03 | 60%                         | 7%                        | 0%                               | 0%    | 0%                                        | 14%                   | 19%            | 0%                               | 100%               | 5.4%                                         | \$89,688                |
| BG 4, CT 2003.03 | 32%                         | 4%                        | 0%                               | 0%    | 0%                                        | 40%                   | 24%            | 5%                               | 95%                | 3.0%                                         | \$54,375                |
| BG 5, CT 2003.03 | 82%                         | 2%                        | 0%                               | 0%    | 0%                                        | 13%                   | 3%             | 1%                               | 99%                | 38.1%                                        | \$30,964                |
| BG 6, CT 2003.03 | 56%                         | 7%                        | 0%                               | 0%    | 0%                                        | 17%                   | 20%            | 1%                               | 99%                | 46.6%                                        | \$20,774                |
| BG 1, CT 2003.04 | 73%                         | 12%                       | 0%                               | 0%    | 0%                                        | 11%                   | 4%             | 0%                               | 100%               | 6.7%                                         | \$84,844                |
| BG 2, CT 2003.04 | 80%                         | 8%                        | 4%                               | 0%    | 0%                                        | 0%                    | 8%             | 4%                               | 96%                | 65.6%                                        | \$14,750                |
| BG 3, CT 2003.04 | 63%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 30%            | 0%                               | 100%               | 69.2%                                        | \$11,992                |
| BG 4, CT 2003.04 | 85%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 9%             | 3%                               | 97%                | 17.2%                                        | \$38,197                |
| BG 5, CT 2003.04 | 43%                         | 6%                        | 0%                               | 0%    | 0%                                        | 21%                   | 30%            | 0%                               | 100%               | 15.6%                                        | \$36,250                |
| BG 1, CT 2004    | 72%                         | 12%                       | 0%                               | 0%    | 0%                                        | 14%                   | 2%             | 0%                               | 100%               | 23.9%                                        | \$23,482                |
| BG 2, CT 2004    | 71%                         | 10%                       | 0%                               | 0%    | 0%                                        | 7%                    | 12%            | 0%                               | 100%               | 28.0%                                        | \$24,070                |
| BG 1, CT 2005    | 80%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 15%            | 0%                               | 100%               | 7.7%                                         | \$33,229                |
| BG 2, CT 2005    | 63%                         | 23%                       | 0%                               | 0%    | 0%                                        | 2%                    | 13%            | 0%                               | 100%               | 17.2%                                        | \$30,721                |
| BG 3, CT 2005    | 69%                         | 20%                       | 0%                               | 0%    | 0%                                        | 5%                    | 7%             | 0%                               | 100%               | 16.9%                                        | \$25,250                |
| BG 4, CT 2005    | 67%                         | 14%                       | 0%                               | 0%    | 0%                                        | 2%                    | 16%            | 0%                               | 100%               | 42.4%                                        | \$18,232                |
| BG 5, CT 2005    | 66%                         | 3%                        | 3%                               | 0%    | 0%                                        | 6%                    | 22%            | 7%                               | 93%                | 82.7%                                        | \$12,857                |
| BG 6, CT 2005    | 76%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 16%            | 0%                               | 100%               | 10.9%                                        | \$28,147                |
| BG 7, CT 2005    | 79%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 13%            | 2%                               | 98%                | 48.4%                                        | \$28,750                |



| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 2006 | 80%                         | 8%                        | 0%                               | 0%    | 0%                                        | 7%                    | 5%             | 0%                               | 100%               | 90.6%                                        | \$5,685                 |
| BG 2, CT 2006 | 68%                         | 10%                       | 0%                               | 0%    | 0%                                        | 18%                   | 5%             | 0%                               | 100%               | 23.8%                                        | \$23,672                |
| BG 3, CT 2006 | 63%                         | 20%                       | 2%                               | 0%    | 0%                                        | 3%                    | 11%            | 0%                               | 100%               | 21.6%                                        | \$29,958                |
| BG 4, CT 2006 | 69%                         | 2%                        | 0%                               | 0%    | 0%                                        | 16%                   | 14%            | 0%                               | 100%               | 36.4%                                        | \$30,321                |
| BG 1, CT 2007 | 89%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 5%             | 0%                               | 100%               | 35.4%                                        | \$27,708                |
| BG 2, CT 2007 | 82%                         | 8%                        | 0%                               | 0%    | 0%                                        | 5%                    | 5%             | 2%                               | 98%                | 21.4%                                        | \$19,226                |
| BG 3, CT 2007 | 86%                         | 6%                        | 0%                               | 0%    | 0%                                        | 4%                    | 4%             | 3%                               | 97%                | 26.8%                                        | \$24,158                |
| BG 1, CT 2008 | 74%                         | 15%                       | 0%                               | 0%    | 0%                                        | 5%                    | 6%             | 0%                               | 100%               | 29.1%                                        | \$26,792                |
| BG 2, CT 2008 | 89%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 3%             | 0%                               | 100%               | 20.4%                                        | \$18,750                |
| BG 3, CT 2008 | 76%                         | 14%                       | 0%                               | 1%    | 0%                                        | 6%                    | 3%             | 0%                               | 100%               | 30.4%                                        | \$24,135                |
| BG 1, CT 2009 | 59%                         | 20%                       | 0%                               | 0%    | 0%                                        | 7%                    | 13%            | 0%                               | 100%               | 76.5%                                        | \$11,190                |
| BG 2, CT 2009 | 75%                         | 18%                       | 1%                               | 0%    | 0%                                        | 5%                    | 1%             | 2%                               | 98%                | 79.1%                                        | \$4,805                 |
| BG 1, CT 2010 | 78%                         | 6%                        | 0%                               | 1%    | 0%                                        | 13%                   | 2%             | 1%                               | 99%                | 73.1%                                        | \$10,981                |
| BG 2, CT 2010 | 68%                         | 21%                       | 0%                               | 0%    | 0%                                        | 6%                    | 5%             | 1%                               | 99%                | 55.1%                                        | \$13,083                |
| BG 1, CT 2012 | 74%                         | 10%                       | 0%                               | 0%    | 0%                                        | 10%                   | 6%             | 0%                               | 100%               | 64.7%                                        | \$9,559                 |
| BG 2, CT 2012 | 84%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 9%             | 1%                               | 99%                | 48.3%                                        | \$18,574                |
| BG 3, CT 2012 | 82%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 0%                               | 100%               | 37.8%                                        | \$13,500                |
| BG 1, CT 2013 | 82%                         | 1%                        | 0%                               | 1%    | 0%                                        | 10%                   | 7%             | 0%                               | 100%               | 30.3%                                        | \$31,094                |
| BG 2, CT 2013 | 95%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 2%             | 0%                               | 100%               | 32.6%                                        | \$33,345                |
| BG 1, CT 2014 | 77%                         | 13%                       | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 1%                               | 99%                | 55.1%                                        | \$14,022                |
| BG 2, CT 2014 | 75%                         | 9%                        | 0%                               | 3%    | 0%                                        | 6%                    | 7%             | 0%                               | 100%               | 49.4%                                        | \$18,023                |
| BG 1, CT 2015 | 80%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 8%             | 0%                               | 100%               | 42.9%                                        | \$24,625                |
| BG 2, CT 2015 | 81%                         | 2%                        | 0%                               | 0%    | 0%                                        | 12%                   | 5%             | 0%                               | 100%               | 64.2%                                        | \$23,633                |
| BG 3, CT 2015 | 88%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 5%             | 0%                               | 100%               | 56.6%                                        | \$16,343                |
| BG 4, CT 2015 | 79%                         | 8%                        | 0%                               | 0%    | 0%                                        | 12%                   | 0%             | 0%                               | 100%               | 46.9%                                        | \$20,605                |
| BG 1, CT 2016 | 87%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 8%             | 0%                               | 100%               | 97.0%                                        | ND                      |
| BG 2, CT 2016 | 92%                         | 4%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 25.2%                                        | \$37,656                |
| BG 3, CT 2016 | 57%                         | 16%                       | 0%                               | 3%    | 0%                                        | 12%                   | 11%            | 0%                               | 100%               | 78.1%                                        | \$10,163                |
| BG 1, CT 2017 | 74%                         | 17%                       | 1%                               | 0%    | 0%                                        | 3%                    | 4%             | 0%                               | 100%               | 38.3%                                        | \$16,423                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 2017    | 75%                         | 11%                       | 0%                               | 0%    | 0%                                        | 5%                    | 9%             | 0%                               | 100%               | 85.7%                                        | \$6,683                 |
| BG 3, CT 2017    | 87%                         | 9%                        | 0%                               | 0%    | 0%                                        | 1%                    | 3%             | 0%                               | 100%               | 52.9%                                        | \$16,833                |
| BG 1, CT 2018    | 90%                         | 10%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 38.0%                                        | \$23,026                |
| BG 2, CT 2018    | 77%                         | 5%                        | 6%                               | 0%    | 0%                                        | 4%                    | 7%             | 3%                               | 97%                | 74.7%                                        | \$10,368                |
| BG 3, CT 2018    | 86%                         | 1%                        | 0%                               | 2%    | 0%                                        | 10%                   | 1%             | 4%                               | 96%                | 37.1%                                        | \$13,438                |
| BG 1, CT 2019    | 79%                         | 13%                       | 0%                               | 0%    | 0%                                        | 2%                    | 6%             | 0%                               | 100%               | 40.6%                                        | \$19,750                |
| BG 2, CT 2019    | 77%                         | 5%                        | 0%                               | 0%    | 0%                                        | 14%                   | 4%             | 0%                               | 100%               | 89.5%                                        | ND                      |
| BG 1, CT 2020    | 78%                         | 5%                        | 0%                               | 0%    | 0%                                        | 10%                   | 7%             | 1%                               | 99%                | 40.5%                                        | \$22,339                |
| BG 2, CT 2020    | 89%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 5%             | 0%                               | 100%               | 71.4%                                        | \$11,354                |
| BG 3, CT 2020    | 90%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 7%             | 0%                               | 100%               | 48.8%                                        | \$21,875                |
| BG 1, CT 2021    | 82%                         | 5%                        | 0%                               | 0%    | 0%                                        | 6%                    | 7%             | 1%                               | 99%                | 58.1%                                        | \$9,886                 |
| BG 2, CT 2021    | 89%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 2%             | 0%                               | 100%               | 24.1%                                        | \$30,469                |
| BG 3, CT 2021    | 86%                         | 12%                       | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 14.0%                                        | \$43,438                |
| BG 1, CT 2022    | 81%                         | 11%                       | 0%                               | 0%    | 0%                                        | 8%                    | 1%             | 1%                               | 99%                | 45.9%                                        | \$17,739                |
| BG 1, CT 2023    | 93%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 1%                               | 99%                | 26.2%                                        | \$25,000                |
| BG 2, CT 2023    | 82%                         | 9%                        | 0%                               | 0%    | 0%                                        | 6%                    | 3%             | 2%                               | 98%                | 33.7%                                        | \$19,700                |
| BG 1, CT 2024.02 | 84%                         | 4%                        | 0%                               | 0%    | 0%                                        | 12%                   | 0%             | 2%                               | 98%                | 19.7%                                        | \$29,916                |
| BG 2, CT 2024.02 | 90%                         | 4%                        | 0%                               | 0%    | 0%                                        | 3%                    | 4%             | 0%                               | 100%               | 45.1%                                        | \$32,548                |
| BG 3, CT 2024.02 | 91%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 6%             | 8%                               | 92%                | 17.2%                                        | \$45,125                |
| BG 4, CT 2024.02 | 87%                         | 6%                        | 0%                               | 0%    | 0%                                        | 6%                    | 1%             | 10%                              | 90%                | 8.5%                                         | \$42,821                |
| BG 5, CT 2024.02 | 90%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 4%             | 0%                               | 100%               | 52.3%                                        | \$14,331                |
| BG 1, CT 2024.03 | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 47.7%                                        | \$18,462                |
| BG 2, CT 2024.03 | 90%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 3%             | 0%                               | 100%               | 45.3%                                        | \$16,853                |
| BG 3, CT 2024.03 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 78.9%                                        | \$11,583                |
| BG 4, CT 2024.03 | 65%                         | 8%                        | 0%                               | 0%    | 0%                                        | 19%                   | 8%             | 3%                               | 97%                | 10.5%                                        | \$24,375                |
| BG 1, CT 2024.04 | 86%                         | 3%                        | 0%                               | 0%    | 0%                                        | 10%                   | 1%             | 0%                               | 100%               | 31.2%                                        | \$32,172                |
| BG 2, CT 2024.04 | 76%                         | 5%                        | 0%                               | 1%    | 0%                                        | 4%                    | 13%            | 0%                               | 100%               | 17.4%                                        | \$27,950                |
| BG 3, CT 2024.04 | 72%                         | 11%                       | 0%                               | 0%    | 0%                                        | 11%                   | 5%             | 0%                               | 100%               | 48.3%                                        | \$17,391                |
| BG 1, CT 2025    | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 24.1%                                        | \$30,536                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 2025    | 89%                         | 0%                        | 0%                               | 1%    | 0%                                        | 9%                    | 2%             | 2%                               | 98%                | 40.6%                                        | \$23,085                |
| BG 3, CT 2025    | 87%                         | 10%                       | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 0%                               | 100%               | 42.7%                                        | \$21,500                |
| BG 1, CT 2026.01 | 85%                         | 6%                        | 0%                               | 0%    | 0%                                        | 6%                    | 3%             | 0%                               | 100%               | 36.8%                                        | \$23,363                |
| BG 2, CT 2026.01 | 88%                         | 2%                        | 0%                               | 1%    | 0%                                        | 0%                    | 9%             | 1%                               | 99%                | 11.8%                                        | \$28,693                |
| BG 3, CT 2026.01 | 80%                         | 12%                       | 0%                               | 0%    | 0%                                        | 6%                    | 2%             | 2%                               | 98%                | 37.0%                                        | \$27,564                |
| BG 4, CT 2026.01 | 86%                         | 12%                       | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 3%                               | 97%                | 49.0%                                        | \$26,563                |
| BG 1, CT 2026.02 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 19%                              | 81%                | 18.8%                                        | \$34,650                |
| BG 2, CT 2026.02 | 78%                         | 13%                       | 0%                               | 0%    | 0%                                        | 5%                    | 4%             | 0%                               | 100%               | 64.7%                                        | \$17,466                |
| BG 3, CT 2026.02 | 71%                         | 0%                        | 0%                               | 0%    | 0%                                        | 29%                   | 0%             | 0%                               | 100%               | 10.5%                                        | \$56,380                |
| BG 4, CT 2026.02 | 83%                         | 15%                       | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 22.7%                                        | \$24,000                |
| BG 5, CT 2026.02 | 86%                         | 9%                        | 0%                               | 0%    | 0%                                        | 4%                    | 1%             | 0%                               | 100%               | 9.8%                                         | \$55,888                |
| BG 6, CT 2026.02 | 77%                         | 18%                       | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 49.1%                                        | \$18,710                |
| BG 1, CT 2027.01 | 53%                         | 10%                       | 0%                               | 0%    | 0%                                        | 31%                   | 6%             | 0%                               | 100%               | 41.6%                                        | \$25,264                |
| BG 2, CT 2027.01 | 58%                         | 4%                        | 0%                               | 0%    | 0%                                        | 38%                   | 0%             | 3%                               | 97%                | 50.5%                                        | \$19,375                |
| BG 3, CT 2027.01 | 82%                         | 11%                       | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 0%                               | 100%               | 37.5%                                        | \$19,297                |
| BG 1, CT 2027.02 | 69%                         | 4%                        | 0%                               | 1%    | 0%                                        | 25%                   | 2%             | 0%                               | 100%               | 38.6%                                        | \$19,470                |
| BG 2, CT 2027.02 | 57%                         | 5%                        | 0%                               | 0%    | 0%                                        | 38%                   | 0%             | 1%                               | 99%                | 19.6%                                        | \$36,974                |
| BG 3, CT 2027.02 | 65%                         | 5%                        | 0%                               | 0%    | 0%                                        | 30%                   | 0%             | 0%                               | 100%               | 23.9%                                        | \$26,005                |
| BG 1, CT 2028    | 63%                         | 8%                        | 0%                               | 0%    | 0%                                        | 28%                   | 1%             | 0%                               | 100%               | 53.7%                                        | \$15,500                |
| BG 2, CT 2028    | 46%                         | 5%                        | 2%                               | 0%    | 0%                                        | 46%                   | 1%             | 0%                               | 100%               | 20.9%                                        | \$24,883                |
| BG 3, CT 2028    | 69%                         | 15%                       | 0%                               | 0%    | 0%                                        | 16%                   | 0%             | 0%                               | 100%               | 57.3%                                        | \$21,190                |
| BG 4, CT 2028    | 85%                         | 2%                        | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 0%                               | 100%               | 49.8%                                        | \$13,561                |
| BG 5, CT 2028    | 48%                         | 16%                       | 3%                               | 0%    | 0%                                        | 32%                   | 0%             | 0%                               | 100%               | 49.7%                                        | \$9,738                 |
| BG 1, CT 3201    | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 63.1%                                        | \$11,350                |
| BG 2, CT 3201    | 97%                         | 1%                        | 1%                               | 0%    | 0%                                        | 1%                    | 0%             | 3%                               | 97%                | 58.4%                                        | \$14,621                |
| BG 1, CT 3202    | 98%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 43.4%                                        | \$18,466                |
| BG 2, CT 3202    | 91%                         | 1%                        | 0%                               | 2%    | 0%                                        | 5%                    | 2%             | 2%                               | 98%                | 44.5%                                        | \$19,854                |
| BG 3, CT 3202    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 0%                               | 100%               | 49.8%                                        | \$16,552                |
| BG 1, CT 3203    | 91%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 7%             | 0%                               | 100%               | 28.0%                                        | \$24,782                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 3203    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 4%             | 0%                               | 100%               | 61.6%                                        | \$11,389                |
| BG 3, CT 3203    | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 0%                               | 100%               | 53.1%                                        | \$18,796                |
| BG 4, CT 3203    | 86%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 3%             | 0%                               | 100%               | 18.7%                                        | \$29,241                |
| BG 1, CT 3204.01 | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 6%             | 0%                               | 100%               | 32.1%                                        | \$24,340                |
| BG 2, CT 3204.01 | 95%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 22.9%                                        | \$31,250                |
| BG 1, CT 3204.02 | 95%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 1%                               | 99%                | 45.3%                                        | \$24,006                |
| BG 2, CT 3204.02 | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 1%             | 0%                               | 100%               | 51.2%                                        | \$16,641                |
| BG 1, CT 3205    | 98%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 47.1%                                        | \$19,483                |
| BG 2, CT 3205    | 92%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 1%                               | 99%                | 46.4%                                        | \$17,008                |
| BG 3, CT 3205    | 86%                         | 10%                       | 0%                               | 0%    | 0%                                        | 3%                    | 1%             | 0%                               | 100%               | 60.3%                                        | \$12,959                |
| BG 1, CT 3206    | 77%                         | 1%                        | 0%                               | 0%    | 0%                                        | 22%                   | 0%             | 0%                               | 100%               | 56.9%                                        | \$20,731                |
| BG 2, CT 3206    | 98%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 39.9%                                        | \$22,694                |
| BG 3, CT 3206    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 5%             | 5%                               | 95%                | 48.9%                                        | \$13,500                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 1001.01 | 36%                         | 29%                       | 0%                               | 1%    | 0%                                        | 34%                   | 0%             | 0%                               | 100%               | 46.1%                                        | \$21,083                |
| BG 2, CT 1001.01 | 27%                         | 25%                       | 0%                               | 0%    | 0%                                        | 47%                   | 1%             | 1%                               | 99%                | 52.9%                                        | \$13,958                |
| BG 1, CT 1001.03 | 47%                         | 20%                       | 0%                               | 0%    | 0%                                        | 32%                   | 0%             | 0%                               | 100%               | 40.1%                                        | \$11,538                |
| BG 2, CT 1001.03 | 30%                         | 21%                       | 0%                               | 0%    | 0%                                        | 49%                   | 0%             | 0%                               | 100%               | 46.7%                                        | \$28,114                |
| BG 3, CT 1001.03 | 39%                         | 17%                       | 0%                               | 0%    | 0%                                        | 43%                   | 0%             | 0%                               | 100%               | 71.3%                                        | \$22,642                |
| BG 4, CT 1001.03 | 46%                         | 18%                       | 0%                               | 7%    | 0%                                        | 29%                   | 0%             | 0%                               | 100%               | 74.6%                                        | \$13,405                |
| BG 1, CT 1001.04 | 28%                         | 10%                       | 0%                               | 0%    | 0%                                        | 61%                   | 0%             | 0%                               | 100%               | 80.0%                                        | \$12,157                |
| BG 2, CT 1001.04 | 57%                         | 9%                        | 0%                               | 0%    | 0%                                        | 34%                   | 0%             | 0%                               | 100%               | 73.7%                                        | \$9,338                 |
| BG 1, CT 1002    | 69%                         | 15%                       | 0%                               | 0%    | 0%                                        | 15%                   | 1%             | 0%                               | 100%               | 33.3%                                        | \$30,224                |
| BG 2, CT 1002    | 45%                         | 19%                       | 0%                               | 2%    | 0%                                        | 32%                   | 1%             | 0%                               | 100%               | 53.1%                                        | \$13,207                |
| BG 3, CT 1002    | 49%                         | 22%                       | 1%                               | 0%    | 0%                                        | 28%                   | 1%             | 0%                               | 100%               | 78.1%                                        | \$8,790                 |
| BG 1, CT 1004    | 38%                         | 9%                        | 0%                               | 0%    | 0%                                        | 53%                   | 0%             | 0%                               | 100%               | 24.9%                                        | \$26,087                |
| BG 2, CT 1004    | 44%                         | 24%                       | 0%                               | 2%    | 0%                                        | 27%                   | 3%             | 1%                               | 99%                | 37.9%                                        | \$30,286                |
| BG 3, CT 1004    | 45%                         | 10%                       | 0%                               | 1%    | 0%                                        | 44%                   | 0%             | 0%                               | 100%               | 56.2%                                        | \$22,188                |
| BG 4, CT 1004    | 52%                         | 7%                        | 0%                               | 0%    | 0%                                        | 40%                   | 1%             | 0%                               | 100%               | 67.6%                                        | \$14,028                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 1005.02 | 51%                         | 19%                       | 0%                               | 0%    | 0%                                        | 29%                   | 1%             | 0%                               | 100%               | 30.6%                                        | \$37,619                |
| BG 2, CT 1005.02 | 68%                         | 16%                       | 0%                               | 0%    | 0%                                        | 16%                   | 0%             | 2%                               | 98%                | 30.3%                                        | \$21,202                |
| BG 3, CT 1005.02 | 46%                         | 23%                       | 0%                               | 3%    | 0%                                        | 28%                   | 0%             | 0%                               | 100%               | 13.7%                                        | \$26,721                |
| BG 1, CT 1005.03 | 64%                         | 8%                        | 0%                               | 1%    | 0%                                        | 25%                   | 1%             | 0%                               | 100%               | 18.9%                                        | \$52,092                |
| BG 1, CT 1005.04 | 67%                         | 17%                       | 0%                               | 0%    | 0%                                        | 16%                   | 0%             | 0%                               | 100%               | 7.8%                                         | \$44,301                |
| BG 2, CT 1005.04 | 69%                         | 7%                        | 0%                               | 0%    | 0%                                        | 23%                   | 0%             | 0%                               | 100%               | 5.4%                                         | \$49,250                |
| BG 1, CT 1006.01 | 55%                         | 3%                        | 0%                               | 0%    | 0%                                        | 42%                   | 0%             | 0%                               | 100%               | 69.4%                                        | \$16,979                |
| BG 2, CT 1006.01 | 39%                         | 37%                       | 0%                               | 2%    | 0%                                        | 22%                   | 0%             | 0%                               | 100%               | 23.1%                                        | \$34,844                |
| BG 3, CT 1006.01 | 55%                         | 4%                        | 1%                               | 0%    | 0%                                        | 39%                   | 0%             | 0%                               | 100%               | 32.4%                                        | \$23,935                |
| BG 1, CT 1006.02 | 40%                         | 22%                       | 0%                               | 1%    | 0%                                        | 36%                   | 0%             | 0%                               | 100%               | 41.3%                                        | \$16,949                |
| BG 2, CT 1006.02 | 45%                         | 13%                       | 0%                               | 0%    | 0%                                        | 42%                   | 0%             | 0%                               | 100%               | 56.0%                                        | \$11,784                |
| BG 1, CT 1007    | 56%                         | 5%                        | 0%                               | 0%    | 0%                                        | 39%                   | 0%             | 0%                               | 100%               | 22.4%                                        | \$18,015                |
| BG 2, CT 1007    | 43%                         | 4%                        | 0%                               | 0%    | 0%                                        | 53%                   | 0%             | 0%                               | 100%               | 37.0%                                        | \$25,870                |
| BG 3, CT 1007    | 63%                         | 10%                       | 0%                               | 0%    | 0%                                        | 24%                   | 3%             | 0%                               | 100%               | 55.7%                                        | \$10,223                |
| BG 4, CT 1007    | 78%                         | 0%                        | 0%                               | 0%    | 0%                                        | 22%                   | 0%             | 0%                               | 100%               | 37.3%                                        | \$14,063                |
| BG 1, CT 1008    | 70%                         | 3%                        | 0%                               | 0%    | 0%                                        | 27%                   | 0%             | 0%                               | 100%               | 47.4%                                        | \$14,091                |
| BG 1, CT 501.03  | 84%                         | 0%                        | 0%                               | 11%   | 0%                                        | 0%                    | 4%             | 4%                               | 96%                | 29.3%                                        | \$34,044                |
| BG 2, CT 501.03  | 91%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 10%                              | 90%                | 38.2%                                        | \$21,571                |
| BG 3, CT 501.03  | 92%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 6%                               | 94%                | 9.8%                                         | \$63,396                |
| BG 4, CT 501.03  | 87%                         | 9%                        | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 5%                               | 95%                | 8.1%                                         | \$41,556                |
| BG 1, CT 501.05  | 73%                         | 21%                       | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 0%                               | 100%               | 23.8%                                        | \$29,770                |
| BG 2, CT 501.05  | 70%                         | 24%                       | 2%                               | 1%    | 0%                                        | 1%                    | 1%             | 2%                               | 98%                | 31.6%                                        | \$26,156                |
| BG 1, CT 501.06  | 60%                         | 4%                        | 0%                               | 7%    | 0%                                        | 6%                    | 23%            | 21%                              | 79%                | 23.1%                                        | \$26,806                |
| BG 2, CT 501.06  | 88%                         | 3%                        | 0%                               | 4%    | 0%                                        | 3%                    | 2%             | 19%                              | 81%                | 11.7%                                        | \$52,857                |
| BG 1, CT 501.07  | 86%                         | 9%                        | 5%                               | 0%    | 0%                                        | 0%                    | 0%             | 8%                               | 92%                | 2.5%                                         | \$80,461                |
| BG 2, CT 501.07  | 87%                         | 7%                        | 0%                               | 3%    | 0%                                        | 0%                    | 3%             | 6%                               | 94%                | 4.3%                                         | \$46,080                |
| BG 3, CT 501.07  | 89%                         | 3%                        | 0%                               | 6%    | 0%                                        | 0%                    | 2%             | 12%                              | 88%                | 10.6%                                        | \$44,638                |
| BG 1, CT 501.10  | 56%                         | 19%                       | 5%                               | 0%    | 0%                                        | 8%                    | 13%            | 4%                               | 96%                | 19.4%                                        | \$27,122                |
| BG 2, CT 501.10  | 73%                         | 9%                        | 0%                               | 2%    | 0%                                        | 16%                   | 0%             | 2%                               | 98%                | 31.6%                                        | \$28,229                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 501.10 | 72%                         | 12%                       | 0%                               | 1%    | 0%                                        | 4%                    | 11%            | 1%                               | 99%                | 20.7%                                        | \$30,350                |
| BG 1, CT 501.11 | 92%                         | 4%                        | 2%                               | 0%    | 0%                                        | 2%                    | 0%             | 7%                               | 93%                | 23.0%                                        | \$25,769                |
| BG 2, CT 501.11 | 79%                         | 9%                        | 0%                               | 0%    | 0%                                        | 3%                    | 9%             | 6%                               | 94%                | 2.1%                                         | \$83,409                |
| BG 1, CT 502.11 | 71%                         | 8%                        | 1%                               | 0%    | 0%                                        | 7%                    | 13%            | 2%                               | 98%                | 17.9%                                        | \$43,519                |
| BG 2, CT 502.11 | 59%                         | 24%                       | 0%                               | 2%    | 0%                                        | 11%                   | 4%             | 0%                               | 100%               | 27.1%                                        | \$30,268                |
| BG 3, CT 502.11 | 56%                         | 33%                       | 0%                               | 0%    | 0%                                        | 10%                   | 1%             | 0%                               | 100%               | 12.4%                                        | \$29,632                |
| BG 1, CT 502.12 | 75%                         | 20%                       | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 1%                               | 99%                | 23.4%                                        | \$24,087                |
| BG 2, CT 502.12 | 75%                         | 4%                        | 0%                               | 0%    | 0%                                        | 5%                    | 15%            | 2%                               | 98%                | 16.9%                                        | \$41,607                |
| BG 3, CT 502.12 | 79%                         | 9%                        | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 0%                               | 100%               | 12.9%                                        | \$36,118                |
| BG 4, CT 502.12 | 62%                         | 11%                       | 7%                               | 1%    | 0%                                        | 8%                    | 12%            | 0%                               | 100%               | 31.4%                                        | \$27,188                |
| BG 5, CT 502.12 | 48%                         | 20%                       | 0%                               | 0%    | 0%                                        | 32%                   | 0%             | 0%                               | 100%               | 83.4%                                        | ND                      |
| BG 1, CT 502.21 | 93%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 2%                               | 98%                | 2.3%                                         | \$44,155                |
| BG 2, CT 502.21 | 75%                         | 13%                       | 0%                               | 0%    | 0%                                        | 3%                    | 9%             | 4%                               | 96%                | 12.1%                                        | \$46,161                |
| BG 3, CT 502.21 | 67%                         | 16%                       | 0%                               | 0%    | 0%                                        | 0%                    | 17%            | 1%                               | 99%                | 21.5%                                        | \$24,375                |
| BG 4, CT 502.21 | 64%                         | 23%                       | 1%                               | 0%    | 0%                                        | 9%                    | 3%             | 0%                               | 100%               | 42.1%                                        | \$19,914                |
| BG 5, CT 502.21 | 72%                         | 28%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 34.1%                                        | \$21,742                |
| BG 1, CT 502.22 | 8%                          | 63%                       | 0%                               | 0%    | 0%                                        | 24%                   | 5%             | 0%                               | 100%               | 58.7%                                        | \$17,161                |
| BG 2, CT 502.22 | 66%                         | 15%                       | 6%                               | 0%    | 0%                                        | 10%                   | 3%             | 3%                               | 97%                | 31.8%                                        | \$28,321                |
| BG 3, CT 502.22 | 46%                         | 27%                       | 0%                               | 3%    | 0%                                        | 17%                   | 7%             | 0%                               | 100%               | 93.6%                                        | \$6,042                 |
| BG 1, CT 502.31 | 73%                         | 13%                       | 3%                               | 6%    | 0%                                        | 3%                    | 2%             | 4%                               | 96%                | 28.3%                                        | \$27,972                |
| BG 2, CT 502.31 | 48%                         | 24%                       | 6%                               | 11%   | 0%                                        | 6%                    | 5%             | 3%                               | 97%                | 32.9%                                        | \$27,558                |
| BG 3, CT 502.31 | 24%                         | 40%                       | 13%                              | 1%    | 0%                                        | 14%                   | 7%             | 0%                               | 100%               | 37.3%                                        | \$18,085                |
| BG 1, CT 502.32 | 66%                         | 8%                        | 8%                               | 0%    | 0%                                        | 12%                   | 6%             | 0%                               | 100%               | 23.2%                                        | \$29,839                |
| BG 2, CT 502.32 | 46%                         | 18%                       | 0%                               | 0%    | 0%                                        | 34%                   | 2%             | 0%                               | 100%               | 12.2%                                        | \$35,280                |
| BG 3, CT 502.32 | 56%                         | 19%                       | 3%                               | 0%    | 0%                                        | 12%                   | 11%            | 1%                               | 99%                | 21.2%                                        | \$29,241                |
| BG 1, CT 502.41 | 60%                         | 25%                       | 9%                               | 0%    | 0%                                        | 2%                    | 5%             | 1%                               | 99%                | 19.1%                                        | \$27,356                |
| BG 2, CT 502.41 | 64%                         | 29%                       | 1%                               | 0%    | 0%                                        | 3%                    | 2%             | 2%                               | 98%                | 18.8%                                        | \$43,924                |
| BG 3, CT 502.41 | 64%                         | 12%                       | 3%                               | 1%    | 0%                                        | 2%                    | 17%            | 1%                               | 99%                | 24.2%                                        | \$28,631                |
| BG 4, CT 502.41 | 55%                         | 18%                       | 2%                               | 2%    | 0%                                        | 0%                    | 23%            | 2%                               | 98%                | 15.7%                                        | \$35,556                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 5, CT 502.41 | 72%                         | 27%                       | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 26.7%                                        | \$32,188                |
| BG 1, CT 502.42 | 63%                         | 15%                       | 1%                               | 1%    | 0%                                        | 16%                   | 4%             | 2%                               | 98%                | 30.1%                                        | \$25,850                |
| BG 2, CT 502.42 | 55%                         | 27%                       | 0%                               | 1%    | 0%                                        | 18%                   | 0%             | 2%                               | 98%                | 27.5%                                        | \$28,289                |
| BG 1, CT 503.02 | 67%                         | 23%                       | 2%                               | 0%    | 0%                                        | 3%                    | 5%             | 0%                               | 100%               | 12.7%                                        | \$33,529                |
| BG 2, CT 503.02 | 68%                         | 24%                       | 0%                               | 1%    | 0%                                        | 7%                    | 1%             | 2%                               | 98%                | 20.6%                                        | \$22,131                |
| BG 3, CT 503.02 | 52%                         | 42%                       | 1%                               | 0%    | 0%                                        | 2%                    | 3%             | 0%                               | 100%               | 39.4%                                        | \$23,081                |
| BG 1, CT 503.11 | 66%                         | 11%                       | 0%                               | 0%    | 0%                                        | 21%                   | 3%             | 2%                               | 98%                | 40.0%                                        | \$22,386                |
| BG 2, CT 503.11 | 87%                         | 3%                        | 0%                               | 0%    | 0%                                        | 8%                    | 2%             | 0%                               | 100%               | 34.2%                                        | \$24,145                |
| BG 1, CT 503.21 | 64%                         | 15%                       | 0%                               | 2%    | 0%                                        | 9%                    | 9%             | 0%                               | 100%               | 37.9%                                        | \$21,367                |
| BG 2, CT 503.21 | 57%                         | 23%                       | 9%                               | 3%    | 0%                                        | 1%                    | 6%             | 3%                               | 97%                | 38.1%                                        | \$30,357                |
| BG 3, CT 503.21 | 55%                         | 27%                       | 0%                               | 0%    | 0%                                        | 10%                   | 8%             | 0%                               | 100%               | 7.3%                                         | \$34,113                |
| BG 4, CT 503.21 | 56%                         | 29%                       | 0%                               | 9%    | 0%                                        | 4%                    | 2%             | 1%                               | 99%                | 30.7%                                        | \$30,375                |
| BG 1, CT 503.31 | 57%                         | 17%                       | 3%                               | 2%    | 0%                                        | 15%                   | 6%             | 1%                               | 99%                | 26.1%                                        | \$31,042                |
| BG 2, CT 503.31 | 76%                         | 4%                        | 0%                               | 0%    | 0%                                        | 8%                    | 12%            | 2%                               | 98%                | 30.5%                                        | \$24,601                |
| BG 1, CT 503.41 | 64%                         | 25%                       | 0%                               | 2%    | 0%                                        | 3%                    | 6%             | 2%                               | 98%                | 25.0%                                        | \$29,259                |
| BG 2, CT 503.41 | 66%                         | 27%                       | 0%                               | 0%    | 0%                                        | 0%                    | 7%             | 4%                               | 96%                | 13.7%                                        | \$20,761                |
| BG 3, CT 503.41 | 48%                         | 32%                       | 0%                               | 0%    | 0%                                        | 13%                   | 8%             | 11%                              | 89%                | 19.9%                                        | \$27,500                |
| BG 4, CT 503.41 | 34%                         | 49%                       | 2%                               | 1%    | 0%                                        | 12%                   | 2%             | 0%                               | 100%               | 73.7%                                        | \$6,822                 |
| BG 1, CT 504.01 | 59%                         | 17%                       | 0%                               | 4%    | 0%                                        | 3%                    | 17%            | 1%                               | 99%                | 23.4%                                        | \$33,582                |
| BG 2, CT 504.01 | 77%                         | 15%                       | 0%                               | 0%    | 0%                                        | 2%                    | 7%             | 1%                               | 99%                | 13.9%                                        | \$42,340                |
| BG 1, CT 504.02 | 53%                         | 19%                       | 9%                               | 3%    | 0%                                        | 16%                   | 1%             | 4%                               | 96%                | 14.6%                                        | \$44,211                |
| BG 2, CT 504.02 | 69%                         | 29%                       | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 19.2%                                        | \$19,890                |
| BG 3, CT 504.02 | 62%                         | 25%                       | 1%                               | 1%    | 0%                                        | 2%                    | 10%            | 0%                               | 100%               | 43.5%                                        | \$17,043                |
| BG 4, CT 504.02 | 60%                         | 5%                        | 2%                               | 0%    | 0%                                        | 22%                   | 11%            | 3%                               | 97%                | 62.0%                                        | \$13,297                |
| BG 1, CT 505.01 | 71%                         | 13%                       | 6%                               | 0%    | 0%                                        | 5%                    | 5%             | 0%                               | 100%               | 18.1%                                        | \$26,360                |
| BG 2, CT 505.01 | 74%                         | 17%                       | 3%                               | 0%    | 0%                                        | 1%                    | 5%             | 0%                               | 100%               | 13.4%                                        | \$34,228                |
| BG 3, CT 505.01 | 77%                         | 10%                       | 8%                               | 0%    | 0%                                        | 1%                    | 4%             | 6%                               | 94%                | 12.8%                                        | \$33,047                |
| BG 1, CT 505.03 | 74%                         | 15%                       | 0%                               | 0%    | 0%                                        | 1%                    | 10%            | 0%                               | 100%               | 24.9%                                        | \$27,177                |
| BG 2, CT 505.03 | 55%                         | 26%                       | 8%                               | 1%    | 0%                                        | 6%                    | 4%             | 0%                               | 100%               | 28.7%                                        | \$30,504                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 505.03 | 68%                         | 30%                       | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 34.9%                                        | \$21,579                |
| BG 1, CT 505.04 | 79%                         | 12%                       | 0%                               | 0%    | 0%                                        | 2%                    | 6%             | 0%                               | 100%               | 38.4%                                        | \$26,027                |
| BG 2, CT 505.04 | 64%                         | 30%                       | 1%                               | 0%    | 0%                                        | 1%                    | 5%             | 2%                               | 98%                | 18.1%                                        | \$43,068                |
| BG 3, CT 505.04 | 67%                         | 26%                       | 0%                               | 1%    | 0%                                        | 5%                    | 1%             | 0%                               | 100%               | 43.7%                                        | \$25,952                |
| BG 1, CT 506    | 74%                         | 9%                        | 0%                               | 6%    | 0%                                        | 11%                   | 0%             | 6%                               | 94%                | 9.5%                                         | \$36,319                |
| BG 2, CT 506    | 60%                         | 36%                       | 0%                               | 0%    | 0%                                        | 1%                    | 4%             | 0%                               | 100%               | 48.0%                                        | \$12,171                |
| BG 3, CT 506    | 58%                         | 29%                       | 6%                               | 0%    | 0%                                        | 2%                    | 5%             | 0%                               | 100%               | 22.7%                                        | \$19,792                |
| BG 4, CT 506    | 79%                         | 6%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 0%                               | 100%               | 63.9%                                        | \$13,438                |
| BG 5, CT 506    | 49%                         | 34%                       | 0%                               | 0%    | 0%                                        | 14%                   | 3%             | 0%                               | 100%               | 50.8%                                        | \$25,750                |
| BG 6, CT 506    | 54%                         | 40%                       | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 0%                               | 100%               | 77.9%                                        | \$6,791                 |
| BG 1, CT 507    | 50%                         | 28%                       | 1%                               | 0%    | 0%                                        | 20%                   | 2%             | 0%                               | 100%               | 26.8%                                        | \$23,227                |
| BG 2, CT 507    | 36%                         | 15%                       | 0%                               | 2%    | 0%                                        | 46%                   | 0%             | 2%                               | 98%                | 69.8%                                        | \$11,250                |
| BG 1, CT 508.03 | 48%                         | 31%                       | 0%                               | 0%    | 0%                                        | 19%                   | 2%             | 0%                               | 100%               | 40.7%                                        | \$22,619                |
| BG 2, CT 508.03 | 63%                         | 16%                       | 0%                               | 0%    | 0%                                        | 19%                   | 1%             | 0%                               | 100%               | 24.6%                                        | \$30,637                |
| BG 1, CT 508.11 | 58%                         | 22%                       | 2%                               | 0%    | 0%                                        | 14%                   | 4%             | 1%                               | 99%                | 17.0%                                        | \$41,982                |
| BG 2, CT 508.11 | 62%                         | 18%                       | 0%                               | 2%    | 0%                                        | 13%                   | 5%             | 1%                               | 99%                | 16.8%                                        | \$32,422                |
| BG 3, CT 508.11 | 77%                         | 15%                       | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 0%                               | 100%               | 38.4%                                        | \$24,196                |
| BG 1, CT 508.12 | 63%                         | 18%                       | 0%                               | 0%    | 0%                                        | 12%                   | 8%             | 0%                               | 100%               | 39.6%                                        | \$29,896                |
| BG 2, CT 508.12 | 67%                         | 21%                       | 2%                               | 0%    | 0%                                        | 8%                    | 3%             | 0%                               | 100%               | 29.4%                                        | \$31,076                |
| BG 1, CT 508.21 | 68%                         | 20%                       | 4%                               | 0%    | 0%                                        | 3%                    | 4%             | 1%                               | 99%                | 29.8%                                        | \$30,366                |
| BG 2, CT 508.21 | 46%                         | 16%                       | 0%                               | 0%    | 0%                                        | 38%                   | 0%             | 0%                               | 100%               | 24.6%                                        | \$36,658                |
| BG 3, CT 508.21 | 60%                         | 23%                       | 0%                               | 3%    | 0%                                        | 9%                    | 5%             | 4%                               | 96%                | 25.7%                                        | \$24,263                |
| BG 1, CT 508.22 | 46%                         | 34%                       | 0%                               | 0%    | 0%                                        | 6%                    | 14%            | 0%                               | 100%               | 21.0%                                        | \$21,857                |
| BG 2, CT 508.22 | 61%                         | 16%                       | 2%                               | 0%    | 0%                                        | 12%                   | 9%             | 1%                               | 99%                | 17.6%                                        | \$36,786                |
| BG 3, CT 508.22 | 48%                         | 32%                       | 0%                               | 1%    | 0%                                        | 16%                   | 3%             | 1%                               | 99%                | 47.3%                                        | \$25,833                |
| BG 1, CT 508.31 | 53%                         | 18%                       | 0%                               | 0%    | 0%                                        | 22%                   | 7%             | 0%                               | 100%               | 32.3%                                        | \$24,213                |
| BG 2, CT 508.31 | 56%                         | 18%                       | 0%                               | 0%    | 0%                                        | 22%                   | 4%             | 0%                               | 100%               | 29.7%                                        | \$25,139                |
| BG 3, CT 508.31 | 64%                         | 26%                       | 0%                               | 0%    | 0%                                        | 10%                   | 0%             | 0%                               | 100%               | 34.4%                                        | \$26,940                |
| BG 1, CT 508.41 | 45%                         | 27%                       | 0%                               | 0%    | 0%                                        | 28%                   | 0%             | 0%                               | 100%               | 42.6%                                        | \$21,250                |



| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 508.41  | 44%                         | 29%                       | 1%                               | 0%    | 0%                                        | 25%                   | 1%             | 0%                               | 100%               | 54.1%                                        | \$19,851                |
| BG 1, CT 509.01  | 54%                         | 18%                       | 0%                               | 0%    | 0%                                        | 24%                   | 4%             | 0%                               | 100%               | 26.0%                                        | \$32,539                |
| BG 2, CT 509.01  | 58%                         | 14%                       | 0%                               | 0%    | 0%                                        | 22%                   | 5%             | 2%                               | 98%                | 24.1%                                        | \$45,792                |
| BG 3, CT 509.01  | 29%                         | 30%                       | 7%                               | 0%    | 0%                                        | 22%                   | 12%            | 0%                               | 100%               | 46.0%                                        | \$18,750                |
| BG 1, CT 509.02  | 39%                         | 26%                       | 0%                               | 0%    | 0%                                        | 27%                   | 8%             | 0%                               | 100%               | 26.6%                                        | \$33,618                |
| BG 2, CT 509.02  | 54%                         | 28%                       | 0%                               | 0%    | 0%                                        | 19%                   | 0%             | 0%                               | 100%               | 48.1%                                        | \$15,449                |
| BG 3, CT 509.02  | 58%                         | 9%                        | 0%                               | 0%    | 0%                                        | 33%                   | 0%             | 2%                               | 98%                | 32.7%                                        | \$24,970                |
| BG 4, CT 509.02  | 64%                         | 14%                       | 4%                               | 0%    | 0%                                        | 19%                   | 0%             | 0%                               | 100%               | 0.0%                                         | \$44,939                |
| BG 5, CT 509.02  | 56%                         | 21%                       | 0%                               | 0%    | 0%                                        | 15%                   | 8%             | 0%                               | 100%               | 16.9%                                        | \$49,511                |
| BG 1, CT 510.01  | 79%                         | 16%                       | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 46.3%                                        | \$17,188                |
| BG 2, CT 510.01  | 72%                         | 7%                        | 4%                               | 0%    | 0%                                        | 11%                   | 5%             | 2%                               | 98%                | 25.9%                                        | \$26,304                |
| BG 3, CT 510.01  | 53%                         | 6%                        | 2%                               | 0%    | 0%                                        | 36%                   | 4%             | 0%                               | 100%               | 47.2%                                        | \$18,254                |
| BG 1, CT 510.02  | 51%                         | 21%                       | 0%                               | 0%    | 0%                                        | 18%                   | 9%             | 0%                               | 100%               | 51.3%                                        | \$16,368                |
| BG 2, CT 510.02  | 58%                         | 19%                       | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 4%                               | 96%                | 41.0%                                        | \$12,361                |
| BG 3, CT 510.02  | 73%                         | 0%                        | 0%                               | 0%    | 0%                                        | 27%                   | 0%             | 3%                               | 97%                | 24.8%                                        | \$36,047                |
| BG 1, CT 511.02  | 51%                         | 11%                       | 0%                               | 0%    | 0%                                        | 38%                   | 0%             | 1%                               | 99%                | 52.0%                                        | \$17,333                |
| BG 2, CT 511.02  | 38%                         | 24%                       | 1%                               | 1%    | 0%                                        | 34%                   | 2%             | 0%                               | 100%               | 47.6%                                        | \$14,426                |
| BG 1, CT 511.03  | 51%                         | 19%                       | 2%                               | 0%    | 0%                                        | 19%                   | 8%             | 2%                               | 98%                | 23.8%                                        | \$30,781                |
| BG 2, CT 511.03  | 67%                         | 7%                        | 1%                               | 4%    | 0%                                        | 17%                   | 5%             | 0%                               | 100%               | 6.8%                                         | \$49,432                |
| BG 3, CT 511.03  | 46%                         | 18%                       | 0%                               | 0%    | 0%                                        | 34%                   | 2%             | 0%                               | 100%               | 28.2%                                        | \$33,929                |
| BG 1, CT 511.04  | 56%                         | 28%                       | 3%                               | 0%    | 0%                                        | 11%                   | 1%             | 3%                               | 97%                | 39.5%                                        | \$33,542                |
| BG 2, CT 511.04  | 69%                         | 12%                       | 0%                               | 0%    | 0%                                        | 11%                   | 8%             | 1%                               | 99%                | 6.8%                                         | \$58,375                |
| BG 3, CT 511.04  | 58%                         | 18%                       | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 0%                               | 100%               | 12.7%                                        | \$27,350                |
| BG 1, CT 9800.03 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 202     | 76%                         | 7%                        | 0%                               | 2%    | 0%                                        | 10%                   | 4%             | 2%                               | 98%                | 37.6%                                        | \$21,111                |
| BG 2, CT 202     | 48%                         | 16%                       | 0%                               | 0%    | 0%                                        | 34%                   | 2%             | 0%                               | 100%               | 60.4%                                        | \$15,036                |
| BG 3, CT 202     | 53%                         | 14%                       | 2%                               | 0%    | 0%                                        | 25%                   | 6%             | 0%                               | 100%               | 78.2%                                        | \$9,265                 |
| BG 4, CT 202     | 68%                         | 12%                       | 0%                               | 0%    | 0%                                        | 16%                   | 4%             | 2%                               | 98%                | 71.5%                                        | \$11,033                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 203.02  | 64%                         | 4%                        | 1%                               | 0%    | 0%                                        | 25%                   | 6%             | 0%                               | 100%               | 65.5%                                        | \$15,229                |
| BG 1, CT 204.03  | 69%                         | 3%                        | 0%                               | 0%    | 0%                                        | 27%                   | 2%             | 0%                               | 100%               | 40.6%                                        | \$18,824                |
| BG 2, CT 204.03  | 57%                         | 27%                       | 2%                               | 0%    | 0%                                        | 10%                   | 5%             | 0%                               | 100%               | 38.8%                                        | \$21,154                |
| BG 3, CT 204.03  | 76%                         | 10%                       | 0%                               | 0%    | 0%                                        | 10%                   | 4%             | 0%                               | 100%               | 31.9%                                        | \$28,650                |
| BG 4, CT 204.03  | 58%                         | 19%                       | 0%                               | 0%    | 0%                                        | 22%                   | 1%             | 0%                               | 100%               | 51.5%                                        | \$16,129                |
| BG 1, CT 204.22  | 68%                         | 6%                        | 2%                               | 0%    | 0%                                        | 22%                   | 2%             | 0%                               | 100%               | 59.8%                                        | \$14,900                |
| BG 1, CT 204.23  | 77%                         | 2%                        | 0%                               | 0%    | 0%                                        | 20%                   | 1%             | 0%                               | 100%               | 31.5%                                        | \$24,745                |
| BG 2, CT 204.23  | 74%                         | 10%                       | 0%                               | 0%    | 0%                                        | 12%                   | 4%             | 0%                               | 100%               | 29.0%                                        | \$26,866                |
| BG 3, CT 204.23  | 82%                         | 0%                        | 2%                               | 0%    | 0%                                        | 1%                    | 15%            | 0%                               | 100%               | 11.0%                                        | \$55,563                |
| BG 1, CT 204.25  | 50%                         | 10%                       | 0%                               | 0%    | 0%                                        | 35%                   | 5%             | 1%                               | 99%                | 80.2%                                        | \$6,583                 |
| BG 2, CT 204.25  | 75%                         | 13%                       | 0%                               | 0%    | 0%                                        | 8%                    | 5%             | 0%                               | 100%               | 36.9%                                        | \$22,303                |
| BG 1, CT 204.26  | 63%                         | 10%                       | 0%                               | 0%    | 0%                                        | 22%                   | 6%             | 1%                               | 99%                | 92.9%                                        | ND                      |
| BG 1, CT 204.27  | 44%                         | 12%                       | 0%                               | 0%    | 0%                                        | 34%                   | 10%            | 3%                               | 97%                | 70.1%                                        | \$12,978                |
| BG 1, CT 205     | 86%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 6%             | 1%                               | 99%                | 10.7%                                        | \$67,619                |
| BG 2, CT 205     | 91%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 1%                               | 99%                | 5.0%                                         | \$62,500                |
| BG 3, CT 205     | 78%                         | 7%                        | 0%                               | 0%    | 0%                                        | 9%                    | 5%             | 3%                               | 97%                | 31.3%                                        | \$40,000                |
| BG 1, CT 9800.01 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9800.02 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9800.03 | 90%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 0%             | 0%                               | 100%               | 94.8%                                        | \$8,563                 |
| BG 1, CT 9800.04 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9800.05 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9800.06 | 15%                         | 0%                        | 0%                               | 0%    | 0%                                        | 85%                   | 0%             | 0%                               | 100%               | 52.1%                                        | ND                      |
| BG 1, CT 9800.07 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9800.08 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 0, CT 9902.01 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 2601    | 71%                         | 6%                        | 0%                               | 1%    | 0%                                        | 13%                   | 9%             | 3%                               | 97%                | 45.3%                                        | \$23,125                |
| BG 2, CT 2601    | 70%                         | 2%                        | 0%                               | 0%    | 0%                                        | 28%                   | 0%             | 0%                               | 100%               | 18.2%                                        | \$33,529                |
| BG 3, CT 2601    | 64%                         | 1%                        | 0%                               | 0%    | 0%                                        | 33%                   | 2%             | 0%                               | 100%               | 54.6%                                        | \$15,017                |
| BG 4, CT 2601    | 74%                         | 3%                        | 0%                               | 0%    | 0%                                        | 23%                   | 0%             | 0%                               | 100%               | 48.6%                                        | \$20,286                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 2602.01 | 82%                         | 5%                        | 0%                               | 0%    | 0%                                        | 12%                   | 1%             | 0%                               | 100%               | 23.8%                                        | \$30,625                |
| BG 2, CT 2602.01 | 87%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 3%             | 1%                               | 99%                | 16.8%                                        | \$34,583                |
| BG 1, CT 2602.02 | 69%                         | 3%                        | 0%                               | 0%    | 0%                                        | 26%                   | 2%             | 2%                               | 98%                | 16.8%                                        | \$50,167                |
| BG 2, CT 2602.02 | 79%                         | 7%                        | 0%                               | 0%    | 0%                                        | 11%                   | 3%             | 0%                               | 100%               | 46.5%                                        | \$11,920                |
| BG 1, CT 2603    | 68%                         | 2%                        | 1%                               | 0%    | 0%                                        | 28%                   | 1%             | 0%                               | 100%               | 49.6%                                        | \$16,985                |
| BG 2, CT 2603    | 79%                         | 3%                        | 0%                               | 0%    | 0%                                        | 16%                   | 2%             | 0%                               | 100%               | 36.6%                                        | \$20,759                |
| BG 3, CT 2603    | 75%                         | 1%                        | 0%                               | 5%    | 0%                                        | 18%                   | 2%             | 0%                               | 100%               | 54.9%                                        | \$13,360                |
| BG 1, CT 2604    | 65%                         | 3%                        | 0%                               | 2%    | 0%                                        | 30%                   | 0%             | 0%                               | 100%               | 58.1%                                        | \$15,042                |
| BG 2, CT 2604    | 66%                         | 1%                        | 0%                               | 0%    | 0%                                        | 33%                   | 0%             | 0%                               | 100%               | 51.2%                                        | \$17,407                |
| BG 3, CT 2604    | 79%                         | 2%                        | 0%                               | 0%    | 0%                                        | 19%                   | 0%             | 0%                               | 100%               | 39.4%                                        | \$17,912                |
| BG 1, CT 2605    | 79%                         | 2%                        | 0%                               | 0%    | 0%                                        | 19%                   | 0%             | 0%                               | 100%               | 30.5%                                        | \$19,907                |
| BG 2, CT 2605    | 69%                         | 2%                        | 0%                               | 0%    | 0%                                        | 26%                   | 3%             | 0%                               | 100%               | 36.4%                                        | \$27,321                |
| BG 3, CT 2605    | 54%                         | 13%                       | 0%                               | 0%    | 0%                                        | 17%                   | 16%            | 0%                               | 100%               | 91.4%                                        | \$6,833                 |
| BG 4, CT 2605    | 64%                         | 0%                        | 0%                               | 0%    | 0%                                        | 26%                   | 10%            | 2%                               | 98%                | 49.8%                                        | \$17,375                |
| BG 1, CT 2606    | 64%                         | 6%                        | 0%                               | 2%    | 0%                                        | 28%                   | 0%             | 0%                               | 100%               | 75.9%                                        | \$4,840                 |
| BG 2, CT 2606    | 81%                         | 3%                        | 0%                               | 0%    | 0%                                        | 16%                   | 0%             | 0%                               | 100%               | 61.6%                                        | \$11,538                |
| BG 3, CT 2606    | 85%                         | 10%                       | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 54.0%                                        | \$20,089                |
| BG 1, CT 2607    | 69%                         | 17%                       | 0%                               | 0%    | 0%                                        | 14%                   | 0%             | 0%                               | 100%               | 50.5%                                        | \$13,988                |
| BG 2, CT 2607    | 71%                         | 5%                        | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 1%                               | 99%                | 67.4%                                        | \$9,147                 |
| BG 3, CT 2607    | 78%                         | 4%                        | 0%                               | 0%    | 0%                                        | 18%                   | 0%             | 0%                               | 100%               | 51.3%                                        | \$18,288                |
| BG 1, CT 2608    | 78%                         | 8%                        | 0%                               | 2%    | 0%                                        | 11%                   | 2%             | 3%                               | 97%                | 49.2%                                        | \$21,958                |
| BG 2, CT 2608    | 77%                         | 7%                        | 0%                               | 0%    | 0%                                        | 16%                   | 0%             | 0%                               | 100%               | 31.3%                                        | \$20,833                |
| BG 3, CT 2608    | 75%                         | 5%                        | 0%                               | 0%    | 0%                                        | 19%                   | 1%             | 1%                               | 99%                | 37.5%                                        | \$27,700                |
| BG 1, CT 2609.01 | 76%                         | 0%                        | 0%                               | 4%    | 0%                                        | 19%                   | 1%             | 0%                               | 100%               | 28.8%                                        | \$20,605                |
| BG 2, CT 2609.01 | 83%                         | 4%                        | 0%                               | 1%    | 0%                                        | 12%                   | 0%             | 3%                               | 97%                | 9.4%                                         | \$44,811                |
| BG 1, CT 2609.02 | 79%                         | 3%                        | 0%                               | 0%    | 0%                                        | 17%                   | 0%             | 0%                               | 100%               | 45.5%                                        | \$18,021                |
| BG 2, CT 2609.02 | 70%                         | 1%                        | 0%                               | 0%    | 0%                                        | 28%                   | 0%             | 1%                               | 99%                | 46.2%                                        | \$28,176                |
| BG 1, CT 1601    | 50%                         | 42%                       | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 33%                              | 67%                | ND                                           | ND                      |
| BG 2, CT 1601    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 1602.01 | 72%                         | 7%                        | 0%                               | 0%    | 0%                                        | 19%                   | 2%             | 0%                               | 100%               | 29.2%                                        | \$27,007                |
| BG 2, CT 1602.01 | 50%                         | 4%                        | 0%                               | 0%    | 0%                                        | 42%                   | 5%             | 0%                               | 100%               | 40.9%                                        | \$19,239                |
| BG 1, CT 1602.02 | 55%                         | 4%                        | 0%                               | 5%    | 0%                                        | 26%                   | 10%            | 0%                               | 100%               | 51.3%                                        | \$16,123                |
| BG 2, CT 1602.02 | 88%                         | 0%                        | 0%                               | 0%    | 0%                                        | 12%                   | 0%             | 3%                               | 97%                | 43.9%                                        | \$23,261                |
| BG 3, CT 1602.02 | 56%                         | 2%                        | 0%                               | 0%    | 0%                                        | 25%                   | 17%            | 0%                               | 100%               | 51.8%                                        | \$14,943                |
| BG 1, CT 1603    | 59%                         | 12%                       | 0%                               | 0%    | 0%                                        | 26%                   | 3%             | 0%                               | 100%               | 36.6%                                        | \$22,784                |
| BG 2, CT 1603    | 53%                         | 5%                        | 0%                               | 5%    | 0%                                        | 37%                   | 1%             | 1%                               | 99%                | 52.4%                                        | \$12,798                |
| BG 3, CT 1603    | 72%                         | 6%                        | 0%                               | 0%    | 0%                                        | 19%                   | 4%             | 1%                               | 99%                | 44.7%                                        | \$19,787                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9556    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 66.0%                                        | \$15,000                |
| BG 2, CT 9556    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 49.5%                                        | \$15,798                |
| BG 3, CT 9556    | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 2%             | 0%                               | 100%               | 60.4%                                        | \$18,444                |
| BG 1, CT 9557    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 50.3%                                        | \$14,957                |
| BG 2, CT 9557    | 90%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 6%             | 0%                               | 100%               | 66.2%                                        | \$12,598                |
| BG 3, CT 9557    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 91.1%                                        | ND                      |
| BG 1, CT 9558    | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 58.1%                                        | \$12,917                |
| BG 2, CT 9558    | 98%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 49.3%                                        | \$14,858                |
| BG 3, CT 9558    | 90%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 1%                               | 99%                | 48.3%                                        | \$15,125                |
| BG 1, CT 9559    | 94%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 0%                               | 100%               | 63.7%                                        | \$12,127                |
| BG 2, CT 9559    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 75.9%                                        | \$9,661                 |
| BG 3, CT 9559    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 86.2%                                        | \$15,875                |
| BG 1, CT 2401.01 | 74%                         | 2%                        | 0%                               | 1%    | 0%                                        | 24%                   | 0%             | 0%                               | 100%               | 33.9%                                        | \$40,491                |
| BG 2, CT 2401.01 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 0.0%                                         | ND                      |
| BG 3, CT 2401.01 | 73%                         | 2%                        | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 1%                               | 99%                | 23.2%                                        | \$57,770                |
| BG 1, CT 2401.02 | 68%                         | 0%                        | 0%                               | 0%    | 0%                                        | 32%                   | 0%             | 0%                               | 100%               | 33.1%                                        | \$18,496                |
| BG 2, CT 2401.02 | 79%                         | 1%                        | 0%                               | 4%    | 0%                                        | 12%                   | 3%             | 0%                               | 100%               | 37.2%                                        | \$28,083                |
| BG 3, CT 2401.02 | 79%                         | 0%                        | 0%                               | 0%    | 0%                                        | 21%                   | 0%             | 1%                               | 99%                | 35.1%                                        | \$24,750                |
| BG 1, CT 2402.01 | 65%                         | 2%                        | 0%                               | 0%    | 0%                                        | 26%                   | 6%             | 0%                               | 100%               | 40.5%                                        | \$22,778                |
| BG 2, CT 2402.01 | 62%                         | 1%                        | 1%                               | 0%    | 0%                                        | 31%                   | 4%             | 1%                               | 99%                | 31.9%                                        | \$26,538                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 2402.02 | 78%                         | 4%                        | 1%                               | 0%    | 0%                                        | 16%                   | 1%             | 0%                               | 100%               | 46.3%                                        | \$16,918                |
| BG 2, CT 2402.02 | 70%                         | 5%                        | 0%                               | 0%    | 0%                                        | 19%                   | 6%             | 0%                               | 100%               | 45.5%                                        | \$25,608                |
| BG 1, CT 2403    | 69%                         | 1%                        | 0%                               | 0%    | 0%                                        | 30%                   | 0%             | 0%                               | 100%               | 27.2%                                        | \$29,450                |
| BG 2, CT 2403    | 92%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 2%                               | 98%                | 36.3%                                        | \$22,714                |
| BG 1, CT 2404.01 | 67%                         | 1%                        | 0%                               | 0%    | 0%                                        | 27%                   | 4%             | 0%                               | 100%               | 39.8%                                        | \$22,361                |
| BG 2, CT 2404.01 | 69%                         | 6%                        | 0%                               | 0%    | 0%                                        | 21%                   | 3%             | 0%                               | 100%               | 39.8%                                        | \$21,743                |
| BG 3, CT 2404.01 | 67%                         | 13%                       | 0%                               | 0%    | 0%                                        | 18%                   | 1%             | 1%                               | 99%                | 17.3%                                        | \$31,111                |
| BG 1, CT 2404.02 | 71%                         | 2%                        | 0%                               | 2%    | 0%                                        | 25%                   | 0%             | 0%                               | 100%               | 48.4%                                        | \$25,056                |
| BG 2, CT 2404.02 | 74%                         | 5%                        | 0%                               | 0%    | 0%                                        | 22%                   | 0%             | 0%                               | 100%               | 32.6%                                        | \$26,667                |
| BG 1, CT 2405    | 88%                         | 3%                        | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 0%                               | 100%               | 48.2%                                        | \$22,298                |
| BG 2, CT 2405    | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 17%                   | 2%             | 0%                               | 100%               | 48.2%                                        | \$17,850                |
| BG 3, CT 2405    | 79%                         | 1%                        | 0%                               | 0%    | 0%                                        | 20%                   | 0%             | 0%                               | 100%               | 52.3%                                        | \$11,250                |
| BG 1, CT 2406.01 | 67%                         | 6%                        | 0%                               | 0%    | 0%                                        | 24%                   | 4%             | 0%                               | 100%               | 42.0%                                        | \$23,962                |
| BG 2, CT 2406.01 | 69%                         | 4%                        | 0%                               | 2%    | 0%                                        | 21%                   | 3%             | 0%                               | 100%               | 55.9%                                        | \$18,500                |
| BG 1, CT 2406.02 | 71%                         | 1%                        | 0%                               | 0%    | 0%                                        | 24%                   | 4%             | 1%                               | 99%                | 31.0%                                        | \$27,049                |
| BG 2, CT 2406.02 | 74%                         | 5%                        | 0%                               | 2%    | 0%                                        | 17%                   | 2%             | 1%                               | 99%                | 45.0%                                        | \$20,970                |
| BG 1, CT 9539    | 85%                         | 0%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 0%                               | 100%               | 44.2%                                        | \$16,148                |
| BG 2, CT 9539    | 66%                         | 8%                        | 0%                               | 0%    | 0%                                        | 24%                   | 2%             | 0%                               | 100%               | 58.0%                                        | \$19,083                |
| BG 1, CT 9540    | 74%                         | 3%                        | 0%                               | 0%    | 0%                                        | 22%                   | 1%             | 0%                               | 100%               | 52.2%                                        | \$17,909                |
| BG 2, CT 9540    | 65%                         | 10%                       | 0%                               | 0%    | 0%                                        | 24%                   | 1%             | 0%                               | 100%               | 70.9%                                        | \$10,933                |
| BG 1, CT 9541    | 58%                         | 14%                       | 0%                               | 0%    | 0%                                        | 26%                   | 2%             | 0%                               | 100%               | 83.5%                                        | \$11,438                |
| BG 2, CT 9541    | 62%                         | 8%                        | 0%                               | 0%    | 0%                                        | 26%                   | 3%             | 0%                               | 100%               | 64.1%                                        | \$15,875                |
| BG 1, CT 9542    | 68%                         | 3%                        | 0%                               | 0%    | 0%                                        | 28%                   | 1%             | 0%                               | 100%               | 61.2%                                        | \$9,262                 |
| BG 2, CT 9542    | 73%                         | 8%                        | 0%                               | 0%    | 0%                                        | 19%                   | 0%             | 1%                               | 99%                | 26.2%                                        | \$31,592                |
| BG 3, CT 9542    | 50%                         | 29%                       | 0%                               | 0%    | 0%                                        | 21%                   | 0%             | 0%                               | 100%               | 46.9%                                        | \$19,038                |
| BG 4, CT 9542    | 59%                         | 8%                        | 0%                               | 0%    | 0%                                        | 32%                   | 1%             | 0%                               | 100%               | 60.7%                                        | \$14,635                |
| BG 1, CT 9543    | 67%                         | 9%                        | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 0%                               | 100%               | 66.2%                                        | \$11,080                |
| BG 2, CT 9543    | 79%                         | 12%                       | 0%                               | 0%    | 0%                                        | 10%                   | 0%             | 0%                               | 100%               | 65.0%                                        | \$12,740                |
| BG 1, CT 9544    | 77%                         | 6%                        | 0%                               | 0%    | 0%                                        | 12%                   | 5%             | 0%                               | 100%               | 43.8%                                        | \$17,540                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 9544 | 75%                         | 0%                        | 0%                               | 0%    | 0%                                        | 17%                   | 8%             | 0%                               | 100%               | 59.5%                                        | \$12,847                |
| BG 1, CT 9545 | 61%                         | 1%                        | 0%                               | 0%    | 0%                                        | 38%                   | 0%             | 1%                               | 99%                | 58.6%                                        | \$16,250                |
| BG 2, CT 9545 | 78%                         | 1%                        | 0%                               | 0%    | 0%                                        | 21%                   | 0%             | 0%                               | 100%               | 31.7%                                        | \$18,125                |
| BG 3, CT 9545 | 53%                         | 0%                        | 0%                               | 0%    | 0%                                        | 47%                   | 0%             | 0%                               | 100%               | 65.6%                                        | \$12,955                |
| BG 4, CT 9545 | 72%                         | 9%                        | 0%                               | 0%    | 0%                                        | 14%                   | 5%             | 1%                               | 99%                | 62.8%                                        | \$18,664                |
| BG 5, CT 9545 | 50%                         | 17%                       | 0%                               | 0%    | 0%                                        | 33%                   | 0%             | 0%                               | 100%               | 64.3%                                        | \$11,957                |
| BG 1, CT 9546 | 59%                         | 6%                        | 0%                               | 0%    | 0%                                        | 32%                   | 3%             | 0%                               | 100%               | 47.0%                                        | \$19,185                |
| BG 2, CT 9546 | 59%                         | 7%                        | 0%                               | 0%    | 0%                                        | 31%                   | 3%             | 0%                               | 100%               | 43.1%                                        | \$19,223                |
| BG 1, CT 9547 | 73%                         | 5%                        | 0%                               | 0%    | 0%                                        | 22%                   | 0%             | 1%                               | 99%                | 27.5%                                        | \$30,772                |
| BG 2, CT 9547 | 65%                         | 6%                        | 0%                               | 0%    | 0%                                        | 28%                   | 1%             | 0%                               | 100%               | 60.6%                                        | \$10,134                |
| BG 1, CT 9517 | 68%                         | 4%                        | 0%                               | 0%    | 0%                                        | 11%                   | 17%            | 1%                               | 99%                | 68.7%                                        | \$11,184                |
| BG 2, CT 9517 | 73%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 23%            | 0%                               | 100%               | 59.2%                                        | \$13,772                |
| BG 3, CT 9517 | 75%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 19%            | 0%                               | 100%               | 50.2%                                        | \$17,702                |
| BG 1, CT 9518 | 54%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 46%            | 0%                               | 100%               | 54.7%                                        | \$12,125                |
| BG 2, CT 9518 | 56%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 40%            | 0%                               | 100%               | 45.9%                                        | \$14,750                |
| BG 3, CT 9518 | 47%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 45%            | 0%                               | 100%               | 67.9%                                        | \$9,362                 |
| BG 1, CT 9519 | 52%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 47%            | 1%                               | 99%                | 93.8%                                        | \$2,870                 |
| BG 2, CT 9519 | 81%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 17%            | 1%                               | 99%                | 58.2%                                        | \$13,693                |
| BG 1, CT 9520 | 61%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 35%            | 0%                               | 100%               | 62.0%                                        | \$16,117                |
| BG 2, CT 9520 | 57%                         | 2%                        | 0%                               | 0%    | 0%                                        | 8%                    | 34%            | 0%                               | 100%               | 57.5%                                        | \$10,469                |
| BG 1, CT 9521 | 63%                         | 8%                        | 0%                               | 0%    | 0%                                        | 2%                    | 27%            | 0%                               | 100%               | 24.4%                                        | \$21,250                |
| BG 2, CT 9521 | 56%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 36%            | 0%                               | 100%               | 70.1%                                        | \$15,639                |
| BG 3, CT 9521 | 52%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 44%            | 0%                               | 100%               | 60.6%                                        | \$10,702                |
| BG 1, CT 5301 | 43%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 55%            | 0%                               | 100%               | 45.7%                                        | \$18,274                |
| BG 2, CT 5301 | 37%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 58%            | 0%                               | 100%               | 56.1%                                        | \$15,403                |
| BG 1, CT 5302 | 46%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 48%            | 0%                               | 100%               | 52.5%                                        | \$15,441                |
| BG 2, CT 5302 | 36%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 64%            | 0%                               | 100%               | 46.7%                                        | \$24,969                |
| BG 3, CT 5302 | 51%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 44%            | 0%                               | 100%               | 56.7%                                        | \$22,933                |
| BG 1, CT 5303 | 50%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 45%            | 0%                               | 100%               | 61.2%                                        | \$14,313                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 5303    | 35%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 60%            | 0%                               | 100%               | 69.0%                                        | \$6,011                 |
| BG 3, CT 5303    | 45%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 55%            | 0%                               | 100%               | 54.8%                                        | \$16,826                |
| BG 1, CT 5304    | 38%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 60%            | 0%                               | 100%               | 66.7%                                        | \$9,250                 |
| BG 2, CT 5304    | 26%                         | 0%                        | 0%                               | 0%    | 0%                                        | 14%                   | 60%            | 0%                               | 100%               | 43.8%                                        | \$24,833                |
| BG 3, CT 5304    | 46%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 46%            | 0%                               | 100%               | 12.1%                                        | \$29,402                |
| BG 4, CT 5304    | 29%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 71%            | 0%                               | 100%               | 69.6%                                        | \$11,875                |
| BG 1, CT 5305    | 33%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 67%            | 2%                               | 98%                | 60.9%                                        | \$16,417                |
| BG 2, CT 5305    | 51%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 47%            | 0%                               | 100%               | 40.1%                                        | \$23,029                |
| BG 3, CT 5305    | 50%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 47%            | 0%                               | 100%               | 39.4%                                        | \$23,894                |
| BG 4, CT 5305    | 42%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 55%            | 3%                               | 97%                | 63.0%                                        | \$11,733                |
| BG 1, CT 5306    | 57%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 39%            | 0%                               | 100%               | 72.1%                                        | \$12,206                |
| BG 2, CT 5306    | 44%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 56%            | 0%                               | 100%               | 55.8%                                        | \$13,125                |
| BG 3, CT 5306    | 15%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 85%            | 0%                               | 100%               | 53.4%                                        | \$15,604                |
| BG 4, CT 5306    | 44%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 56%            | 2%                               | 98%                | 62.7%                                        | \$15,102                |
| BG 1, CT 9505    | 56%                         | 3%                        | 0%                               | 0%    | 0%                                        | 29%                   | 12%            | 3%                               | 97%                | 49.4%                                        | \$18,611                |
| BG 2, CT 9505    | 61%                         | 9%                        | 0%                               | 0%    | 0%                                        | 27%                   | 2%             | 10%                              | 90%                | 59.1%                                        | \$14,318                |
| BG 0, CT 9905.01 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 5401    | 93%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 0%                               | 100%               | 35.3%                                        | \$19,231                |
| BG 2, CT 5401    | 61%                         | 19%                       | 0%                               | 0%    | 0%                                        | 0%                    | 19%            | 0%                               | 100%               | 46.6%                                        | \$17,778                |
| BG 1, CT 5402    | 78%                         | 15%                       | 0%                               | 0%    | 0%                                        | 3%                    | 5%             | 3%                               | 97%                | 18.5%                                        | \$48,026                |
| BG 2, CT 5402    | 94%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 12%                              | 88%                | 14.3%                                        | \$46,324                |
| BG 3, CT 5402    | 55%                         | 17%                       | 0%                               | 0%    | 0%                                        | 3%                    | 25%            | 0%                               | 100%               | 42.0%                                        | \$12,404                |
| BG 4, CT 5402    | 92%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 14%                              | 86%                | 17.6%                                        | \$52,375                |
| BG 1, CT 5403    | 70%                         | 20%                       | 0%                               | 0%    | 0%                                        | 1%                    | 9%             | 0%                               | 100%               | 32.4%                                        | \$22,107                |
| BG 2, CT 5403    | 67%                         | 13%                       | 0%                               | 0%    | 0%                                        | 3%                    | 18%            | 0%                               | 100%               | 57.1%                                        | \$13,601                |
| BG 1, CT 5404    | 76%                         | 6%                        | 0%                               | 1%    | 0%                                        | 8%                    | 8%             | 7%                               | 93%                | 3.9%                                         | \$65,638                |
| BG 2, CT 5404    | 70%                         | 16%                       | 0%                               | 0%    | 0%                                        | 3%                    | 11%            | 1%                               | 99%                | 40.7%                                        | \$26,031                |
| BG 3, CT 5404    | 81%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 8%             | 1%                               | 99%                | 15.1%                                        | \$50,893                |
| BG 1, CT 5405    | 68%                         | 15%                       | 0%                               | 0%    | 0%                                        | 4%                    | 13%            | 4%                               | 96%                | 41.7%                                        | \$20,431                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 5405    | 84%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 1%                               | 99%                | 40.2%                                        | \$27,730                |
| BG 3, CT 5405    | 55%                         | 27%                       | 0%                               | 0%    | 0%                                        | 0%                    | 18%            | 3%                               | 97%                | 33.2%                                        | \$31,179                |
| BG 1, CT 5406    | 59%                         | 25%                       | 0%                               | 0%    | 0%                                        | 2%                    | 15%            | 1%                               | 99%                | 67.6%                                        | \$14,534                |
| BG 2, CT 5406    | 69%                         | 22%                       | 0%                               | 0%    | 0%                                        | 1%                    | 8%             | 2%                               | 98%                | 34.1%                                        | \$30,541                |
| BG 1, CT 5407    | 72%                         | 21%                       | 0%                               | 0%    | 0%                                        | 0%                    | 7%             | 1%                               | 99%                | 63.0%                                        | \$13,611                |
| BG 2, CT 5407    | 78%                         | 7%                        | 0%                               | 0%    | 0%                                        | 2%                    | 12%            | 1%                               | 99%                | 26.7%                                        | \$37,287                |
| BG 3, CT 5407    | 74%                         | 13%                       | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 1%                               | 99%                | 54.8%                                        | \$15,441                |
| BG 0, CT 9900.21 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 1501.02 | 61%                         | 10%                       | 0%                               | 0%    | 0%                                        | 25%                   | 3%             | 0%                               | 100%               | 43.3%                                        | \$22,353                |
| BG 2, CT 1501.02 | 70%                         | 7%                        | 0%                               | 0%    | 0%                                        | 22%                   | 1%             | 0%                               | 100%               | 24.8%                                        | \$25,076                |
| BG 1, CT 1501.04 | 61%                         | 7%                        | 0%                               | 5%    | 0%                                        | 26%                   | 0%             | 5%                               | 95%                | 40.0%                                        | \$23,867                |
| BG 2, CT 1501.04 | 64%                         | 14%                       | 0%                               | 0%    | 0%                                        | 14%                   | 8%             | 1%                               | 99%                | 25.3%                                        | \$27,176                |
| BG 3, CT 1501.04 | 69%                         | 7%                        | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 0%                               | 100%               | 43.0%                                        | \$25,038                |
| BG 4, CT 1501.04 | 87%                         | 0%                        | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 0%                               | 100%               | 32.8%                                        | \$16,250                |
| BG 1, CT 1502    | 72%                         | 10%                       | 0%                               | 0%    | 0%                                        | 18%                   | 0%             | 1%                               | 99%                | 20.3%                                        | \$31,299                |
| BG 2, CT 1502    | 62%                         | 14%                       | 2%                               | 0%    | 0%                                        | 19%                   | 3%             | 0%                               | 100%               | 52.2%                                        | \$15,268                |
| BG 3, CT 1502    | 71%                         | 6%                        | 0%                               | 1%    | 0%                                        | 20%                   | 2%             | 1%                               | 99%                | 24.1%                                        | \$30,765                |
| BG 4, CT 1502    | 83%                         | 2%                        | 0%                               | 0%    | 0%                                        | 14%                   | 0%             | 0%                               | 100%               | 49.7%                                        | \$15,591                |
| BG 1, CT 1503.01 | 54%                         | 8%                        | 1%                               | 1%    | 0%                                        | 34%                   | 1%             | 0%                               | 100%               | 42.9%                                        | \$16,648                |
| BG 2, CT 1503.01 | 50%                         | 13%                       | 0%                               | 3%    | 0%                                        | 34%                   | 0%             | 0%                               | 100%               | 61.4%                                        | \$17,403                |
| BG 3, CT 1503.01 | 48%                         | 9%                        | 0%                               | 3%    | 0%                                        | 40%                   | 0%             | 0%                               | 100%               | 97.4%                                        | \$3,798                 |
| BG 1, CT 1503.02 | 51%                         | 8%                        | 0%                               | 0%    | 0%                                        | 40%                   | 1%             | 0%                               | 100%               | 33.4%                                        | \$23,417                |
| BG 2, CT 1503.02 | 69%                         | 7%                        | 0%                               | 0%    | 0%                                        | 18%                   | 7%             | 1%                               | 99%                | 51.9%                                        | \$15,035                |
| BG 1, CT 1504    | 46%                         | 12%                       | 0%                               | 0%    | 0%                                        | 36%                   | 6%             | 1%                               | 99%                | 65.4%                                        | \$18,672                |
| BG 2, CT 1504    | 57%                         | 11%                       | 0%                               | 0%    | 0%                                        | 20%                   | 11%            | 0%                               | 100%               | 80.1%                                        | \$11,875                |
| BG 3, CT 1504    | 65%                         | 11%                       | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 5%                               | 95%                | 7.9%                                         | \$43,365                |
| BG 4, CT 1504    | 69%                         | 7%                        | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 0%                               | 100%               | 17.7%                                        | \$22,955                |
| BG 5, CT 1504    | 71%                         | 8%                        | 0%                               | 0%    | 0%                                        | 21%                   | 0%             | 0%                               | 100%               | 29.3%                                        | \$16,625                |
| BG 1, CT 1505    | 62%                         | 10%                       | 0%                               | 0%    | 0%                                        | 27%                   | 2%             | 0%                               | 100%               | 52.2%                                        | \$15,929                |



| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 1505    | 42%                         | 11%                       | 0%                               | 0%    | 0%                                        | 43%                   | 5%             | 0%                               | 100%               | 69.3%                                        | \$16,818                |
| BG 3, CT 1505    | 51%                         | 9%                        | 0%                               | 0%    | 0%                                        | 34%                   | 6%             | 0%                               | 100%               | 52.1%                                        | \$12,556                |
| BG 4, CT 1505    | 48%                         | 9%                        | 0%                               | 0%    | 0%                                        | 41%                   | 2%             | 0%                               | 100%               | 53.2%                                        | \$14,131                |
| BG 1, CT 1506.01 | 53%                         | 9%                        | 0%                               | 1%    | 0%                                        | 31%                   | 6%             | 0%                               | 100%               | 42.6%                                        | \$21,635                |
| BG 1, CT 1506.02 | 58%                         | 7%                        | 0%                               | 0%    | 0%                                        | 32%                   | 3%             | 2%                               | 98%                | 30.5%                                        | \$31,744                |
| BG 2, CT 1506.02 | 54%                         | 10%                       | 0%                               | 0%    | 0%                                        | 35%                   | 1%             | 0%                               | 100%               | 33.3%                                        | \$30,464                |
| BG 0, CT 9901.03 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 5801    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 54.7%                                        | \$14,619                |
| BG 2, CT 5801    | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 1%                               | 99%                | 36.4%                                        | \$21,071                |
| BG 3, CT 5801    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 69.9%                                        | \$11,046                |
| BG 1, CT 5802    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 54.3%                                        | \$15,587                |
| BG 2, CT 5802    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 76.8%                                        | \$14,181                |
| BG 3, CT 5802    | 98%                         | 0%                        | 0%                               | 1%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 52.3%                                        | \$20,861                |
| BG 4, CT 5802    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 46.7%                                        | \$24,205                |
| BG 1, CT 9609    | 95%                         | 3%                        | 1%                               | 0%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 52.1%                                        | \$13,860                |
| BG 2, CT 9609    | 96%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 59.4%                                        | \$11,731                |
| BG 3, CT 9609    | 92%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 0%                               | 100%               | 71.2%                                        | \$11,000                |
| BG 1, CT 9610    | 82%                         | 3%                        | 0%                               | 0%    | 0%                                        | 12%                   | 4%             | 1%                               | 99%                | 74.9%                                        | \$12,285                |
| BG 2, CT 9610    | 89%                         | 2%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 6%                               | 94%                | 44.3%                                        | \$15,870                |
| BG 1, CT 9611    | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 4%             | 0%                               | 100%               | 73.1%                                        | \$15,806                |
| BG 2, CT 9611    | 87%                         | 5%                        | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 1%                               | 99%                | 76.4%                                        | \$11,615                |
| BG 1, CT 9612    | 77%                         | 15%                       | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 0%                               | 100%               | 67.0%                                        | \$13,088                |
| BG 2, CT 9612    | 90%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 5%             | 0%                               | 100%               | 63.9%                                        | \$12,422                |
| BG 1, CT 9613    | 85%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 8%             | 1%                               | 99%                | 95.6%                                        | \$4,643                 |
| BG 2, CT 9613    | 95%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 2%             | 3%                               | 97%                | 35.6%                                        | \$23,672                |
| BG 1, CT 9614    | 93%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 38.7%                                        | \$24,125                |
| BG 2, CT 9614    | 90%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 4%             | 0%                               | 100%               | 47.8%                                        | \$14,292                |
| BG 1, CT 9615    | 92%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 2%                               | 98%                | 53.2%                                        | \$13,438                |
| BG 2, CT 9615    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 57.8%                                        | \$13,750                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 9615    | 97%                         | 3%                        | 1%                               | 0%    | 0%                                        | 0%                    | 0%             | 2%                               | 98%                | 82.6%                                        | \$8,849                 |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 2701    | 76%                         | 4%                        | 0%                               | 0%    | 0%                                        | 17%                   | 4%             | 0%                               | 100%               | 56.6%                                        | \$16,759                |
| BG 2, CT 2701    | 75%                         | 10%                       | 4%                               | 0%    | 0%                                        | 2%                    | 9%             | 1%                               | 99%                | 61.2%                                        | \$13,963                |
| BG 3, CT 2701    | 80%                         | 7%                        | 0%                               | 0%    | 0%                                        | 10%                   | 3%             | 1%                               | 99%                | 46.1%                                        | \$15,250                |
| BG 4, CT 2701    | 67%                         | 8%                        | 1%                               | 0%    | 0%                                        | 14%                   | 9%             | 1%                               | 99%                | 30.9%                                        | \$19,779                |
| BG 1, CT 2702.01 | 54%                         | 7%                        | 0%                               | 0%    | 0%                                        | 26%                   | 13%            | 0%                               | 100%               | 58.9%                                        | \$13,457                |
| BG 2, CT 2702.01 | 42%                         | 16%                       | 0%                               | 0%    | 0%                                        | 22%                   | 21%            | 9%                               | 91%                | 79.8%                                        | \$8,828                 |
| BG 3, CT 2702.01 | 60%                         | 8%                        | 0%                               | 0%    | 0%                                        | 18%                   | 15%            | 0%                               | 100%               | 41.6%                                        | \$24,096                |
| BG 1, CT 2702.02 | 52%                         | 11%                       | 0%                               | 0%    | 0%                                        | 32%                   | 6%             | 0%                               | 100%               | 63.7%                                        | \$10,299                |
| BG 2, CT 2702.02 | 74%                         | 15%                       | 0%                               | 0%    | 0%                                        | 1%                    | 10%            | 1%                               | 99%                | 62.6%                                        | \$17,500                |
| BG 1, CT 2703    | 65%                         | 7%                        | 0%                               | 0%    | 0%                                        | 12%                   | 16%            | 0%                               | 100%               | 53.7%                                        | \$29,565                |
| BG 2, CT 2703    | 86%                         | 14%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 27.7%                                        | \$23,750                |
| BG 3, CT 2703    | 47%                         | 34%                       | 0%                               | 0%    | 0%                                        | 12%                   | 7%             | 0%                               | 100%               | 62.2%                                        | \$12,344                |
| BG 4, CT 2703    | 67%                         | 12%                       | 0%                               | 0%    | 0%                                        | 5%                    | 16%            | 0%                               | 100%               | 32.8%                                        | \$31,441                |
| BG 1, CT 2704    | 96%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 60.8%                                        | \$6,836                 |
| BG 2, CT 2704    | 69%                         | 16%                       | 0%                               | 0%    | 0%                                        | 7%                    | 8%             | 0%                               | 100%               | 36.9%                                        | \$18,583                |
| BG 3, CT 2704    | 72%                         | 17%                       | 0%                               | 0%    | 0%                                        | 6%                    | 5%             | 0%                               | 100%               | 88.2%                                        | \$5,000                 |
| BG 1, CT 2705    | 78%                         | 14%                       | 1%                               | 0%    | 0%                                        | 4%                    | 3%             | 0%                               | 100%               | 42.0%                                        | \$27,192                |
| BG 2, CT 2705    | 56%                         | 35%                       | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 12.3%                                        | \$20,417                |
| BG 3, CT 2705    | 49%                         | 21%                       | 8%                               | 0%    | 0%                                        | 16%                   | 5%             | 0%                               | 100%               | 70.8%                                        | \$10,956                |
| BG 4, CT 2705    | 66%                         | 20%                       | 0%                               | 0%    | 0%                                        | 10%                   | 3%             | 0%                               | 100%               | 31.5%                                        | \$17,431                |
| BG 5, CT 2705    | 84%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 7%             | 0%                               | 100%               | 19.3%                                        | \$36,616                |
| BG 1, CT 2706    | 80%                         | 7%                        | 1%                               | 0%    | 0%                                        | 4%                    | 8%             | 0%                               | 100%               | 61.0%                                        | \$12,854                |
| BG 2, CT 2706    | 59%                         | 11%                       | 0%                               | 0%    | 0%                                        | 8%                    | 22%            | 0%                               | 100%               | 66.0%                                        | \$14,219                |
| BG 3, CT 2706    | 61%                         | 19%                       | 0%                               | 0%    | 0%                                        | 4%                    | 16%            | 0%                               | 100%               | 46.6%                                        | \$26,563                |
| BG 4, CT 2706    | 57%                         | 19%                       | 0%                               | 0%    | 0%                                        | 8%                    | 16%            | 0%                               | 100%               | 82.1%                                        | \$8,630                 |
| BG 1, CT 2707    | 61%                         | 10%                       | 0%                               | 0%    | 0%                                        | 19%                   | 11%            | 0%                               | 100%               | 42.9%                                        | \$21,042                |
| BG 2, CT 2707    | 54%                         | 19%                       | 0%                               | 0%    | 0%                                        | 12%                   | 15%            | 0%                               | 100%               | 65.4%                                        | \$9,519                 |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 2707    | 53%                         | 24%                       | 0%                               | 0%    | 0%                                        | 17%                   | 5%             | 0%                               | 100%               | 58.9%                                        | \$15,075                |
| BG 1, CT 2708    | 74%                         | 8%                        | 0%                               | 0%    | 0%                                        | 10%                   | 7%             | 0%                               | 100%               | 48.2%                                        | \$21,684                |
| BG 2, CT 2708    | 64%                         | 8%                        | 0%                               | 0%    | 0%                                        | 21%                   | 6%             | 0%                               | 100%               | 56.9%                                        | \$13,942                |
| BG 3, CT 2708    | 87%                         | 0%                        | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 0%                               | 100%               | 74.0%                                        | \$5,625                 |
| BG 4, CT 2708    | 74%                         | 16%                       | 0%                               | 0%    | 0%                                        | 6%                    | 4%             | 0%                               | 100%               | 17.3%                                        | \$23,678                |
| BG 0, CT 9926    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 7401.01 | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 2%                               | 98%                | 64.5%                                        | \$10,341                |
| BG 2, CT 7401.01 | 93%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 1%                               | 99%                | 54.1%                                        | \$14,010                |
| BG 1, CT 7401.02 | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 3%                               | 97%                | 53.0%                                        | \$16,193                |
| BG 2, CT 7401.02 | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 0%                               | 100%               | 47.7%                                        | \$17,222                |
| BG 3, CT 7401.02 | 94%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 3%             | 2%                               | 98%                | 53.5%                                        | \$11,932                |
| BG 1, CT 7402    | 86%                         | 4%                        | 0%                               | 0%    | 0%                                        | 8%                    | 2%             | 0%                               | 100%               | 40.3%                                        | \$24,286                |
| BG 2, CT 7402    | 90%                         | 5%                        | 2%                               | 0%    | 0%                                        | 0%                    | 3%             | 1%                               | 99%                | 54.2%                                        | \$14,241                |
| BG 3, CT 7402    | 90%                         | 3%                        | 0%                               | 0%    | 0%                                        | 5%                    | 2%             | 0%                               | 100%               | 60.4%                                        | \$13,901                |
| BG 1, CT 7403    | 92%                         | 4%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 25.9%                                        | \$21,027                |
| BG 2, CT 7403    | 86%                         | 6%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 30.7%                                        | \$23,654                |
| BG 3, CT 7403    | 82%                         | 4%                        | 0%                               | 0%    | 0%                                        | 9%                    | 5%             | 0%                               | 100%               | 60.0%                                        | \$7,950                 |
| BG 4, CT 7403    | 97%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 67.3%                                        | \$12,188                |
| BG 1, CT 7404    | 93%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 54.6%                                        | \$14,448                |
| BG 2, CT 7404    | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 0%                               | 100%               | 57.7%                                        | \$15,421                |
| BG 3, CT 7404    | 87%                         | 5%                        | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 0%                               | 100%               | 66.5%                                        | \$11,589                |
| BG 0, CT 9900.01 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 401.01  | 57%                         | 5%                        | 0%                               | 0%    | 0%                                        | 30%                   | 7%             | 0%                               | 100%               | 56.3%                                        | \$17,225                |
| BG 2, CT 401.01  | 70%                         | 7%                        | 0%                               | 0%    | 0%                                        | 18%                   | 5%             | 0%                               | 100%               | 45.4%                                        | \$18,203                |
| BG 1, CT 401.02  | 62%                         | 23%                       | 3%                               | 0%    | 0%                                        | 6%                    | 6%             | 2%                               | 98%                | 71.5%                                        | \$12,865                |
| BG 2, CT 401.02  | 36%                         | 23%                       | 2%                               | 0%    | 0%                                        | 11%                   | 28%            | 3%                               | 97%                | 35.0%                                        | \$18,125                |
| BG 3, CT 401.02  | 54%                         | 23%                       | 0%                               | 0%    | 0%                                        | 8%                    | 15%            | 0%                               | 100%               | 21.6%                                        | \$31,932                |
| BG 1, CT 401.03  | 54%                         | 13%                       | 0%                               | 0%    | 0%                                        | 28%                   | 6%             | 0%                               | 100%               | 51.0%                                        | \$15,823                |
| BG 2, CT 401.03  | 65%                         | 7%                        | 0%                               | 0%    | 0%                                        | 21%                   | 6%             | 0%                               | 100%               | 80.5%                                        | \$9,139                 |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 402    | 85%                         | 3%                        | 0%                               | 0%    | 0%                                        | 8%                    | 4%             | 1%                               | 99%                | 13.6%                                        | \$65,714                |
| BG 2, CT 402    | 95%                         | 3%                        | 1%                               | 1%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 5.7%                                         | \$47,371                |
| BG 3, CT 402    | 61%                         | 8%                        | 0%                               | 0%    | 0%                                        | 24%                   | 7%             | 2%                               | 98%                | 41.2%                                        | \$31,583                |
| BG 4, CT 402    | 90%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 7%             | 3%                               | 97%                | 10.9%                                        | \$53,750                |
| BG 1, CT 403.01 | 93%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 2%                               | 98%                | 9.9%                                         | \$42,159                |
| BG 1, CT 403.02 | 84%                         | 0%                        | 0%                               | 0%    | 0%                                        | 13%                   | 2%             | 9%                               | 91%                | 15.2%                                        | \$40,750                |
| BG 2, CT 403.02 | 93%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 1%             | 0%                               | 100%               | 13.8%                                        | \$38,750                |
| BG 1, CT 403.03 | 92%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 7.4%                                         | \$46,806                |
| BG 2, CT 403.03 | 82%                         | 4%                        | 2%                               | 0%    | 0%                                        | 6%                    | 6%             | 1%                               | 99%                | 7.8%                                         | \$44,482                |
| BG 1, CT 403.04 | 83%                         | 7%                        | 0%                               | 0%    | 0%                                        | 10%                   | 0%             | 2%                               | 98%                | 20.0%                                        | \$50,500                |
| BG 2, CT 403.04 | 90%                         | 3%                        | 0%                               | 2%    | 0%                                        | 4%                    | 1%             | 4%                               | 96%                | 0.0%                                         | \$99,706                |
| BG 3, CT 403.04 | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 10.0%                                        | \$101,000               |
| BG 4, CT 403.04 | 96%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 1%                               | 99%                | 4.0%                                         | \$50,927                |
| BG 1, CT 404.03 | 90%                         | 4%                        | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 1%                               | 99%                | 11.5%                                        | \$77,535                |
| BG 2, CT 404.03 | 82%                         | 2%                        | 0%                               | 0%    | 0%                                        | 16%                   | 0%             | 0%                               | 100%               | 12.4%                                        | \$44,808                |
| BG 3, CT 404.03 | 61%                         | 14%                       | 1%                               | 0%    | 0%                                        | 24%                   | 1%             | 0%                               | 100%               | 37.3%                                        | \$34,878                |
| BG 1, CT 404.11 | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 4%                               | 96%                | 0.8%                                         | \$76,563                |
| BG 2, CT 404.11 | 77%                         | 3%                        | 0%                               | 0%    | 0%                                        | 14%                   | 6%             | 1%                               | 99%                | 46.8%                                        | \$24,338                |
| BG 3, CT 404.11 | 77%                         | 7%                        | 0%                               | 0%    | 0%                                        | 12%                   | 4%             | 0%                               | 100%               | 19.0%                                        | \$61,250                |
| BG 1, CT 404.12 | 92%                         | 4%                        | 0%                               | 0%    | 0%                                        | 3%                    | 1%             | 2%                               | 98%                | 7.5%                                         | \$72,813                |
| BG 2, CT 404.12 | 93%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 3%                               | 97%                | 11.7%                                        | \$44,853                |
| BG 1, CT 404.21 | 79%                         | 7%                        | 1%                               | 0%    | 0%                                        | 11%                   | 3%             | 4%                               | 96%                | 35.6%                                        | \$38,385                |
| BG 2, CT 404.21 | 54%                         | 21%                       | 0%                               | 0%    | 0%                                        | 12%                   | 14%            | 1%                               | 99%                | 8.5%                                         | \$32,443                |
| BG 3, CT 404.21 | 85%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 8%             | 0%                               | 100%               | 27.5%                                        | \$34,767                |
| BG 4, CT 404.21 | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 7%                               | 93%                | 2.2%                                         | \$104,333               |
| BG 5, CT 404.21 | 72%                         | 0%                        | 0%                               | 0%    | 0%                                        | 16%                   | 12%            | 0%                               | 100%               | 4.8%                                         | \$50,653                |
| BG 1, CT 404.22 | 84%                         | 4%                        | 0%                               | 0%    | 0%                                        | 10%                   | 3%             | 4%                               | 96%                | 20.8%                                        | \$44,706                |
| BG 2, CT 404.22 | 94%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 1%                               | 99%                | 20.3%                                        | \$25,660                |
| BG 3, CT 404.22 | 42%                         | 26%                       | 0%                               | 0%    | 0%                                        | 21%                   | 10%            | 1%                               | 99%                | 46.6%                                        | \$15,913                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 404.32 | 71%                         | 8%                        | 0%                               | 0%    | 0%                                        | 6%                    | 16%            | 1%                               | 99%                | 15.7%                                        | \$36,548                |
| BG 2, CT 404.32 | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 39.8%                                        | \$29,038                |
| BG 3, CT 404.32 | 83%                         | 3%                        | 3%                               | 0%    | 0%                                        | 9%                    | 2%             | 3%                               | 97%                | 22.0%                                        | \$35,708                |
| BG 1, CT 404.42 | 78%                         | 2%                        | 0%                               | 3%    | 0%                                        | 9%                    | 7%             | 3%                               | 97%                | 12.7%                                        | \$47,097                |
| BG 2, CT 404.42 | 68%                         | 3%                        | 5%                               | 0%    | 0%                                        | 18%                   | 7%             | 0%                               | 100%               | 22.9%                                        | \$24,722                |
| BG 3, CT 404.42 | 85%                         | 0%                        | 0%                               | 0%    | 0%                                        | 14%                   | 1%             | 1%                               | 99%                | 15.0%                                        | \$53,269                |
| BG 1, CT 405    | 68%                         | 5%                        | 5%                               | 0%    | 0%                                        | 22%                   | 0%             | 0%                               | 100%               | 69.7%                                        | \$6,595                 |
| BG 2, CT 405    | 77%                         | 9%                        | 0%                               | 0%    | 0%                                        | 10%                   | 4%             | 1%                               | 99%                | 21.3%                                        | \$50,518                |
| BG 3, CT 405    | 89%                         | 1%                        | 0%                               | 0%    | 0%                                        | 10%                   | 0%             | 0%                               | 100%               | 12.6%                                        | \$65,486                |
| BG 1, CT 406.01 | 78%                         | 3%                        | 0%                               | 0%    | 0%                                        | 16%                   | 4%             | 0%                               | 100%               | 52.7%                                        | \$18,906                |
| BG 2, CT 406.01 | 58%                         | 5%                        | 2%                               | 0%    | 0%                                        | 35%                   | 0%             | 0%                               | 100%               | 35.5%                                        | \$21,250                |
| BG 3, CT 406.01 | 78%                         | 4%                        | 0%                               | 0%    | 0%                                        | 14%                   | 4%             | 0%                               | 100%               | 10.7%                                        | \$41,800                |
| BG 1, CT 406.02 | 86%                         | 2%                        | 3%                               | 0%    | 0%                                        | 9%                    | 0%             | 1%                               | 99%                | 3.8%                                         | \$79,318                |
| BG 2, CT 406.02 | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 7%                               | 93%                | 3.0%                                         | \$87,083                |
| BG 3, CT 406.02 | 76%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 15%            | 6%                               | 94%                | 4.8%                                         | \$114,500               |
| BG 4, CT 406.02 | 78%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 11%            | 0%                               | 100%               | 27.5%                                        | \$22,125                |
| BG 5, CT 406.02 | 38%                         | 32%                       | 0%                               | 0%    | 0%                                        | 30%                   | 0%             | 0%                               | 100%               | 41.7%                                        | \$21,042                |
| BG 6, CT 406.02 | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 19%                   | 0%             | 0%                               | 100%               | 12.7%                                        | \$56,875                |
| BG 1, CT 407    | 79%                         | 3%                        | 0%                               | 0%    | 0%                                        | 16%                   | 2%             | 0%                               | 100%               | 41.9%                                        | \$23,828                |
| BG 2, CT 407    | 70%                         | 10%                       | 0%                               | 0%    | 0%                                        | 14%                   | 7%             | 0%                               | 100%               | 30.3%                                        | \$27,153                |
| BG 3, CT 407    | 64%                         | 0%                        | 0%                               | 0%    | 0%                                        | 31%                   | 4%             | 0%                               | 100%               | 43.8%                                        | \$17,537                |
| BG 1, CT 408    | 65%                         | 3%                        | 0%                               | 0%    | 0%                                        | 18%                   | 13%            | 2%                               | 98%                | 46.3%                                        | \$18,036                |
| BG 2, CT 408    | 81%                         | 5%                        | 0%                               | 0%    | 0%                                        | 13%                   | 1%             | 0%                               | 100%               | 52.1%                                        | \$18,822                |
| BG 1, CT 409    | 87%                         | 4%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 25.4%                                        | \$25,564                |
| BG 2, CT 409    | 62%                         | 1%                        | 0%                               | 0%    | 0%                                        | 26%                   | 11%            | 2%                               | 98%                | 45.6%                                        | \$18,770                |
| BG 3, CT 409    | 70%                         | 0%                        | 0%                               | 0%    | 0%                                        | 24%                   | 6%             | 0%                               | 100%               | 54.1%                                        | \$16,638                |
| BG 1, CT 410    | 44%                         | 11%                       | 0%                               | 0%    | 0%                                        | 34%                   | 11%            | 0%                               | 100%               | 27.8%                                        | \$24,813                |
| BG 2, CT 410    | 64%                         | 0%                        | 1%                               | 0%    | 0%                                        | 32%                   | 3%             | 1%                               | 99%                | 46.0%                                        | \$21,194                |
| BG 1, CT 411    | 88%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 5%             | 0%                               | 100%               | 27.8%                                        | \$26,274                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 411     | 73%                         | 0%                        | 0%                               | 0%    | 0%                                        | 20%                   | 7%             | 2%                               | 98%                | 38.8%                                        | \$22,188                |
| BG 1, CT 2101    | 71%                         | 5%                        | 0%                               | 0%    | 0%                                        | 5%                    | 19%            | 0%                               | 100%               | 44.1%                                        | \$24,079                |
| BG 2, CT 2101    | 67%                         | 5%                        | 0%                               | 2%    | 0%                                        | 12%                   | 14%            | 0%                               | 100%               | 51.7%                                        | \$16,737                |
| BG 1, CT 2102.01 | 66%                         | 4%                        | 0%                               | 0%    | 0%                                        | 16%                   | 15%            | 0%                               | 100%               | 39.8%                                        | \$34,844                |
| BG 2, CT 2102.01 | 61%                         | 2%                        | 0%                               | 0%    | 0%                                        | 17%                   | 20%            | 0%                               | 100%               | 65.3%                                        | \$12,762                |
| BG 1, CT 2102.02 | 38%                         | 12%                       | 0%                               | 0%    | 0%                                        | 11%                   | 38%            | 0%                               | 100%               | 39.5%                                        | \$21,107                |
| BG 2, CT 2102.02 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 100.0%                                       | ND                      |
| BG 3, CT 2102.02 | 64%                         | 13%                       | 0%                               | 0%    | 0%                                        | 11%                   | 13%            | 1%                               | 99%                | 46.6%                                        | \$24,610                |
| BG 4, CT 2102.02 | 46%                         | 11%                       | 0%                               | 0%    | 0%                                        | 9%                    | 34%            | 0%                               | 100%               | 33.8%                                        | \$27,500                |
| BG 1, CT 2103    | 75%                         | 1%                        | 0%                               | 0%    | 0%                                        | 23%                   | 0%             | 0%                               | 100%               | 60.5%                                        | \$12,813                |
| BG 2, CT 2103    | 46%                         | 9%                        | 0%                               | 0%    | 0%                                        | 11%                   | 34%            | 3%                               | 97%                | 60.7%                                        | \$17,105                |
| BG 3, CT 2103    | 48%                         | 22%                       | 0%                               | 0%    | 0%                                        | 7%                    | 23%            | 0%                               | 100%               | 76.6%                                        | \$10,858                |
| BG 1, CT 2104    | 62%                         | 11%                       | 1%                               | 0%    | 0%                                        | 7%                    | 19%            | 0%                               | 100%               | 51.1%                                        | \$15,375                |
| BG 2, CT 2104    | 50%                         | 14%                       | 0%                               | 0%    | 0%                                        | 15%                   | 21%            | 0%                               | 100%               | 52.6%                                        | \$20,423                |
| BG 3, CT 2104    | 47%                         | 6%                        | 0%                               | 0%    | 0%                                        | 19%                   | 29%            | 1%                               | 99%                | 32.4%                                        | \$29,773                |
| BG 1, CT 2105.02 | 76%                         | 1%                        | 0%                               | 1%    | 0%                                        | 4%                    | 17%            | 2%                               | 98%                | 10.7%                                        | \$52,589                |
| BG 2, CT 2105.02 | 57%                         | 7%                        | 0%                               | 1%    | 0%                                        | 16%                   | 19%            | 0%                               | 100%               | 15.2%                                        | \$64,142                |
| BG 3, CT 2105.02 | 93%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 1%                               | 99%                | 10.9%                                        | \$55,350                |
| BG 1, CT 2105.03 | 67%                         | 9%                        | 1%                               | 0%    | 0%                                        | 8%                    | 15%            | 0%                               | 100%               | 16.9%                                        | \$35,898                |
| BG 1, CT 2105.04 | 62%                         | 5%                        | 0%                               | 0%    | 0%                                        | 17%                   | 15%            | 3%                               | 97%                | 33.4%                                        | \$35,227                |
| BG 2, CT 2105.04 | 74%                         | 5%                        | 0%                               | 0%    | 0%                                        | 9%                    | 12%            | 2%                               | 98%                | 46.1%                                        | \$13,036                |
| BG 3, CT 2105.04 | 56%                         | 14%                       | 0%                               | 0%    | 0%                                        | 16%                   | 14%            | 0%                               | 100%               | 38.3%                                        | \$25,556                |
| BG 4, CT 2105.04 | 21%                         | 66%                       | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 0%                               | 100%               | 49.3%                                        | \$30,242                |
| BG 1, CT 3101    | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 0%                               | 100%               | 25.8%                                        | \$26,429                |
| BG 2, CT 3101    | 95%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 40.4%                                        | \$21,481                |
| BG 3, CT 3101    | 88%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 6%             | 1%                               | 99%                | 44.1%                                        | \$20,556                |
| BG 4, CT 3101    | 92%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 0%                               | 100%               | 47.6%                                        | \$21,782                |
| BG 1, CT 3102    | 88%                         | 3%                        | 0%                               | 7%    | 0%                                        | 0%                    | 2%             | 7%                               | 93%                | 63.4%                                        | \$9,091                 |
| BG 2, CT 3102    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 0%                               | 100%               | 51.9%                                        | \$14,226                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 3102    | 92%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 1%                               | 99%                | 41.0%                                        | \$19,273                |
| BG 1, CT 3103    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 1%                               | 99%                | 26.3%                                        | \$32,250                |
| BG 2, CT 3103    | 82%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 1%                               | 99%                | 38.9%                                        | \$18,949                |
| BG 3, CT 3103    | 85%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 8%             | 2%                               | 98%                | 38.1%                                        | \$22,083                |
| BG 4, CT 3103    | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 2%                               | 98%                | 54.6%                                        | \$14,885                |
| BG 1, CT 3104    | 88%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 8%             | 0%                               | 100%               | 42.4%                                        | \$23,041                |
| BG 2, CT 3104    | 90%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 8%             | 0%                               | 100%               | 51.1%                                        | \$16,972                |
| BG 3, CT 3104    | 97%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 1%                               | 99%                | 51.3%                                        | \$17,939                |
| BG 4, CT 3104    | 99%                         | 0%                        | 0%                               | 1%    | 0%                                        | 0%                    | 0%             | 2%                               | 98%                | 43.4%                                        | \$19,991                |
| BG 1, CT 3105    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 2%                               | 98%                | 50.7%                                        | \$21,828                |
| BG 2, CT 3105    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 39.2%                                        | \$20,765                |
| BG 3, CT 3105    | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 39.4%                                        | \$18,731                |
| BG 4, CT 3105    | 95%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 1%             | 0%                               | 100%               | 42.3%                                        | \$15,875                |
| BG 1, CT 3106    | 96%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 45.8%                                        | \$19,265                |
| BG 2, CT 3106    | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 61.0%                                        | \$14,398                |
| BG 3, CT 3106    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 71.2%                                        | \$12,963                |
| BG 4, CT 3106    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 67.8%                                        | \$13,833                |
| BG 0, CT 9900.16 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 8201    | 33%                         | 6%                        | 0%                               | 0%    | 0%                                        | 10%                   | 51%            | 1%                               | 99%                | 26.2%                                        | \$23,448                |
| BG 2, CT 8201    | 69%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 26%            | 3%                               | 97%                | 34.2%                                        | \$21,959                |
| BG 3, CT 8201    | 43%                         | 0%                        | 0%                               | 0%    | 0%                                        | 14%                   | 44%            | 0%                               | 100%               | 33.9%                                        | \$21,217                |
| BG 4, CT 8201    | 37%                         | 0%                        | 0%                               | 0%    | 0%                                        | 22%                   | 41%            | 2%                               | 98%                | 45.3%                                        | \$15,581                |
| BG 5, CT 8201    | 35%                         | 0%                        | 0%                               | 0%    | 0%                                        | 26%                   | 39%            | 2%                               | 98%                | 46.8%                                        | \$13,314                |
| BG 1, CT 8203    | 67%                         | 2%                        | 0%                               | 4%    | 0%                                        | 14%                   | 14%            | 0%                               | 100%               | 29.4%                                        | \$22,165                |
| BG 2, CT 8203    | 52%                         | 4%                        | 0%                               | 0%    | 0%                                        | 20%                   | 24%            | 3%                               | 97%                | 24.7%                                        | \$30,497                |
| BG 1, CT 8204    | 71%                         | 3%                        | 0%                               | 0%    | 0%                                        | 16%                   | 10%            | 1%                               | 99%                | 51.5%                                        | \$14,127                |
| BG 2, CT 8204    | 70%                         | 2%                        | 0%                               | 0%    | 0%                                        | 10%                   | 19%            | 0%                               | 100%               | 51.4%                                        | \$11,716                |
| BG 1, CT 8205    | 59%                         | 3%                        | 0%                               | 0%    | 0%                                        | 9%                    | 29%            | 0%                               | 100%               | 22.4%                                        | \$23,061                |
| BG 2, CT 8205    | 65%                         | 13%                       | 0%                               | 2%    | 0%                                        | 5%                    | 15%            | 1%                               | 99%                | 24.8%                                        | \$22,750                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 1801    | 21%                         | 7%                        | 0%                               | 0%    | 0%                                        | 65%                   | 7%             | 0%                               | 100%               | 57.8%                                        | \$13,650                |
| BG 2, CT 1801    | 59%                         | 11%                       | 0%                               | 0%    | 0%                                        | 27%                   | 2%             | 1%                               | 99%                | 57.4%                                        | \$17,604                |
| BG 3, CT 1801    | 61%                         | 20%                       | 0%                               | 0%    | 0%                                        | 7%                    | 12%            | 1%                               | 99%                | 37.4%                                        | \$19,813                |
| BG 4, CT 1801    | 59%                         | 11%                       | 3%                               | 0%    | 0%                                        | 24%                   | 3%             | 1%                               | 99%                | 34.4%                                        | \$21,392                |
| BG 1, CT 1802.01 | 74%                         | 3%                        | 0%                               | 0%    | 0%                                        | 22%                   | 1%             | 0%                               | 100%               | 13.2%                                        | \$22,355                |
| BG 2, CT 1802.01 | 61%                         | 3%                        | 0%                               | 0%    | 0%                                        | 30%                   | 7%             | 2%                               | 98%                | 52.6%                                        | \$19,083                |
| BG 1, CT 1802.02 | 72%                         | 3%                        | 0%                               | 0%    | 0%                                        | 19%                   | 7%             | 1%                               | 99%                | 47.8%                                        | \$23,200                |
| BG 2, CT 1802.02 | 56%                         | 17%                       | 0%                               | 0%    | 0%                                        | 20%                   | 8%             | 0%                               | 100%               | 44.8%                                        | \$18,377                |
| BG 3, CT 1802.02 | 46%                         | 6%                        | 0%                               | 0%    | 0%                                        | 37%                   | 11%            | 9%                               | 91%                | 41.2%                                        | \$15,967                |
| BG 1, CT 1803.01 | 61%                         | 1%                        | 0%                               | 0%    | 0%                                        | 22%                   | 17%            | 0%                               | 100%               | 38.4%                                        | \$19,520                |
| BG 2, CT 1803.01 | 22%                         | 8%                        | 0%                               | 0%    | 0%                                        | 13%                   | 57%            | 0%                               | 100%               | 37.0%                                        | \$25,096                |
| BG 1, CT 1803.02 | 59%                         | 7%                        | 0%                               | 0%    | 0%                                        | 17%                   | 18%            | 0%                               | 100%               | 54.0%                                        | \$15,848                |
| BG 2, CT 1803.02 | 66%                         | 2%                        | 0%                               | 0%    | 0%                                        | 20%                   | 12%            | 1%                               | 99%                | 47.3%                                        | \$16,827                |
| BG 1, CT 1804    | 53%                         | 7%                        | 0%                               | 0%    | 0%                                        | 24%                   | 16%            | 0%                               | 100%               | 50.3%                                        | \$24,460                |
| BG 2, CT 1804    | 61%                         | 15%                       | 2%                               | 1%    | 0%                                        | 18%                   | 4%             | 0%                               | 100%               | 43.3%                                        | \$18,182                |
| BG 3, CT 1804    | 70%                         | 3%                        | 0%                               | 0%    | 0%                                        | 26%                   | 1%             | 0%                               | 100%               | 57.2%                                        | \$17,572                |
| BG 1, CT 1805    | 76%                         | 6%                        | 0%                               | 0%    | 0%                                        | 18%                   | 0%             | 0%                               | 100%               | 36.7%                                        | \$18,466                |
| BG 2, CT 1805    | 68%                         | 2%                        | 0%                               | 0%    | 0%                                        | 30%                   | 0%             | 2%                               | 98%                | 9.8%                                         | \$44,400                |
| BG 3, CT 1805    | 61%                         | 5%                        | 0%                               | 0%    | 0%                                        | 34%                   | 0%             | 1%                               | 99%                | 28.5%                                        | \$32,772                |
| BG 1, CT 1806    | 48%                         | 6%                        | 0%                               | 1%    | 0%                                        | 33%                   | 11%            | 1%                               | 99%                | 74.2%                                        | \$22,972                |
| BG 2, CT 1806    | 65%                         | 18%                       | 0%                               | 2%    | 0%                                        | 10%                   | 5%             | 0%                               | 100%               | 55.1%                                        | \$7,316                 |
| BG 3, CT 1806    | 40%                         | 1%                        | 0%                               | 0%    | 0%                                        | 46%                   | 13%            | 0%                               | 100%               | 49.3%                                        | \$17,701                |
| BG 4, CT 1806    | 65%                         | 7%                        | 0%                               | 0%    | 0%                                        | 15%                   | 14%            | 1%                               | 99%                | 49.7%                                        | \$17,632                |
| BG 5, CT 1806    | 76%                         | 8%                        | 0%                               | 0%    | 0%                                        | 14%                   | 2%             | 0%                               | 100%               | 64.3%                                        | \$11,818                |
| BG 1, CT 1807    | 55%                         | 15%                       | 0%                               | 0%    | 0%                                        | 26%                   | 4%             | 0%                               | 100%               | 52.2%                                        | \$16,364                |
| BG 2, CT 1807    | 75%                         | 8%                        | 0%                               | 1%    | 0%                                        | 15%                   | 1%             | 1%                               | 99%                | 27.8%                                        | \$21,226                |
| BG 3, CT 1807    | 64%                         | 1%                        | 0%                               | 4%    | 0%                                        | 28%                   | 2%             | 1%                               | 99%                | 56.4%                                        | \$16,013                |
| BG 4, CT 1807    | 75%                         | 5%                        | 0%                               | 0%    | 0%                                        | 16%                   | 4%             | 0%                               | 100%               | 55.2%                                        | \$30,795                |
| BG 1, CT 1808    | 72%                         | 6%                        | 2%                               | 1%    | 0%                                        | 18%                   | 1%             | 3%                               | 97%                | 29.9%                                        | \$26,528                |



| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 1808    | 68%                         | 5%                        | 0%                               | 2%    | 0%                                        | 16%                   | 10%            | 2%                               | 98%                | 30.6%                                        | \$25,625                |
| BG 3, CT 1808    | 55%                         | 2%                        | 0%                               | 2%    | 0%                                        | 39%                   | 2%             | 1%                               | 99%                | 60.9%                                        | \$18,017                |
| BG 1, CT 1809.01 | 73%                         | 2%                        | 0%                               | 0%    | 0%                                        | 23%                   | 3%             | 1%                               | 99%                | 39.6%                                        | \$16,638                |
| BG 2, CT 1809.01 | 29%                         | 11%                       | 1%                               | 5%    | 0%                                        | 48%                   | 6%             | 0%                               | 100%               | 63.4%                                        | \$15,803                |
| BG 1, CT 1809.02 | 72%                         | 1%                        | 1%                               | 0%    | 0%                                        | 17%                   | 10%            | 4%                               | 96%                | 25.2%                                        | \$60,476                |
| BG 2, CT 1809.02 | 52%                         | 0%                        | 0%                               | 0%    | 0%                                        | 31%                   | 17%            | 11%                              | 89%                | 20.4%                                        | \$84,135                |
| BG 3, CT 1809.02 | 70%                         | 3%                        | 0%                               | 1%    | 0%                                        | 20%                   | 5%             | 1%                               | 99%                | 26.0%                                        | \$46,591                |
| BG 0, CT 9918    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 4101    | 65%                         | 3%                        | 1%                               | 0%    | 0%                                        | 28%                   | 4%             | 2%                               | 98%                | 56.7%                                        | \$14,896                |
| BG 2, CT 4101    | 67%                         | 1%                        | 2%                               | 0%    | 0%                                        | 29%                   | 1%             | 2%                               | 98%                | 42.8%                                        | \$15,524                |
| BG 3, CT 4101    | 63%                         | 2%                        | 0%                               | 0%    | 0%                                        | 23%                   | 11%            | 1%                               | 99%                | 42.0%                                        | \$22,863                |
| BG 1, CT 4102    | 64%                         | 10%                       | 1%                               | 0%    | 0%                                        | 21%                   | 4%             | 1%                               | 99%                | 73.8%                                        | \$10,265                |
| BG 2, CT 4102    | 63%                         | 8%                        | 0%                               | 0%    | 0%                                        | 24%                   | 5%             | 1%                               | 99%                | 50.5%                                        | \$13,777                |
| BG 1, CT 4103    | 90%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 4%             | 0%                               | 100%               | 44.7%                                        | \$19,375                |
| BG 2, CT 4103    | 82%                         | 4%                        | 0%                               | 1%    | 0%                                        | 7%                    | 6%             | 1%                               | 99%                | 30.7%                                        | \$22,174                |
| BG 3, CT 4103    | 60%                         | 5%                        | 0%                               | 0%    | 0%                                        | 26%                   | 8%             | 0%                               | 100%               | 75.8%                                        | \$10,259                |
| BG 1, CT 4104.01 | 85%                         | 2%                        | 2%                               | 0%    | 0%                                        | 11%                   | 0%             | 1%                               | 99%                | 58.6%                                        | \$13,482                |
| BG 2, CT 4104.01 | 55%                         | 7%                        | 0%                               | 0%    | 0%                                        | 38%                   | 0%             | 0%                               | 100%               | 58.2%                                        | \$16,004                |
| BG 1, CT 4104.02 | 69%                         | 3%                        | 0%                               | 0%    | 0%                                        | 25%                   | 2%             | 0%                               | 100%               | 35.8%                                        | \$18,882                |
| BG 2, CT 4104.02 | 67%                         | 15%                       | 0%                               | 0%    | 0%                                        | 16%                   | 1%             | 2%                               | 98%                | 66.4%                                        | \$9,375                 |
| BG 3, CT 4104.02 | 65%                         | 6%                        | 2%                               | 0%    | 0%                                        | 23%                   | 4%             | 0%                               | 100%               | 59.8%                                        | \$17,500                |
| BG 4, CT 4104.02 | 71%                         | 6%                        | 2%                               | 0%    | 0%                                        | 18%                   | 4%             | 2%                               | 98%                | 55.0%                                        | \$13,603                |
| BG 1, CT 4105    | 61%                         | 8%                        | 0%                               | 0%    | 0%                                        | 25%                   | 6%             | 2%                               | 98%                | 58.0%                                        | \$10,616                |
| BG 2, CT 4105    | 78%                         | 1%                        | 0%                               | 0%    | 0%                                        | 17%                   | 4%             | 3%                               | 97%                | 52.4%                                        | \$14,036                |
| BG 3, CT 4105    | 73%                         | 4%                        | 0%                               | 0%    | 0%                                        | 21%                   | 1%             | 1%                               | 99%                | 32.8%                                        | \$24,095                |
| BG 1, CT 4106    | 66%                         | 4%                        | 0%                               | 0%    | 0%                                        | 16%                   | 14%            | 0%                               | 100%               | 64.5%                                        | \$17,558                |
| BG 2, CT 4106    | 61%                         | 2%                        | 0%                               | 0%    | 0%                                        | 37%                   | 0%             | 0%                               | 100%               | 72.1%                                        | \$9,773                 |
| BG 3, CT 4106    | 55%                         | 5%                        | 0%                               | 0%    | 0%                                        | 27%                   | 13%            | 0%                               | 100%               | 69.0%                                        | \$14,792                |
| BG 4, CT 4106    | 70%                         | 3%                        | 0%                               | 0%    | 0%                                        | 25%                   | 2%             | 0%                               | 100%               | 69.6%                                        | \$12,035                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 4107.01 | 68%                         | 2%                        | 1%                               | 0%    | 0%                                        | 29%                   | 0%             | 0%                               | 100%               | 53.9%                                        | \$14,814                |
| BG 2, CT 4107.01 | 55%                         | 13%                       | 5%                               | 0%    | 0%                                        | 23%                   | 4%             | 1%                               | 99%                | 56.6%                                        | \$13,980                |
| BG 1, CT 4107.02 | 51%                         | 3%                        | 0%                               | 0%    | 0%                                        | 38%                   | 8%             | 0%                               | 100%               | 42.6%                                        | \$21,165                |
| BG 2, CT 4107.02 | 66%                         | 7%                        | 0%                               | 0%    | 0%                                        | 23%                   | 4%             | 2%                               | 98%                | 71.7%                                        | \$8,655                 |
| BG 3, CT 4107.02 | 58%                         | 10%                       | 0%                               | 0%    | 0%                                        | 29%                   | 2%             | 0%                               | 100%               | 65.6%                                        | \$11,607                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9560    | 70%                         | 3%                        | 0%                               | 0%    | 0%                                        | 7%                    | 20%            | 0%                               | 100%               | 56.4%                                        | \$14,306                |
| BG 2, CT 9560    | 82%                         | 5%                        | 1%                               | 0%    | 0%                                        | 1%                    | 11%            | 0%                               | 100%               | 51.1%                                        | \$31,429                |
| BG 3, CT 9560    | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 7%             | 0%                               | 100%               | 44.1%                                        | \$19,063                |
| BG 1, CT 9561    | 77%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 17%            | 0%                               | 100%               | 57.1%                                        | \$13,056                |
| BG 2, CT 9561    | 87%                         | 7%                        | 0%                               | 0%    | 0%                                        | 4%                    | 3%             | 1%                               | 99%                | 58.7%                                        | \$16,339                |
| BG 1, CT 9562    | 86%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 11%            | 0%                               | 100%               | 62.6%                                        | \$18,906                |
| BG 2, CT 9562    | 85%                         | 4%                        | 0%                               | 0%    | 0%                                        | 3%                    | 9%             | 0%                               | 100%               | 55.9%                                        | \$19,826                |
| BG 3, CT 9562    | 83%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 9%             | 0%                               | 100%               | 58.3%                                        | \$14,682                |
| BG 4, CT 9562    | 80%                         | 0%                        | 5%                               | 1%    | 0%                                        | 7%                    | 7%             | 0%                               | 100%               | 32.0%                                        | \$22,534                |
| BG 1, CT 7101.02 | 59%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 35%            | 1%                               | 99%                | 75.6%                                        | \$14,416                |
| BG 2, CT 7101.02 | 53%                         | 1%                        | 0%                               | 0%    | 0%                                        | 9%                    | 38%            | 0%                               | 100%               | 71.9%                                        | \$15,017                |
| BG 3, CT 7101.02 | 68%                         | 12%                       | 0%                               | 0%    | 0%                                        | 6%                    | 14%            | 1%                               | 99%                | 44.8%                                        | \$23,281                |
| BG 1, CT 7102    | 68%                         | 10%                       | 0%                               | 0%    | 0%                                        | 5%                    | 17%            | 0%                               | 100%               | 76.1%                                        | \$10,682                |
| BG 2, CT 7102    | 62%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 29%            | 1%                               | 99%                | 38.5%                                        | \$22,450                |
| BG 3, CT 7102    | 44%                         | 7%                        | 0%                               | 2%    | 0%                                        | 8%                    | 40%            | 0%                               | 100%               | 60.8%                                        | \$13,480                |
| BG 1, CT 7103.01 | 74%                         | 10%                       | 0%                               | 0%    | 0%                                        | 2%                    | 13%            | 3%                               | 97%                | 40.0%                                        | \$21,324                |
| BG 2, CT 7103.01 | 75%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 22%            | 0%                               | 100%               | 25.7%                                        | \$30,859                |
| BG 1, CT 7103.02 | 64%                         | 8%                        | 0%                               | 0%    | 0%                                        | 3%                    | 26%            | 0%                               | 100%               | 52.8%                                        | \$24,286                |
| BG 2, CT 7103.02 | 61%                         | 13%                       | 0%                               | 2%    | 0%                                        | 10%                   | 14%            | 2%                               | 98%                | 40.5%                                        | \$22,500                |
| BG 3, CT 7103.02 | 74%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 23%            | 0%                               | 100%               | 29.4%                                        | \$31,379                |
| BG 1, CT 7104    | 68%                         | 4%                        | 0%                               | 0%    | 0%                                        | 8%                    | 21%            | 0%                               | 100%               | 62.8%                                        | \$14,085                |
| BG 2, CT 7104    | 71%                         | 9%                        | 0%                               | 0%    | 0%                                        | 1%                    | 19%            | 0%                               | 100%               | 74.7%                                        | \$4,438                 |
| BG 1, CT 7105    | 67%                         | 15%                       | 0%                               | 0%    | 0%                                        | 9%                    | 9%             | 0%                               | 100%               | 47.6%                                        | \$16,447                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 7105    | 46%                         | 22%                       | 0%                               | 0%    | 0%                                        | 4%                    | 28%            | 0%                               | 100%               | 55.4%                                        | \$13,750                |
| BG 1, CT 7106    | 71%                         | 7%                        | 0%                               | 0%    | 0%                                        | 2%                    | 20%            | 0%                               | 100%               | 28.7%                                        | \$17,390                |
| BG 2, CT 7106    | 72%                         | 9%                        | 0%                               | 0%    | 0%                                        | 3%                    | 16%            | 0%                               | 100%               | 52.7%                                        | \$15,000                |
| BG 1, CT 7107    | 67%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 27%            | 0%                               | 100%               | 51.8%                                        | \$15,223                |
| BG 2, CT 7107    | 78%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 18%            | 0%                               | 100%               | 56.0%                                        | \$16,591                |
| BG 1, CT 7108    | 66%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 27%            | 0%                               | 100%               | 51.1%                                        | \$18,646                |
| BG 2, CT 7108    | 63%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 30%            | 1%                               | 99%                | 33.2%                                        | \$24,074                |
| BG 3, CT 7108    | 78%                         | 0%                        | 0%                               | 1%    | 0%                                        | 1%                    | 19%            | 1%                               | 99%                | 47.8%                                        | \$18,824                |
| BG 4, CT 7108    | 58%                         | 18%                       | 0%                               | 1%    | 0%                                        | 3%                    | 19%            | 0%                               | 100%               | 75.6%                                        | \$14,659                |
| BG 1, CT 7109.01 | 60%                         | 5%                        | 0%                               | 0%    | 0%                                        | 5%                    | 31%            | 0%                               | 100%               | 48.7%                                        | \$18,881                |
| BG 2, CT 7109.01 | 49%                         | 15%                       | 0%                               | 0%    | 0%                                        | 3%                    | 33%            | 0%                               | 100%               | 45.9%                                        | \$23,079                |
| BG 3, CT 7109.01 | 66%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 28%            | 0%                               | 100%               | 59.5%                                        | \$13,390                |
| BG 1, CT 7109.02 | 56%                         | 15%                       | 0%                               | 0%    | 0%                                        | 5%                    | 24%            | 0%                               | 100%               | 67.8%                                        | \$14,067                |
| BG 2, CT 7109.02 | 68%                         | 9%                        | 0%                               | 3%    | 0%                                        | 6%                    | 15%            | 0%                               | 100%               | 57.9%                                        | \$18,585                |
| BG 3, CT 7109.02 | 16%                         | 15%                       | 0%                               | 0%    | 0%                                        | 21%                   | 49%            | 0%                               | 100%               | 57.9%                                        | \$17,153                |
| BG 1, CT 7110.02 | 48%                         | 12%                       | 0%                               | 0%    | 0%                                        | 0%                    | 40%            | 1%                               | 99%                | 50.5%                                        | \$17,380                |
| BG 2, CT 7110.02 | 46%                         | 15%                       | 0%                               | 1%    | 0%                                        | 13%                   | 26%            | 3%                               | 97%                | 61.9%                                        | \$13,445                |
| BG 3, CT 7110.02 | 31%                         | 6%                        | 0%                               | 0%    | 0%                                        | 11%                   | 52%            | 0%                               | 100%               | 67.7%                                        | \$11,595                |
| BG 4, CT 7110.02 | 52%                         | 23%                       | 6%                               | 0%    | 0%                                        | 1%                    | 19%            | 1%                               | 99%                | 52.9%                                        | \$16,029                |
| BG 0, CT 9900.01 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 5001    | 87%                         | 0%                        | 0%                               | 0%    | 0%                                        | 12%                   | 1%             | 0%                               | 100%               | 22.5%                                        | \$28,828                |
| BG 2, CT 5001    | 79%                         | 4%                        | 0%                               | 0%    | 0%                                        | 17%                   | 0%             | 0%                               | 100%               | 58.1%                                        | \$15,451                |
| BG 3, CT 5001    | 81%                         | 4%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 0%                               | 100%               | 49.0%                                        | \$20,308                |
| BG 4, CT 5001    | 85%                         | 0%                        | 0%                               | 0%    | 0%                                        | 14%                   | 1%             | 0%                               | 100%               | 71.6%                                        | \$15,563                |
| BG 5, CT 5001    | 83%                         | 1%                        | 0%                               | 0%    | 0%                                        | 16%                   | 0%             | 0%                               | 100%               | 73.9%                                        | \$11,607                |
| BG 1, CT 5002    | 76%                         | 14%                       | 0%                               | 0%    | 0%                                        | 8%                    | 1%             | 0%                               | 100%               | 48.7%                                        | \$15,833                |
| BG 2, CT 5002    | 76%                         | 7%                        | 0%                               | 0%    | 0%                                        | 14%                   | 4%             | 3%                               | 97%                | 38.1%                                        | \$18,224                |
| BG 3, CT 5002    | 87%                         | 8%                        | 0%                               | 0%    | 0%                                        | 3%                    | 2%             | 1%                               | 99%                | 32.3%                                        | \$35,000                |
| BG 4, CT 5002    | 82%                         | 4%                        | 0%                               | 0%    | 0%                                        | 12%                   | 2%             | 0%                               | 100%               | 40.1%                                        | \$15,375                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 5, CT 5002    | 77%                         | 0%                        | 1%                               | 0%    | 0%                                        | 22%                   | 0%             | 0%                               | 100%               | 44.3%                                        | \$13,056                |
| BG 1, CT 5003.01 | 82%                         | 1%                        | 0%                               | 0%    | 0%                                        | 12%                   | 5%             | 2%                               | 98%                | 39.8%                                        | \$19,811                |
| BG 2, CT 5003.01 | 82%                         | 9%                        | 0%                               | 0%    | 0%                                        | 5%                    | 3%             | 2%                               | 98%                | 39.8%                                        | \$35,402                |
| BG 3, CT 5003.01 | 88%                         | 6%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 34.6%                                        | \$21,250                |
| BG 1, CT 5003.02 | 83%                         | 1%                        | 0%                               | 0%    | 0%                                        | 12%                   | 4%             | 1%                               | 99%                | 54.9%                                        | \$14,844                |
| BG 2, CT 5003.02 | 96%                         | 2%                        | 0%                               | 0%    | 2%                                        | 0%                    | 0%             | 2%                               | 98%                | 48.2%                                        | \$14,526                |
| BG 3, CT 5003.02 | 82%                         | 3%                        | 0%                               | 0%    | 0%                                        | 12%                   | 3%             | 0%                               | 100%               | 54.1%                                        | \$14,339                |
| BG 1, CT 5004.01 | 83%                         | 3%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 1%                               | 99%                | 69.0%                                        | \$11,641                |
| BG 2, CT 5004.01 | 87%                         | 5%                        | 0%                               | 0%    | 0%                                        | 5%                    | 3%             | 1%                               | 99%                | 35.4%                                        | \$32,083                |
| BG 3, CT 5004.01 | 82%                         | 5%                        | 0%                               | 0%    | 0%                                        | 14%                   | 0%             | 0%                               | 100%               | 69.2%                                        | \$11,618                |
| BG 1, CT 5004.02 | 82%                         | 0%                        | 0%                               | 0%    | 0%                                        | 16%                   | 2%             | 0%                               | 100%               | 32.9%                                        | \$21,522                |
| BG 2, CT 5004.02 | 93%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 70.3%                                        | \$13,811                |
| BG 3, CT 5004.02 | 83%                         | 2%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 0%                               | 100%               | 42.3%                                        | \$20,458                |
| BG 1, CT 8501.01 | 96%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 64.8%                                        | \$15,313                |
| BG 2, CT 8501.01 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 63.3%                                        | \$13,452                |
| BG 1, CT 8501.02 | 97%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 71.3%                                        | \$13,188                |
| BG 2, CT 8501.02 | 98%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 35.4%                                        | \$19,543                |
| BG 3, CT 8501.02 | 94%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 93.0%                                        | \$4,457                 |
| BG 4, CT 8501.02 | 98%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 58.0%                                        | \$15,000                |
| BG 1, CT 8502    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 49.2%                                        | \$14,120                |
| BG 2, CT 8502    | 94%                         | 4%                        | 2%                               | 0%    | 0%                                        | 0%                    | 1%             | 1%                               | 99%                | 72.5%                                        | \$7,196                 |
| BG 3, CT 8502    | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 3%             | 0%                               | 100%               | 40.3%                                        | \$22,957                |
| BG 1, CT 8503    | 89%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 59.7%                                        | \$12,102                |
| BG 2, CT 8503    | 89%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 5%             | 0%                               | 100%               | 68.0%                                        | \$13,125                |
| BG 3, CT 8503    | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 64.7%                                        | \$11,908                |
| BG 4, CT 8503    | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 6%                               | 94%                | 75.4%                                        | \$12,675                |
| BG 1, CT 8504    | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 5%             | 0%                               | 100%               | 60.1%                                        | \$15,821                |
| BG 2, CT 8504    | 87%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 7%             | 0%                               | 100%               | 65.2%                                        | \$14,700                |
| BG 3, CT 8504    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 63.6%                                        | \$10,000                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 4, CT 8504    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 4%             | 0%                               | 100%               | 78.5%                                        | \$14,000                |
| BG 0, CT 9911    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9577    | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 1%             | 0%                               | 100%               | 61.1%                                        | \$13,026                |
| BG 2, CT 9577    | 94%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 72.2%                                        | \$7,264                 |
| BG 3, CT 9577    | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 1%                               | 99%                | 48.5%                                        | \$15,451                |
| BG 1, CT 9578    | 92%                         | 2%                        | 0%                               | 1%    | 0%                                        | 1%                    | 4%             | 1%                               | 99%                | 72.3%                                        | \$14,444                |
| BG 2, CT 9578    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 72.5%                                        | \$8,729                 |
| BG 3, CT 9578    | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 58.1%                                        | \$15,250                |
| BG 1, CT 9579    | 96%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 58.7%                                        | \$14,618                |
| BG 2, CT 9579    | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 1%                               | 99%                | 55.1%                                        | \$9,845                 |
| BG 1, CT 9580    | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 1%                               | 99%                | 76.2%                                        | \$11,941                |
| BG 2, CT 9580    | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 53.7%                                        | \$16,201                |
| BG 1, CT 9581    | 96%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 0%                               | 100%               | 61.3%                                        | \$9,191                 |
| BG 2, CT 9581    | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 3%             | 1%                               | 99%                | 50.8%                                        | \$12,566                |
| BG 1, CT 9582    | 92%                         | 4%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 60.2%                                        | \$13,808                |
| BG 2, CT 9582    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 60.4%                                        | \$11,204                |
| BG 1, CT 9583    | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 1%                               | 99%                | 62.1%                                        | \$7,621                 |
| BG 2, CT 9583    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 0%                               | 100%               | 92.5%                                        | \$6,042                 |
| BG 1, CT 9584    | 95%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 1%                               | 99%                | 62.3%                                        | \$9,706                 |
| BG 2, CT 9584    | 91%                         | 0%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 3%                               | 97%                | 43.1%                                        | \$12,769                |
| BG 1, CT 9597    | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 2%                               | 98%                | 65.0%                                        | \$13,278                |
| BG 2, CT 9597    | 98%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 66.7%                                        | \$15,038                |
| BG 1, CT 9598    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 0%                               | 100%               | 45.7%                                        | \$17,895                |
| BG 2, CT 9598    | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 59.1%                                        | \$12,368                |
| BG 1, CT 9599    | 95%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 2%                               | 98%                | 54.7%                                        | \$16,596                |
| BG 2, CT 9599    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 59.8%                                        | \$21,442                |
| BG 3, CT 9599    | 95%                         | 2%                        | 1%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 53.6%                                        | \$17,985                |
| BG 1, CT 1901.01 | 53%                         | 11%                       | 0%                               | 0%    | 0%                                        | 2%                    | 34%            | 0%                               | 100%               | 70.3%                                        | \$15,379                |
| BG 2, CT 1901.01 | 65%                         | 2%                        | 0%                               | 5%    | 0%                                        | 0%                    | 27%            | 1%                               | 99%                | 68.6%                                        | \$9,578                 |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 1901.01 | 66%                         | 3%                        | 4%                               | 0%    | 0%                                        | 6%                    | 21%            | 0%                               | 100%               | 44.6%                                        | \$20,119                |
| BG 1, CT 1901.02 | 75%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 20%            | 0%                               | 100%               | 39.5%                                        | \$18,629                |
| BG 2, CT 1901.02 | 62%                         | 2%                        | 0%                               | 0%    | 0%                                        | 15%                   | 21%            | 1%                               | 99%                | 32.5%                                        | \$25,903                |
| BG 3, CT 1901.02 | 76%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 20%            | 0%                               | 100%               | 19.3%                                        | \$28,355                |
| BG 4, CT 1901.02 | 72%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 23%            | 1%                               | 99%                | 44.6%                                        | \$23,829                |
| BG 1, CT 1902.01 | 65%                         | 4%                        | 0%                               | 0%    | 0%                                        | 6%                    | 25%            | 0%                               | 100%               | 60.8%                                        | \$14,917                |
| BG 2, CT 1902.01 | 67%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 25%            | 0%                               | 100%               | 63.5%                                        | \$15,640                |
| BG 3, CT 1902.01 | 73%                         | 3%                        | 0%                               | 0%    | 0%                                        | 5%                    | 19%            | 1%                               | 99%                | 45.9%                                        | \$17,727                |
| BG 1, CT 1902.02 | 69%                         | 20%                       | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 0%                               | 100%               | 85.5%                                        | \$5,583                 |
| BG 2, CT 1902.02 | 75%                         | 9%                        | 0%                               | 0%    | 0%                                        | 1%                    | 16%            | 0%                               | 100%               | 43.7%                                        | \$18,250                |
| BG 1, CT 1903.01 | 51%                         | 4%                        | 0%                               | 0%    | 0%                                        | 11%                   | 34%            | 0%                               | 100%               | 38.2%                                        | \$18,626                |
| BG 2, CT 1903.01 | 62%                         | 8%                        | 0%                               | 0%    | 0%                                        | 2%                    | 28%            | 1%                               | 99%                | 59.0%                                        | \$21,224                |
| BG 3, CT 1903.01 | 58%                         | 3%                        | 0%                               | 0%    | 0%                                        | 7%                    | 31%            | 0%                               | 100%               | 56.5%                                        | \$15,833                |
| BG 1, CT 1903.02 | 76%                         | 3%                        | 0%                               | 0%    | 0%                                        | 5%                    | 16%            | 0%                               | 100%               | 53.4%                                        | \$18,167                |
| BG 2, CT 1903.02 | 68%                         | 5%                        | 0%                               | 0%    | 0%                                        | 6%                    | 21%            | 0%                               | 100%               | 49.2%                                        | \$19,141                |
| BG 1, CT 1101.01 | 15%                         | 40%                       | 0%                               | 0%    | 0%                                        | 44%                   | 0%             | 0%                               | 100%               | 47.4%                                        | \$16,060                |
| BG 2, CT 1101.01 | 6%                          | 48%                       | 0%                               | 0%    | 0%                                        | 42%                   | 3%             | 0%                               | 100%               | 73.8%                                        | \$10,337                |
| BG 1, CT 1101.02 | 11%                         | 45%                       | 0%                               | 0%    | 0%                                        | 42%                   | 2%             | 0%                               | 100%               | 57.4%                                        | \$18,611                |
| BG 2, CT 1101.02 | 16%                         | 41%                       | 0%                               | 0%    | 0%                                        | 43%                   | 0%             | 0%                               | 100%               | 44.5%                                        | \$16,281                |
| BG 1, CT 1102    | 12%                         | 32%                       | 0%                               | 0%    | 0%                                        | 55%                   | 0%             | 0%                               | 100%               | 58.1%                                        | \$16,250                |
| BG 2, CT 1102    | 16%                         | 28%                       | 0%                               | 4%    | 0%                                        | 52%                   | 0%             | 0%                               | 100%               | 66.5%                                        | \$12,443                |
| BG 1, CT 1103.01 | 7%                          | 42%                       | 2%                               | 0%    | 0%                                        | 49%                   | 0%             | 0%                               | 100%               | 53.5%                                        | \$12,368                |
| BG 2, CT 1103.01 | 33%                         | 12%                       | 0%                               | 0%    | 0%                                        | 51%                   | 4%             | 0%                               | 100%               | 58.1%                                        | \$21,801                |
| BG 1, CT 1103.02 | 14%                         | 42%                       | 0%                               | 1%    | 0%                                        | 42%                   | 1%             | 0%                               | 100%               | 36.0%                                        | \$19,127                |
| BG 2, CT 1103.02 | 19%                         | 42%                       | 0%                               | 0%    | 0%                                        | 39%                   | 0%             | 0%                               | 100%               | 32.0%                                        | \$19,107                |
| BG 3, CT 1103.02 | 6%                          | 29%                       | 0%                               | 1%    | 0%                                        | 64%                   | 0%             | 0%                               | 100%               | 40.4%                                        | \$20,776                |
| BG 1, CT 1103.03 | 56%                         | 19%                       | 0%                               | 0%    | 0%                                        | 22%                   | 2%             | 0%                               | 100%               | 28.7%                                        | \$25,897                |
| BG 2, CT 1103.03 | 67%                         | 16%                       | 0%                               | 0%    | 0%                                        | 17%                   | 0%             | 0%                               | 100%               | 23.2%                                        | \$34,727                |
| BG 1, CT 1103.04 | 55%                         | 21%                       | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 0%                               | 100%               | 21.0%                                        | \$41,304                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 1103.04 | 57%                         | 33%                       | 0%                               | 0%    | 0%                                        | 9%                    | 1%             | 0%                               | 100%               | 20.5%                                        | \$22,311                |
| BG 3, CT 1103.04 | 46%                         | 25%                       | 0%                               | 1%    | 0%                                        | 26%                   | 2%             | 0%                               | 100%               | 29.0%                                        | \$33,868                |
| BG 1, CT 1104    | 23%                         | 26%                       | 0%                               | 0%    | 0%                                        | 50%                   | 2%             | 0%                               | 100%               | 82.6%                                        | \$9,495                 |
| BG 2, CT 1104    | 17%                         | 71%                       | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 0%                               | 100%               | 47.3%                                        | \$16,250                |
| BG 1, CT 1105    | 11%                         | 61%                       | 0%                               | 0%    | 0%                                        | 24%                   | 4%             | 0%                               | 100%               | 63.1%                                        | \$12,674                |
| BG 2, CT 1105    | 29%                         | 28%                       | 0%                               | 0%    | 0%                                        | 33%                   | 9%             | 0%                               | 100%               | 50.8%                                        | \$22,813                |
| BG 1, CT 1106    | 6%                          | 67%                       | 0%                               | 0%    | 0%                                        | 17%                   | 9%             | 0%                               | 100%               | 49.1%                                        | \$20,536                |
| BG 2, CT 1106    | 17%                         | 59%                       | 0%                               | 0%    | 0%                                        | 24%                   | 0%             | 0%                               | 100%               | 42.9%                                        | \$15,652                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 1401.01 | 62%                         | 17%                       | 0%                               | 2%    | 0%                                        | 16%                   | 4%             | 0%                               | 100%               | 26.6%                                        | \$29,076                |
| BG 2, CT 1401.01 | 48%                         | 8%                        | 0%                               | 1%    | 0%                                        | 39%                   | 4%             | 2%                               | 98%                | 32.2%                                        | \$23,015                |
| BG 1, CT 1401.02 | 67%                         | 1%                        | 0%                               | 1%    | 0%                                        | 30%                   | 1%             | 0%                               | 100%               | 41.0%                                        | \$16,346                |
| BG 2, CT 1401.02 | 64%                         | 6%                        | 0%                               | 1%    | 0%                                        | 28%                   | 1%             | 0%                               | 100%               | 58.1%                                        | \$14,067                |
| BG 3, CT 1401.02 | 50%                         | 7%                        | 0%                               | 1%    | 0%                                        | 41%                   | 1%             | 1%                               | 99%                | 38.2%                                        | \$17,243                |
| BG 1, CT 1402.01 | 58%                         | 17%                       | 0%                               | 0%    | 0%                                        | 23%                   | 2%             | 8%                               | 92%                | 66.9%                                        | \$12,083                |
| BG 2, CT 1402.01 | 55%                         | 11%                       | 0%                               | 1%    | 0%                                        | 32%                   | 0%             | 6%                               | 94%                | 72.5%                                        | \$8,125                 |
| BG 1, CT 1402.02 | 50%                         | 13%                       | 0%                               | 0%    | 0%                                        | 32%                   | 5%             | 4%                               | 96%                | 45.9%                                        | \$19,250                |
| BG 2, CT 1402.02 | 64%                         | 9%                        | 0%                               | 2%    | 0%                                        | 23%                   | 2%             | 0%                               | 100%               | 31.1%                                        | \$29,656                |
| BG 3, CT 1402.02 | 58%                         | 10%                       | 2%                               | 0%    | 0%                                        | 25%                   | 5%             | 1%                               | 99%                | 38.3%                                        | \$25,477                |
| BG 1, CT 1403    | 50%                         | 5%                        | 0%                               | 3%    | 0%                                        | 38%                   | 4%             | 4%                               | 96%                | 58.2%                                        | \$13,431                |
| BG 2, CT 1403    | 42%                         | 21%                       | 0%                               | 0%    | 0%                                        | 30%                   | 7%             | 0%                               | 100%               | 64.6%                                        | \$15,208                |
| BG 3, CT 1403    | 45%                         | 9%                        | 0%                               | 0%    | 0%                                        | 44%                   | 2%             | 4%                               | 96%                | 25.9%                                        | \$31,696                |
| BG 4, CT 1403    | 46%                         | 2%                        | 0%                               | 0%    | 0%                                        | 47%                   | 5%             | 0%                               | 100%               | 43.2%                                        | \$17,321                |
| BG 0, CT 9900.01 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 5701    | 92%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 3%                               | 97%                | 24.4%                                        | \$23,036                |
| BG 2, CT 5701    | 82%                         | 5%                        | 0%                               | 0%    | 0%                                        | 11%                   | 2%             | 0%                               | 100%               | 55.6%                                        | \$18,427                |
| BG 3, CT 5701    | 75%                         | 3%                        | 0%                               | 0%    | 0%                                        | 22%                   | 0%             | 2%                               | 98%                | 56.5%                                        | \$8,594                 |
| BG 4, CT 5701    | 87%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 40.4%                                        | \$18,945                |
| BG 1, CT 5702.01 | 90%                         | 2%                        | 0%                               | 0%    | 0%                                        | 8%                    | 1%             | 1%                               | 99%                | 43.3%                                        | \$17,218                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 5702.01 | 90%                         | 1%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 33.5%                                        | \$27,106                |
| BG 1, CT 5702.02 | 85%                         | 7%                        | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 1%                               | 99%                | 40.1%                                        | \$18,373                |
| BG 2, CT 5702.02 | 78%                         | 5%                        | 0%                               | 0%    | 0%                                        | 17%                   | 0%             | 1%                               | 99%                | 33.4%                                        | \$24,450                |
| BG 1, CT 5703    | 85%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 7%             | 0%                               | 100%               | 77.5%                                        | \$5,833                 |
| BG 2, CT 5703    | 91%                         | 7%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 63.5%                                        | \$15,023                |
| BG 3, CT 5703    | 78%                         | 3%                        | 0%                               | 0%    | 0%                                        | 14%                   | 4%             | 0%                               | 100%               | 61.9%                                        | \$9,420                 |
| BG 4, CT 5703    | 93%                         | 1%                        | 0%                               | 1%    | 0%                                        | 3%                    | 3%             | 0%                               | 100%               | 58.7%                                        | \$10,560                |
| BG 1, CT 5704    | 88%                         | 7%                        | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 1%                               | 99%                | 43.4%                                        | \$15,804                |
| BG 2, CT 5704    | 83%                         | 9%                        | 0%                               | 0%    | 0%                                        | 4%                    | 4%             | 0%                               | 100%               | 65.0%                                        | \$11,761                |
| BG 3, CT 5704    | 77%                         | 3%                        | 0%                               | 0%    | 0%                                        | 20%                   | 0%             | 0%                               | 100%               | 63.1%                                        | \$10,909                |
| BG 1, CT 5705    | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 9%             | 4%                               | 96%                | 31.8%                                        | \$29,539                |
| BG 2, CT 5705    | 82%                         | 5%                        | 0%                               | 0%    | 0%                                        | 10%                   | 2%             | 5%                               | 95%                | 36.0%                                        | \$24,710                |
| BG 3, CT 5705    | 84%                         | 7%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 43.3%                                        | \$22,297                |
| BG 1, CT 5706    | 88%                         | 1%                        | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 2%                               | 98%                | 74.7%                                        | \$8,563                 |
| BG 2, CT 5706    | 91%                         | 3%                        | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 1%                               | 99%                | 39.9%                                        | \$20,955                |
| BG 1, CT 5707    | 95%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 1%                               | 99%                | 59.8%                                        | \$12,277                |
| BG 2, CT 5707    | 91%                         | 0%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 63.9%                                        | \$13,433                |
| BG 3, CT 5707    | 86%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 6%             | 0%                               | 100%               | 47.6%                                        | \$18,720                |
| BG 1, CT 5708    | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 4%             | 1%                               | 99%                | 47.2%                                        | \$19,250                |
| BG 2, CT 5708    | 85%                         | 9%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 2%                               | 98%                | 25.6%                                        | \$25,595                |
| BG 3, CT 5708    | 91%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 2%                               | 98%                | 55.5%                                        | \$18,098                |
| BG 4, CT 5708    | 87%                         | 6%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 2%                               | 98%                | 34.2%                                        | \$22,313                |
| BG 0, CT 9900.25 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9601    | 88%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 6%             | 1%                               | 99%                | 80.1%                                        | \$10,183                |
| BG 2, CT 9601    | 97%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 63.2%                                        | \$9,657                 |
| BG 3, CT 9601    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 36.5%                                        | \$19,714                |
| BG 1, CT 9602    | 96%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 57.2%                                        | \$15,893                |
| BG 2, CT 9602    | 93%                         | 4%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 41.7%                                        | \$18,917                |
| BG 1, CT 9514    | 71%                         | 14%                       | 0%                               | 0%    | 0%                                        | 4%                    | 11%            | 0%                               | 100%               | 65.2%                                        | \$18,056                |



| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 9514 | 35%                         | 12%                       | 0%                               | 0%    | 0%                                        | 8%                    | 45%            | 0%                               | 100%               | 52.2%                                        | \$13,145                |
| BG 3, CT 9514 | 25%                         | 22%                       | 0%                               | 0%    | 0%                                        | 4%                    | 49%            | 0%                               | 100%               | 46.3%                                        | \$22,773                |
| BG 4, CT 9514 | 43%                         | 17%                       | 0%                               | 0%    | 0%                                        | 0%                    | 40%            | 0%                               | 100%               | 31.0%                                        | \$24,300                |
| BG 5, CT 9514 | 45%                         | 25%                       | 2%                               | 0%    | 0%                                        | 5%                    | 24%            | 0%                               | 100%               | 46.1%                                        | \$28,553                |
| BG 6, CT 9514 | 55%                         | 22%                       | 0%                               | 0%    | 0%                                        | 7%                    | 16%            | 0%                               | 100%               | 70.8%                                        | \$18,043                |
| BG 1, CT 9515 | 26%                         | 40%                       | 0%                               | 0%    | 0%                                        | 5%                    | 29%            | 0%                               | 100%               | 74.7%                                        | \$14,327                |
| BG 2, CT 9515 | 38%                         | 30%                       | 0%                               | 0%    | 0%                                        | 9%                    | 23%            | 0%                               | 100%               | 64.0%                                        | \$14,435                |
| BG 1, CT 9516 | 60%                         | 20%                       | 1%                               | 0%    | 0%                                        | 6%                    | 12%            | 2%                               | 98%                | 42.3%                                        | \$20,481                |
| BG 2, CT 9516 | 50%                         | 27%                       | 0%                               | 0%    | 0%                                        | 9%                    | 15%            | 0%                               | 100%               | 44.9%                                        | \$15,750                |
| BG 0, CT 9900 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 801  | 34%                         | 3%                        | 0%                               | 0%    | 0%                                        | 26%                   | 37%            | 0%                               | 100%               | 68.3%                                        | \$9,625                 |
| BG 2, CT 801  | 26%                         | 12%                       | 0%                               | 0%    | 0%                                        | 57%                   | 5%             | 0%                               | 100%               | 91.3%                                        | \$4,083                 |
| BG 1, CT 802  | 36%                         | 4%                        | 0%                               | 0%    | 0%                                        | 29%                   | 31%            | 2%                               | 98%                | 74.2%                                        | ND                      |
| BG 2, CT 802  | 30%                         | 2%                        | 0%                               | 0%    | 0%                                        | 36%                   | 31%            | 0%                               | 100%               | 74.1%                                        | \$5,086                 |
| BG 1, CT 803  | 24%                         | 5%                        | 0%                               | 0%    | 0%                                        | 40%                   | 30%            | 0%                               | 100%               | 96.9%                                        | \$2,917                 |
| BG 2, CT 803  | 50%                         | 2%                        | 0%                               | 0%    | 0%                                        | 30%                   | 18%            | 0%                               | 100%               | 29.6%                                        | \$18,466                |
| BG 3, CT 803  | 43%                         | 10%                       | 0%                               | 0%    | 0%                                        | 25%                   | 22%            | 0%                               | 100%               | 58.7%                                        | \$11,964                |
| BG 1, CT 804  | 30%                         | 5%                        | 0%                               | 0%    | 0%                                        | 22%                   | 43%            | 0%                               | 100%               | 64.4%                                        | \$8,259                 |
| BG 1, CT 805  | 33%                         | 6%                        | 0%                               | 0%    | 0%                                        | 52%                   | 9%             | 2%                               | 98%                | 75.4%                                        | \$12,675                |
| BG 2, CT 805  | 38%                         | 12%                       | 0%                               | 0%    | 0%                                        | 24%                   | 26%            | 0%                               | 100%               | 38.4%                                        | \$23,750                |
| BG 1, CT 806  | 32%                         | 0%                        | 0%                               | 0%    | 0%                                        | 60%                   | 8%             | 0%                               | 100%               | 58.9%                                        | \$11,216                |
| BG 2, CT 806  | 18%                         | 1%                        | 0%                               | 0%    | 0%                                        | 58%                   | 23%            | 2%                               | 98%                | 88.6%                                        | ND                      |
| BG 1, CT 808  | 66%                         | 2%                        | 0%                               | 0%    | 0%                                        | 10%                   | 21%            | 1%                               | 99%                | 48.1%                                        | \$13,903                |
| BG 2, CT 808  | 69%                         | 9%                        | 0%                               | 0%    | 0%                                        | 14%                   | 7%             | 3%                               | 97%                | 21.3%                                        | \$42,813                |
| BG 3, CT 808  | 27%                         | 15%                       | 0%                               | 0%    | 0%                                        | 14%                   | 44%            | 0%                               | 100%               | 51.1%                                        | \$15,000                |
| BG 1, CT 809  | 41%                         | 13%                       | 0%                               | 0%    | 0%                                        | 35%                   | 11%            | 1%                               | 99%                | 65.3%                                        | \$12,009                |
| BG 2, CT 809  | 36%                         | 0%                        | 0%                               | 0%    | 0%                                        | 36%                   | 28%            | 0%                               | 100%               | 68.2%                                        | \$11,923                |
| BG 1, CT 810  | 43%                         | 0%                        | 0%                               | 0%    | 0%                                        | 38%                   | 19%            | 0%                               | 100%               | 67.2%                                        | \$9,212                 |
| BG 2, CT 810  | 26%                         | 3%                        | 0%                               | 0%    | 0%                                        | 32%                   | 38%            | 0%                               | 100%               | 76.0%                                        | \$10,318                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 811    | 61%                         | 2%                        | 0%                               | 0%    | 0%                                        | 13%                   | 23%            | 0%                               | 100%               | 49.1%                                        | \$7,109                 |
| BG 2, CT 811    | 36%                         | 8%                        | 0%                               | 0%    | 0%                                        | 31%                   | 25%            | 0%                               | 100%               | 64.7%                                        | \$13,468                |
| BG 1, CT 812    | 28%                         | 0%                        | 0%                               | 0%    | 0%                                        | 50%                   | 22%            | 0%                               | 100%               | 75.0%                                        | \$9,946                 |
| BG 2, CT 812    | 24%                         | 10%                       | 0%                               | 0%    | 0%                                        | 42%                   | 25%            | 0%                               | 100%               | 84.2%                                        | \$2,743                 |
| BG 3, CT 812    | 21%                         | 3%                        | 0%                               | 0%    | 0%                                        | 35%                   | 41%            | 0%                               | 100%               | 95.6%                                        | ND                      |
| BG 4, CT 812    | 25%                         | 4%                        | 0%                               | 0%    | 0%                                        | 63%                   | 7%             | 0%                               | 100%               | 100.0%                                       | \$2,831                 |
| BG 5, CT 812    | 36%                         | 1%                        | 0%                               | 0%    | 0%                                        | 50%                   | 13%            | 1%                               | 99%                | 100.0%                                       | \$3,218                 |
| BG 1, CT 813    | 59%                         | 1%                        | 0%                               | 0%    | 0%                                        | 22%                   | 18%            | 0%                               | 100%               | 54.7%                                        | \$14,063                |
| BG 2, CT 813    | 64%                         | 2%                        | 0%                               | 0%    | 0%                                        | 9%                    | 24%            | 2%                               | 98%                | 26.4%                                        | \$24,875                |
| BG 1, CT 815.01 | 38%                         | 2%                        | 0%                               | 0%    | 0%                                        | 33%                   | 27%            | 0%                               | 100%               | 44.3%                                        | \$18,750                |
| BG 2, CT 815.01 | 47%                         | 0%                        | 0%                               | 1%    | 0%                                        | 29%                   | 22%            | 3%                               | 97%                | 20.8%                                        | \$19,509                |
| BG 3, CT 815.01 | 17%                         | 1%                        | 0%                               | 0%    | 0%                                        | 62%                   | 21%            | 0%                               | 100%               | 80.8%                                        | \$4,368                 |
| BG 1, CT 815.12 | 79%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 6%                               | 94%                | 51.5%                                        | \$9,592                 |
| BG 2, CT 815.12 | 96%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 5%                               | 95%                | 84.6%                                        | \$15,257                |
| BG 3, CT 815.12 | 69%                         | 15%                       | 0%                               | 0%    | 0%                                        | 16%                   | 0%             | 1%                               | 99%                | 56.1%                                        | \$13,333                |
| BG 4, CT 815.12 | 79%                         | 5%                        | 0%                               | 0%    | 0%                                        | 9%                    | 6%             | 3%                               | 97%                | 52.9%                                        | \$11,884                |
| BG 1, CT 815.22 | 32%                         | 2%                        | 0%                               | 0%    | 0%                                        | 28%                   | 38%            | 2%                               | 98%                | 19.7%                                        | \$40,703                |
| BG 2, CT 815.22 | 34%                         | 3%                        | 0%                               | 2%    | 0%                                        | 43%                   | 18%            | 2%                               | 98%                | 24.3%                                        | \$46,328                |
| BG 1, CT 816.01 | 13%                         | 0%                        | 0%                               | 0%    | 0%                                        | 33%                   | 54%            | 0%                               | 100%               | 49.2%                                        | \$16,938                |
| BG 2, CT 816.01 | 57%                         | 0%                        | 0%                               | 1%    | 0%                                        | 2%                    | 40%            | 6%                               | 94%                | 7.7%                                         | \$49,261                |
| BG 3, CT 816.01 | 45%                         | 1%                        | 0%                               | 0%    | 0%                                        | 28%                   | 26%            | 1%                               | 99%                | 27.7%                                        | \$28,964                |
| BG 1, CT 816.02 | 18%                         | 4%                        | 0%                               | 0%    | 0%                                        | 32%                   | 46%            | 1%                               | 99%                | 45.7%                                        | \$18,067                |
| BG 2, CT 816.02 | 28%                         | 2%                        | 0%                               | 0%    | 0%                                        | 31%                   | 39%            | 2%                               | 98%                | 42.1%                                        | \$19,958                |
| BG 3, CT 816.02 | 44%                         | 0%                        | 0%                               | 0%    | 0%                                        | 36%                   | 20%            | 3%                               | 97%                | 27.2%                                        | \$23,750                |
| BG 1, CT 817    | 40%                         | 1%                        | 0%                               | 0%    | 0%                                        | 28%                   | 32%            | 0%                               | 100%               | 51.3%                                        | \$15,201                |
| BG 2, CT 817    | 25%                         | 0%                        | 0%                               | 0%    | 0%                                        | 28%                   | 47%            | 0%                               | 100%               | 45.1%                                        | \$14,031                |
| BG 3, CT 817    | 28%                         | 14%                       | 0%                               | 0%    | 0%                                        | 28%                   | 30%            | 2%                               | 98%                | 52.4%                                        | \$12,319                |
| BG 1, CT 818    | 68%                         | 1%                        | 0%                               | 1%    | 0%                                        | 25%                   | 6%             | 3%                               | 97%                | 4.3%                                         | \$32,639                |
| BG 2, CT 818    | 93%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 3%                               | 97%                | 35.1%                                        | \$16,689                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 818    | 74%                         | 3%                        | 0%                               | 0%    | 0%                                        | 21%                   | 3%             | 2%                               | 98%                | 47.0%                                        | \$15,972                |
| BG 1, CT 819    | 85%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 7%             | 1%                               | 99%                | 39.1%                                        | \$15,028                |
| BG 2, CT 819    | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 1%                               | 99%                | 28.1%                                        | \$21,900                |
| BG 3, CT 819    | 74%                         | 4%                        | 0%                               | 0%    | 0%                                        | 9%                    | 14%            | 2%                               | 98%                | 52.7%                                        | \$15,327                |
| BG 4, CT 819    | 92%                         | 2%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 2%                               | 98%                | 45.7%                                        | \$16,359                |
| BG 1, CT 820.01 | 74%                         | 6%                        | 0%                               | 0%    | 0%                                        | 6%                    | 14%            | 1%                               | 99%                | 42.9%                                        | \$21,765                |
| BG 2, CT 820.01 | 86%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 7%             | 0%                               | 100%               | 67.9%                                        | \$14,792                |
| BG 3, CT 820.01 | 85%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 6%             | 0%                               | 100%               | 49.1%                                        | \$22,182                |
| BG 4, CT 820.01 | 89%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 37.7%                                        | \$23,167                |
| BG 1, CT 820.12 | 93%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 1%                               | 99%                | 46.4%                                        | \$18,971                |
| BG 2, CT 820.12 | 79%                         | 6%                        | 0%                               | 0%    | 0%                                        | 4%                    | 12%            | 0%                               | 100%               | 31.7%                                        | \$25,307                |
| BG 3, CT 820.12 | 82%                         | 1%                        | 0%                               | 0%    | 0%                                        | 12%                   | 5%             | 0%                               | 100%               | 20.8%                                        | \$24,375                |
| BG 1, CT 820.22 | 95%                         | 2%                        | 0%                               | 1%    | 0%                                        | 1%                    | 0%             | 4%                               | 96%                | 30.8%                                        | \$25,048                |
| BG 2, CT 820.22 | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 0%                               | 100%               | 46.1%                                        | \$18,846                |
| BG 1, CT 821.02 | 64%                         | 11%                       | 0%                               | 0%    | 0%                                        | 16%                   | 8%             | 4%                               | 96%                | 77.9%                                        | \$6,539                 |
| BG 2, CT 821.02 | 79%                         | 2%                        | 0%                               | 0%    | 0%                                        | 19%                   | 1%             | 2%                               | 98%                | 33.4%                                        | \$35,417                |
| BG 3, CT 821.02 | 81%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 12%            | 1%                               | 99%                | 25.6%                                        | \$19,890                |
| BG 1, CT 821.03 | 87%                         | 5%                        | 0%                               | 0%    | 0%                                        | 4%                    | 4%             | 2%                               | 98%                | 75.7%                                        | \$9,429                 |
| BG 2, CT 821.03 | 79%                         | 7%                        | 1%                               | 0%    | 0%                                        | 10%                   | 4%             | 1%                               | 99%                | 28.5%                                        | \$23,807                |
| BG 1, CT 821.04 | 90%                         | 2%                        | 3%                               | 0%    | 0%                                        | 4%                    | 2%             | 2%                               | 98%                | 58.3%                                        | \$13,679                |
| BG 2, CT 821.04 | 86%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 6%             | 1%                               | 99%                | 57.7%                                        | \$17,361                |
| BG 0, CT 9900   | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 4201   | 59%                         | 8%                        | 0%                               | 0%    | 0%                                        | 14%                   | 19%            | 2%                               | 98%                | 59.2%                                        | \$13,028                |
| BG 2, CT 4201   | 93%                         | 2%                        | 0%                               | 0%    | 1%                                        | 3%                    | 1%             | 1%                               | 99%                | 45.4%                                        | \$16,823                |
| BG 3, CT 4201   | 82%                         | 5%                        | 0%                               | 0%    | 0%                                        | 6%                    | 7%             | 3%                               | 97%                | 52.9%                                        | \$13,250                |
| BG 1, CT 4202   | 88%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 9%             | 3%                               | 97%                | 52.3%                                        | \$22,500                |
| BG 2, CT 4202   | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 64.2%                                        | \$13,036                |
| BG 3, CT 4202   | 89%                         | 1%                        | 0%                               | 0%    | 0%                                        | 9%                    | 2%             | 0%                               | 100%               | 38.6%                                        | \$16,852                |
| BG 4, CT 4202   | 88%                         | 0%                        | 0%                               | 0%    | 0%                                        | 9%                    | 3%             | 0%                               | 100%               | 62.9%                                        | \$11,786                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 4203.01 | 78%                         | 4%                        | 0%                               | 0%    | 0%                                        | 16%                   | 2%             | 0%                               | 100%               | 62.4%                                        | \$17,500                |
| BG 2, CT 4203.01 | 87%                         | 1%                        | 0%                               | 0%    | 0%                                        | 8%                    | 4%             | 1%                               | 99%                | 59.9%                                        | \$10,960                |
| BG 1, CT 4203.02 | 90%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 2%             | 2%                               | 98%                | 54.3%                                        | \$13,721                |
| BG 2, CT 4203.02 | 70%                         | 0%                        | 0%                               | 0%    | 0%                                        | 20%                   | 9%             | 0%                               | 100%               | 49.4%                                        | \$21,361                |
| BG 3, CT 4203.02 | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 1%                               | 99%                | 52.3%                                        | \$17,745                |
| BG 1, CT 4204.01 | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 7%             | 0%                               | 100%               | 54.9%                                        | \$13,839                |
| BG 2, CT 4204.01 | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 65.3%                                        | \$12,120                |
| BG 1, CT 4204.02 | 85%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 7%             | 1%                               | 99%                | 54.0%                                        | \$12,819                |
| BG 2, CT 4204.02 | 72%                         | 4%                        | 0%                               | 0%    | 0%                                        | 18%                   | 7%             | 0%                               | 100%               | 56.7%                                        | \$13,553                |
| BG 1, CT 4205    | 83%                         | 0%                        | 0%                               | 0%    | 0%                                        | 11%                   | 6%             | 0%                               | 100%               | 29.4%                                        | \$18,089                |
| BG 2, CT 4205    | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 6%             | 1%                               | 99%                | 41.1%                                        | \$11,518                |
| BG 3, CT 4205    | 81%                         | 1%                        | 0%                               | 0%    | 0%                                        | 9%                    | 10%            | 0%                               | 100%               | 48.7%                                        | \$15,441                |
| BG 1, CT 9552.01 | 80%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 19%            | 0%                               | 100%               | 61.9%                                        | \$13,409                |
| BG 2, CT 9552.01 | 91%                         | 7%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 66.2%                                        | \$10,988                |
| BG 1, CT 9552.02 | 82%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 13%            | 0%                               | 100%               | 41.2%                                        | \$22,795                |
| BG 2, CT 9552.02 | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 0%                               | 100%               | 52.0%                                        | \$20,101                |
| BG 3, CT 9552.02 | 86%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 0%                               | 100%               | 60.3%                                        | \$9,579                 |
| BG 1, CT 9553    | 82%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 16%            | 0%                               | 100%               | 54.1%                                        | \$16,020                |
| BG 2, CT 9553    | 77%                         | 10%                       | 0%                               | 0%    | 0%                                        | 4%                    | 9%             | 0%                               | 100%               | 57.7%                                        | \$13,399                |
| BG 3, CT 9553    | 80%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 14%            | 1%                               | 99%                | 70.2%                                        | \$11,744                |
| BG 1, CT 9554.01 | 84%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 16%            | 0%                               | 100%               | 45.2%                                        | \$24,737                |
| BG 2, CT 9554.01 | 87%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 0%                               | 100%               | 62.6%                                        | \$13,913                |
| BG 3, CT 9554.01 | 76%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 20%            | 0%                               | 100%               | 41.5%                                        | \$15,625                |
| BG 1, CT 9554.02 | 82%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 14%            | 0%                               | 100%               | 51.9%                                        | \$12,929                |
| BG 2, CT 9554.02 | 85%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 0%                               | 100%               | 56.9%                                        | \$16,823                |
| BG 1, CT 9555    | 89%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 9%             | 0%                               | 100%               | 67.8%                                        | \$10,313                |
| BG 2, CT 9555    | 72%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 23%            | 0%                               | 100%               | 62.9%                                        | \$13,958                |
| BG 1, CT 1701    | 71%                         | 0%                        | 0%                               | 1%    | 0%                                        | 26%                   | 2%             | 1%                               | 99%                | 58.3%                                        | \$12,731                |
| BG 2, CT 1701    | 73%                         | 12%                       | 0%                               | 10%   | 0%                                        | 5%                    | 0%             | 2%                               | 98%                | 46.5%                                        | \$13,913                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 1701    | 50%                         | 0%                        | 0%                               | 0%    | 0%                                        | 50%                   | 0%             | 2%                               | 98%                | 47.0%                                        | \$17,140                |
| BG 4, CT 1701    | 74%                         | 6%                        | 0%                               | 0%    | 0%                                        | 16%                   | 4%             | 2%                               | 98%                | 55.5%                                        | \$18,827                |
| BG 1, CT 1702    | 81%                         | 1%                        | 0%                               | 0%    | 0%                                        | 18%                   | 0%             | 0%                               | 100%               | 66.3%                                        | \$18,780                |
| BG 2, CT 1702    | 84%                         | 1%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 3%                               | 97%                | 55.8%                                        | \$16,548                |
| BG 3, CT 1702    | 87%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 2%             | 2%                               | 98%                | 53.6%                                        | \$12,195                |
| BG 4, CT 1702    | 60%                         | 1%                        | 0%                               | 0%    | 0%                                        | 37%                   | 2%             | 0%                               | 100%               | 38.3%                                        | \$18,715                |
| BG 1, CT 1703    | 71%                         | 9%                        | 0%                               | 0%    | 0%                                        | 13%                   | 6%             | 0%                               | 100%               | 58.6%                                        | \$16,833                |
| BG 2, CT 1703    | 59%                         | 5%                        | 0%                               | 4%    | 0%                                        | 31%                   | 1%             | 0%                               | 100%               | 50.6%                                        | \$13,846                |
| BG 3, CT 1703    | 60%                         | 3%                        | 0%                               | 0%    | 0%                                        | 31%                   | 5%             | 0%                               | 100%               | 73.3%                                        | \$10,139                |
| BG 4, CT 1703    | 59%                         | 1%                        | 0%                               | 0%    | 0%                                        | 39%                   | 2%             | 0%                               | 100%               | 34.7%                                        | \$27,991                |
| BG 1, CT 1704    | 76%                         | 6%                        | 0%                               | 3%    | 0%                                        | 14%                   | 1%             | 0%                               | 100%               | 70.3%                                        | \$4,189                 |
| BG 2, CT 1704    | 47%                         | 8%                        | 0%                               | 4%    | 0%                                        | 39%                   | 2%             | 0%                               | 100%               | 75.7%                                        | \$10,743                |
| BG 3, CT 1704    | 74%                         | 4%                        | 0%                               | 0%    | 0%                                        | 18%                   | 4%             | 1%                               | 99%                | 36.3%                                        | \$26,297                |
| BG 0, CT 9900.13 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 5201    | 34%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 62%            | 0%                               | 100%               | 22.6%                                        | \$26,771                |
| BG 2, CT 5201    | 52%                         | 9%                        | 0%                               | 0%    | 0%                                        | 7%                    | 32%            | 0%                               | 100%               | 31.8%                                        | \$22,188                |
| BG 3, CT 5201    | 44%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 51%            | 0%                               | 100%               | 57.5%                                        | \$17,564                |
| BG 1, CT 5202    | 44%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 50%            | 0%                               | 100%               | 52.5%                                        | \$15,369                |
| BG 2, CT 5202    | 42%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 55%            | 0%                               | 100%               | 60.0%                                        | \$15,151                |
| BG 3, CT 5202    | 43%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 54%            | 2%                               | 98%                | 72.7%                                        | \$12,688                |
| BG 1, CT 5203    | 33%                         | 7%                        | 0%                               | 0%    | 0%                                        | 2%                    | 58%            | 0%                               | 100%               | 66.1%                                        | \$12,721                |
| BG 2, CT 5203    | 22%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 70%            | 1%                               | 99%                | 70.1%                                        | \$6,310                 |
| BG 1, CT 5204    | 32%                         | 4%                        | 0%                               | 0%    | 0%                                        | 3%                    | 61%            | 0%                               | 100%               | 59.6%                                        | \$17,104                |
| BG 2, CT 5204    | 33%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 63%            | 0%                               | 100%               | 57.2%                                        | \$15,316                |
| BG 3, CT 5204    | 35%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 65%            | 1%                               | 99%                | 54.4%                                        | \$15,456                |
| BG 1, CT 5205    | 61%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 38%            | 0%                               | 100%               | 33.8%                                        | \$19,464                |
| BG 2, CT 5205    | 36%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 59%            | 2%                               | 98%                | 38.9%                                        | \$26,283                |
| BG 3, CT 5205    | 32%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 59%            | 0%                               | 100%               | 50.8%                                        | \$16,250                |
| BG 4, CT 5205    | 40%                         | 11%                       | 0%                               | 0%    | 0%                                        | 9%                    | 40%            | 0%                               | 100%               | 51.6%                                        | \$23,160                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 9548.01 | 75%                         | 3%                        | 0%                               | 0%    | 0%                                        | 8%                    | 15%            | 0%                               | 100%               | 60.9%                                        | \$13,722                |
| BG 2, CT 9548.01 | 84%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 10%            | 0%                               | 100%               | 52.3%                                        | \$17,298                |
| BG 3, CT 9548.01 | 82%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 11%            | 2%                               | 98%                | 57.2%                                        | \$14,038                |
| BG 1, CT 9548.02 | 69%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 31%            | 0%                               | 100%               | 61.4%                                        | \$15,043                |
| BG 2, CT 9548.02 | 79%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 16%            | 0%                               | 100%               | 61.0%                                        | \$15,393                |
| BG 1, CT 9549.01 | 85%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 12%            | 0%                               | 100%               | 68.0%                                        | \$12,337                |
| BG 2, CT 9549.01 | 85%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 15%            | 0%                               | 100%               | 76.6%                                        | \$12,451                |
| BG 3, CT 9549.01 | 69%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 27%            | 0%                               | 100%               | 71.8%                                        | \$7,366                 |
| BG 1, CT 9549.02 | 74%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 21%            | 0%                               | 100%               | 58.5%                                        | \$15,476                |
| BG 2, CT 9549.02 | 79%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 0%                               | 100%               | 74.9%                                        | \$15,125                |
| BG 1, CT 9550.01 | 73%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 26%            | 0%                               | 100%               | 58.6%                                        | \$11,458                |
| BG 2, CT 9550.01 | 86%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 2%                               | 98%                | 51.9%                                        | \$10,000                |
| BG 3, CT 9550.01 | 88%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 6%             | 0%                               | 100%               | 58.2%                                        | \$16,311                |
| BG 4, CT 9550.01 | 73%                         | 5%                        | 0%                               | 0%    | 0%                                        | 7%                    | 16%            | 0%                               | 100%               | 60.3%                                        | \$17,083                |
| BG 1, CT 9550.02 | 81%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 14%            | 2%                               | 98%                | 67.6%                                        | \$20,040                |
| BG 2, CT 9550.02 | 64%                         | 7%                        | 0%                               | 0%    | 0%                                        | 8%                    | 21%            | 0%                               | 100%               | 56.9%                                        | \$15,227                |
| BG 1, CT 9551    | 65%                         | 8%                        | 0%                               | 0%    | 0%                                        | 8%                    | 19%            | 0%                               | 100%               | 57.6%                                        | \$14,724                |
| BG 2, CT 9551    | 79%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 12%            | 1%                               | 99%                | 45.2%                                        | \$14,405                |
| BG 1, CT 2901    | 63%                         | 9%                        | 0%                               | 0%    | 0%                                        | 18%                   | 11%            | 0%                               | 100%               | 59.8%                                        | \$10,707                |
| BG 2, CT 2901    | 71%                         | 14%                       | 0%                               | 0%    | 0%                                        | 2%                    | 13%            | 0%                               | 100%               | 57.9%                                        | \$14,688                |
| BG 3, CT 2901    | 41%                         | 30%                       | 0%                               | 0%    | 0%                                        | 9%                    | 19%            | 0%                               | 100%               | 54.6%                                        | \$18,816                |
| BG 1, CT 2902    | 76%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 15%            | 0%                               | 100%               | 75.0%                                        | \$9,856                 |
| BG 2, CT 2902    | 66%                         | 8%                        | 0%                               | 0%    | 0%                                        | 15%                   | 12%            | 0%                               | 100%               | 61.4%                                        | \$12,108                |
| BG 3, CT 2902    | 55%                         | 14%                       | 0%                               | 0%    | 0%                                        | 23%                   | 7%             | 0%                               | 100%               | 46.4%                                        | \$17,315                |
| BG 4, CT 2902    | 55%                         | 19%                       | 5%                               | 0%    | 0%                                        | 10%                   | 12%            | 0%                               | 100%               | 60.6%                                        | \$12,737                |
| BG 1, CT 2903    | 60%                         | 9%                        | 2%                               | 0%    | 0%                                        | 9%                    | 20%            | 0%                               | 100%               | 53.3%                                        | \$15,500                |
| BG 2, CT 2903    | 54%                         | 18%                       | 1%                               | 0%    | 0%                                        | 12%                   | 15%            | 0%                               | 100%               | 57.4%                                        | \$15,195                |
| BG 3, CT 2903    | 75%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 25%            | 0%                               | 100%               | 68.2%                                        | \$11,442                |
| BG 1, CT 2904    | 54%                         | 19%                       | 0%                               | 0%    | 0%                                        | 3%                    | 23%            | 2%                               | 98%                | 34.9%                                        | \$14,565                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 2904   | 53%                         | 8%                        | 1%                               | 0%    | 0%                                        | 9%                    | 28%            | 1%                               | 99%                | 46.8%                                        | \$16,804                |
| BG 3, CT 2904   | 52%                         | 4%                        | 0%                               | 0%    | 0%                                        | 17%                   | 28%            | 0%                               | 100%               | 60.1%                                        | \$12,100                |
| BG 0, CT 9900   | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 7301   | 91%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 0%                               | 100%               | 51.6%                                        | \$14,298                |
| BG 2, CT 7301   | 88%                         | 0%                        | 0%                               | 0%    | 0%                                        | 9%                    | 2%             | 1%                               | 99%                | 64.6%                                        | \$12,258                |
| BG 3, CT 7301   | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 1%             | 4%                               | 96%                | 66.2%                                        | \$14,335                |
| BG 4, CT 7301   | 90%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 10%            | 0%                               | 100%               | 61.2%                                        | \$13,625                |
| BG 1, CT 7302   | 92%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 1%             | 1%                               | 99%                | 50.0%                                        | \$23,390                |
| BG 1, CT 7303   | 84%                         | 2%                        | 0%                               | 0%    | 0%                                        | 10%                   | 4%             | 3%                               | 97%                | 73.2%                                        | \$14,489                |
| BG 2, CT 7303   | 88%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 0%                               | 100%               | 69.8%                                        | \$11,710                |
| BG 3, CT 7303   | 93%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 59.6%                                        | \$13,036                |
| BG 4, CT 7303   | 90%                         | 5%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 1%                               | 99%                | 60.9%                                        | \$19,125                |
| BG 1, CT 7304   | 83%                         | 5%                        | 3%                               | 0%    | 0%                                        | 9%                    | 1%             | 3%                               | 97%                | 60.2%                                        | \$9,437                 |
| BG 1, CT 7307   | 93%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 52.9%                                        | \$16,602                |
| BG 2, CT 7307   | 83%                         | 8%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 66.7%                                        | \$16,127                |
| BG 3, CT 7307   | 82%                         | 7%                        | 0%                               | 0%    | 0%                                        | 10%                   | 1%             | 1%                               | 99%                | 60.9%                                        | \$12,500                |
| BG 1, CT 7308   | 91%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 0%                               | 100%               | 49.8%                                        | \$14,911                |
| BG 0, CT 9900   | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 701    | 88%                         | 4%                        | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 1%                               | 99%                | 20.0%                                        | \$33,036                |
| BG 2, CT 701    | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 9%                    | 2%             | 0%                               | 100%               | 67.7%                                        | \$7,375                 |
| BG 3, CT 701    | 81%                         | 1%                        | 1%                               | 0%    | 0%                                        | 12%                   | 5%             | 0%                               | 100%               | 60.0%                                        | \$13,990                |
| BG 4, CT 701    | 92%                         | 2%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 3%                               | 97%                | 20.2%                                        | \$38,307                |
| BG 1, CT 702.01 | 54%                         | 4%                        | 0%                               | 0%    | 0%                                        | 13%                   | 29%            | 2%                               | 98%                | 51.5%                                        | \$18,357                |
| BG 2, CT 702.01 | 81%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 14%            | 0%                               | 100%               | 66.7%                                        | \$18,950                |
| BG 1, CT 702.02 | 65%                         | 15%                       | 0%                               | 0%    | 0%                                        | 1%                    | 19%            | 1%                               | 99%                | 75.6%                                        | \$10,439                |
| BG 2, CT 702.02 | 66%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 34%            | 8%                               | 92%                | 25.5%                                        | \$43,889                |
| BG 3, CT 702.02 | 69%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 29%            | 0%                               | 100%               | 78.3%                                        | \$16,548                |
| BG 1, CT 703    | 61%                         | 10%                       | 0%                               | 0%    | 0%                                        | 9%                    | 20%            | 0%                               | 100%               | 60.2%                                        | \$9,500                 |
| BG 2, CT 703    | 60%                         | 6%                        | 1%                               | 0%    | 0%                                        | 13%                   | 20%            | 0%                               | 100%               | 63.0%                                        | \$10,845                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 703    | 69%                         | 13%                       | 0%                               | 1%    | 0%                                        | 0%                    | 17%            | 0%                               | 100%               | 50.8%                                        | \$13,523                |
| BG 1, CT 704    | 67%                         | 8%                        | 0%                               | 1%    | 0%                                        | 5%                    | 18%            | 0%                               | 100%               | 86.6%                                        | \$2,813                 |
| BG 2, CT 704    | 62%                         | 12%                       | 0%                               | 0%    | 0%                                        | 10%                   | 16%            | 1%                               | 99%                | 93.3%                                        | ND                      |
| BG 1, CT 705.02 | 71%                         | 3%                        | 0%                               | 0%    | 0%                                        | 7%                    | 19%            | 0%                               | 100%               | 59.3%                                        | \$15,625                |
| BG 2, CT 705.02 | 78%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 14%            | 0%                               | 100%               | 34.9%                                        | \$14,688                |
| BG 3, CT 705.02 | 82%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 11%            | 1%                               | 99%                | 23.7%                                        | \$18,868                |
| BG 1, CT 705.03 | 92%                         | 0%                        | 0%                               | 3%    | 0%                                        | 0%                    | 5%             | 4%                               | 96%                | 22.0%                                        | \$51,765                |
| BG 2, CT 705.03 | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 17%            | 0%                               | 100%               | 48.3%                                        | \$22,583                |
| BG 3, CT 705.03 | 89%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 9%             | 2%                               | 98%                | 14.7%                                        | \$39,242                |
| BG 1, CT 705.13 | 65%                         | 7%                        | 0%                               | 0%    | 0%                                        | 4%                    | 24%            | 0%                               | 100%               | 71.9%                                        | \$5,363                 |
| BG 2, CT 705.13 | 65%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 26%            | 0%                               | 100%               | 55.5%                                        | \$15,595                |
| BG 1, CT 705.14 | 67%                         | 10%                       | 0%                               | 0%    | 0%                                        | 3%                    | 21%            | 0%                               | 100%               | 28.3%                                        | \$30,133                |
| BG 2, CT 705.14 | 49%                         | 11%                       | 0%                               | 0%    | 0%                                        | 3%                    | 37%            | 2%                               | 98%                | 65.2%                                        | \$11,528                |
| BG 1, CT 705.22 | 62%                         | 8%                        | 0%                               | 0%    | 0%                                        | 8%                    | 22%            | 1%                               | 99%                | 80.6%                                        | \$5,313                 |
| BG 2, CT 705.22 | 86%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 9%             | 1%                               | 99%                | 11.2%                                        | \$35,833                |
| BG 3, CT 705.22 | 76%                         | 6%                        | 0%                               | 0%    | 0%                                        | 6%                    | 11%            | 0%                               | 100%               | 38.7%                                        | \$17,940                |
| BG 1, CT 708    | 32%                         | 20%                       | 0%                               | 0%    | 0%                                        | 8%                    | 40%            | 3%                               | 97%                | 90.9%                                        | \$4,702                 |
| BG 2, CT 708    | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 18%            | 0%                               | 100%               | 73.6%                                        | \$9,160                 |
| BG 1, CT 709    | 66%                         | 10%                       | 0%                               | 1%    | 0%                                        | 8%                    | 15%            | 0%                               | 100%               | 75.4%                                        | \$9,819                 |
| BG 2, CT 709    | 64%                         | 13%                       | 0%                               | 0%    | 0%                                        | 9%                    | 14%            | 0%                               | 100%               | 95.3%                                        | \$6,286                 |
| BG 3, CT 709    | 67%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 29%            | 0%                               | 100%               | 73.4%                                        | \$11,191                |
| BG 1, CT 710    | 91%                         | 3%                        | 0%                               | 0%    | 0%                                        | 7%                    | 0%             | 0%                               | 100%               | 66.6%                                        | \$11,534                |
| BG 2, CT 710    | 75%                         | 6%                        | 0%                               | 0%    | 0%                                        | 11%                   | 8%             | 0%                               | 100%               | 69.5%                                        | \$11,125                |
| BG 1, CT 712    | 59%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 35%            | 0%                               | 100%               | 45.5%                                        | \$10,069                |
| BG 2, CT 712    | 49%                         | 23%                       | 0%                               | 0%    | 0%                                        | 5%                    | 22%            | 1%                               | 99%                | 58.5%                                        | \$12,645                |
| BG 3, CT 712    | 77%                         | 4%                        | 0%                               | 2%    | 0%                                        | 0%                    | 17%            | 0%                               | 100%               | 61.3%                                        | \$11,208                |
| BG 1, CT 713    | 50%                         | 11%                       | 7%                               | 0%    | 0%                                        | 19%                   | 13%            | 0%                               | 100%               | 100.0%                                       | ND                      |
| BG 2, CT 713    | 64%                         | 15%                       | 0%                               | 0%    | 0%                                        | 12%                   | 9%             | 0%                               | 100%               | 61.1%                                        | \$13,265                |
| BG 3, CT 713    | 54%                         | 10%                       | 0%                               | 0%    | 0%                                        | 6%                    | 29%            | 0%                               | 100%               | 88.8%                                        | ND                      |



| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 4, CT 713    | 71%                         | 0%                        | 0%                               | 0%    | 0%                                        | 16%                   | 13%            | 0%                               | 100%               | 92.2%                                        | ND                      |
| BG 1, CT 714.01 | 49%                         | 1%                        | 0%                               | 0%    | 0%                                        | 9%                    | 41%            | 1%                               | 99%                | 59.0%                                        | \$19,333                |
| BG 2, CT 714.01 | 89%                         | 1%                        | 1%                               | 0%    | 0%                                        | 4%                    | 6%             | 1%                               | 99%                | 37.8%                                        | \$24,858                |
| BG 1, CT 714.02 | 89%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 2%             | 0%                               | 100%               | 35.7%                                        | \$22,917                |
| BG 2, CT 714.02 | 90%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 4%             | 0%                               | 100%               | 51.6%                                        | \$13,063                |
| BG 3, CT 714.02 | 85%                         | 1%                        | 0%                               | 0%    | 0%                                        | 9%                    | 5%             | 0%                               | 100%               | 33.1%                                        | \$41,094                |
| BG 1, CT 715    | 87%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 0%                               | 100%               | 30.6%                                        | \$27,298                |
| BG 2, CT 715    | 80%                         | 0%                        | 2%                               | 0%    | 0%                                        | 5%                    | 14%            | 0%                               | 100%               | 65.6%                                        | \$11,334                |
| BG 3, CT 715    | 73%                         | 3%                        | 0%                               | 0%    | 0%                                        | 12%                   | 12%            | 1%                               | 99%                | 57.6%                                        | \$12,019                |
| BG 4, CT 715    | 81%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 18%            | 0%                               | 100%               | 57.3%                                        | \$13,750                |
| BG 1, CT 716.01 | 83%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 17%            | 3%                               | 97%                | 25.5%                                        | \$36,700                |
| BG 2, CT 716.01 | 72%                         | 13%                       | 0%                               | 1%    | 0%                                        | 4%                    | 10%            | 1%                               | 99%                | 45.6%                                        | \$22,500                |
| BG 3, CT 716.01 | 57%                         | 27%                       | 0%                               | 0%    | 0%                                        | 7%                    | 9%             | 0%                               | 100%               | 43.4%                                        | \$20,293                |
| BG 1, CT 716.02 | 61%                         | 14%                       | 0%                               | 0%    | 0%                                        | 5%                    | 20%            | 6%                               | 94%                | 94.8%                                        | ND                      |
| BG 2, CT 716.02 | 55%                         | 16%                       | 0%                               | 0%    | 0%                                        | 11%                   | 17%            | 0%                               | 100%               | 94.6%                                        | \$6,172                 |
| BG 3, CT 716.02 | 60%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 31%            | 0%                               | 100%               | 75.3%                                        | \$18,162                |
| BG 4, CT 716.02 | 43%                         | 10%                       | 0%                               | 0%    | 0%                                        | 9%                    | 38%            | 0%                               | 100%               | 77.5%                                        | \$10,734                |
| BG 1, CT 717    | 65%                         | 5%                        | 0%                               | 7%    | 0%                                        | 2%                    | 21%            | 9%                               | 91%                | 43.2%                                        | \$18,000                |
| BG 2, CT 717    | 60%                         | 8%                        | 0%                               | 0%    | 0%                                        | 7%                    | 24%            | 0%                               | 100%               | 45.4%                                        | \$14,750                |
| BG 1, CT 718    | 80%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 10%            | 0%                               | 100%               | 76.9%                                        | \$12,361                |
| BG 2, CT 718    | 71%                         | 12%                       | 0%                               | 0%    | 0%                                        | 0%                    | 17%            | 3%                               | 97%                | 57.7%                                        | \$6,533                 |
| BG 3, CT 718    | 69%                         | 0%                        | 0%                               | 0%    | 0%                                        | 24%                   | 7%             | 0%                               | 100%               | 74.1%                                        | \$12,583                |
| BG 1, CT 719    | 36%                         | 19%                       | 0%                               | 0%    | 0%                                        | 10%                   | 35%            | 0%                               | 100%               | 100.0%                                       | ND                      |
| BG 2, CT 719    | 51%                         | 4%                        | 0%                               | 0%    | 0%                                        | 6%                    | 38%            | 1%                               | 99%                | 98.4%                                        | \$4,500                 |
| BG 3, CT 719    | 61%                         | 10%                       | 0%                               | 0%    | 0%                                        | 16%                   | 14%            | 0%                               | 100%               | 60.2%                                        | \$12,333                |
| BG 4, CT 719    | 46%                         | 9%                        | 0%                               | 0%    | 0%                                        | 4%                    | 42%            | 0%                               | 100%               | 79.6%                                        | \$11,029                |
| BG 5, CT 719    | 77%                         | 0%                        | 0%                               | 0%    | 0%                                        | 9%                    | 13%            | 0%                               | 100%               | 52.7%                                        | \$16,976                |
| BG 6, CT 719    | 46%                         | 0%                        | 0%                               | 0%    | 0%                                        | 14%                   | 39%            | 0%                               | 100%               | 49.7%                                        | \$8,922                 |
| BG 1, CT 720    | 76%                         | 7%                        | 0%                               | 0%    | 0%                                        | 4%                    | 13%            | 0%                               | 100%               | 36.6%                                        | \$22,261                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 721.01 | 83%                         | 6%                        | 0%                               | 0%    | 0%                                        | 7%                    | 5%             | 0%                               | 100%               | 84.6%                                        | \$9,118                 |
| BG 2, CT 721.01 | 57%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 31%            | 0%                               | 100%               | 60.6%                                        | \$10,526                |
| BG 1, CT 721.02 | 67%                         | 11%                       | 0%                               | 0%    | 0%                                        | 4%                    | 18%            | 0%                               | 100%               | 24.6%                                        | \$28,424                |
| BG 2, CT 721.02 | 72%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 21%            | 0%                               | 100%               | 47.5%                                        | \$29,250                |
| BG 3, CT 721.02 | 79%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 19%            | 0%                               | 100%               | 32.9%                                        | \$24,728                |
| BG 4, CT 721.02 | 68%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 27%            | 0%                               | 100%               | 24.3%                                        | \$27,159                |
| BG 1, CT 722.01 | 53%                         | 8%                        | 0%                               | 1%    | 0%                                        | 3%                    | 35%            | 1%                               | 99%                | 29.1%                                        | \$27,898                |
| BG 2, CT 722.01 | 52%                         | 13%                       | 0%                               | 0%    | 0%                                        | 6%                    | 29%            | 0%                               | 100%               | 58.1%                                        | \$16,614                |
| BG 3, CT 722.01 | 63%                         | 11%                       | 0%                               | 0%    | 0%                                        | 4%                    | 23%            | 1%                               | 99%                | 92.9%                                        | ND                      |
| BG 1, CT 722.02 | 84%                         | 5%                        | 2%                               | 0%    | 0%                                        | 0%                    | 9%             | 0%                               | 100%               | 38.4%                                        | \$21,389                |
| BG 2, CT 722.02 | 93%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 4%             | 0%                               | 100%               | 36.3%                                        | \$18,814                |
| BG 3, CT 722.02 | 63%                         | 5%                        | 0%                               | 0%    | 0%                                        | 8%                    | 24%            | 0%                               | 100%               | 32.8%                                        | \$30,294                |
| BG 4, CT 722.02 | 66%                         | 14%                       | 0%                               | 0%    | 0%                                        | 0%                    | 20%            | 0%                               | 100%               | 11.3%                                        | \$55,469                |
| BG 5, CT 722.02 | 69%                         | 5%                        | 0%                               | 0%    | 0%                                        | 7%                    | 19%            | 0%                               | 100%               | 23.6%                                        | \$26,011                |
| BG 6, CT 722.02 | 65%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 30%            | 3%                               | 97%                | 10.3%                                        | \$76,970                |
| BG 1, CT 723    | 39%                         | 12%                       | 0%                               | 0%    | 0%                                        | 12%                   | 37%            | 0%                               | 100%               | 73.9%                                        | \$10,179                |
| BG 2, CT 723    | 45%                         | 23%                       | 0%                               | 0%    | 0%                                        | 15%                   | 18%            | 0%                               | 100%               | 73.5%                                        | \$10,938                |
| BG 1, CT 724    | 83%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 16%            | 0%                               | 100%               | 2.6%                                         | \$98,482                |
| BG 2, CT 724    | 65%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 35%            | 0%                               | 100%               | 22.0%                                        | \$46,204                |
| BG 3, CT 724    | 86%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 0%                               | 100%               | 39.1%                                        | \$18,068                |
| BG 4, CT 724    | 65%                         | 6%                        | 0%                               | 0%    | 0%                                        | 9%                    | 20%            | 0%                               | 100%               | 48.5%                                        | \$14,357                |
| BG 5, CT 724    | 62%                         | 16%                       | 0%                               | 0%    | 0%                                        | 10%                   | 12%            | 2%                               | 98%                | 46.9%                                        | \$26,791                |
| BG 1, CT 725    | 63%                         | 2%                        | 0%                               | 0%    | 0%                                        | 15%                   | 20%            | 1%                               | 99%                | 52.2%                                        | \$17,348                |
| BG 2, CT 725    | 49%                         | 6%                        | 0%                               | 0%    | 0%                                        | 15%                   | 30%            | 0%                               | 100%               | 43.5%                                        | \$18,175                |
| BG 3, CT 725    | 78%                         | 6%                        | 0%                               | 0%    | 0%                                        | 3%                    | 13%            | 0%                               | 100%               | 10.3%                                        | \$41,389                |
| BG 1, CT 726    | 83%                         | 0%                        | 2%                               | 0%    | 0%                                        | 4%                    | 11%            | 0%                               | 100%               | 58.9%                                        | \$12,857                |
| BG 2, CT 726    | 81%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 13%            | 0%                               | 100%               | 83.8%                                        | \$12,844                |
| BG 3, CT 726    | 68%                         | 3%                        | 0%                               | 0%    | 0%                                        | 8%                    | 21%            | 0%                               | 100%               | 71.0%                                        | \$11,765                |
| BG 4, CT 726    | 82%                         | 7%                        | 0%                               | 0%    | 0%                                        | 12%                   | 0%             | 0%                               | 100%               | 68.7%                                        | \$14,917                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 727.01 | 82%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 10%            | 0%                               | 100%               | 33.8%                                        | \$22,724                |
| BG 2, CT 727.01 | 80%                         | 5%                        | 0%                               | 0%    | 0%                                        | 4%                    | 11%            | 2%                               | 98%                | 46.3%                                        | \$25,781                |
| BG 1, CT 727.03 | 92%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 2%             | 2%                               | 98%                | 63.7%                                        | \$11,914                |
| BG 2, CT 727.03 | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 10%                   | 1%             | 0%                               | 100%               | 45.9%                                        | \$19,500                |
| BG 3, CT 727.03 | 74%                         | 4%                        | 0%                               | 0%    | 0%                                        | 13%                   | 8%             | 4%                               | 96%                | 50.9%                                        | \$15,000                |
| BG 4, CT 727.03 | 96%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 2%                               | 98%                | 22.9%                                        | \$63,681                |
| BG 5, CT 727.03 | 96%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 1%                               | 99%                | 5.1%                                         | \$75,156                |
| BG 1, CT 727.04 | 87%                         | 4%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 74.1%                                        | \$7,545                 |
| BG 2, CT 727.04 | 78%                         | 4%                        | 0%                               | 0%    | 0%                                        | 11%                   | 6%             | 0%                               | 100%               | 69.2%                                        | \$5,101                 |
| BG 1, CT 729    | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 36.1%                                        | \$23,456                |
| BG 2, CT 729    | 90%                         | 3%                        | 0%                               | 0%    | 0%                                        | 5%                    | 2%             | 0%                               | 100%               | 51.7%                                        | \$14,531                |
| BG 3, CT 729    | 76%                         | 8%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 0%                               | 100%               | 34.2%                                        | \$21,607                |
| BG 4, CT 729    | 85%                         | 4%                        | 0%                               | 0%    | 0%                                        | 7%                    | 3%             | 2%                               | 98%                | 13.0%                                        | \$40,893                |
| BG 1, CT 730.01 | 85%                         | 3%                        | 0%                               | 0%    | 0%                                        | 12%                   | 0%             | 0%                               | 100%               | 54.6%                                        | \$13,942                |
| BG 2, CT 730.01 | 96%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 52.4%                                        | \$13,565                |
| BG 3, CT 730.01 | 74%                         | 3%                        | 0%                               | 0%    | 0%                                        | 12%                   | 11%            | 0%                               | 100%               | 40.9%                                        | \$12,011                |
| BG 1, CT 730.02 | 92%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 3%             | 3%                               | 97%                | 61.9%                                        | \$11,864                |
| BG 2, CT 730.02 | 85%                         | 1%                        | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 0%                               | 100%               | 68.5%                                        | \$14,949                |
| BG 3, CT 730.02 | 86%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 3%             | 2%                               | 98%                | 62.0%                                        | \$14,524                |
| BG 1, CT 730.03 | 96%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 3%                               | 97%                | 56.3%                                        | \$18,650                |
| BG 1, CT 730.04 | 84%                         | 0%                        | 0%                               | 0%    | 0%                                        | 14%                   | 2%             | 0%                               | 100%               | 71.9%                                        | \$13,906                |
| BG 2, CT 730.04 | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 0%                               | 100%               | 35.5%                                        | \$23,913                |
| BG 3, CT 730.04 | 78%                         | 2%                        | 0%                               | 0%    | 0%                                        | 16%                   | 3%             | 2%                               | 98%                | 34.2%                                        | \$30,703                |
| BG 4, CT 730.04 | 92%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 2%             | 0%                               | 100%               | 53.7%                                        | \$22,426                |
| BG 1, CT 730.05 | 94%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 36.3%                                        | \$27,383                |
| BG 2, CT 730.05 | 80%                         | 6%                        | 2%                               | 0%    | 0%                                        | 10%                   | 1%             | 0%                               | 100%               | 13.7%                                        | \$33,839                |
| BG 3, CT 730.05 | 87%                         | 1%                        | 0%                               | 0%    | 0%                                        | 11%                   | 1%             | 0%                               | 100%               | 22.6%                                        | \$22,434                |
| BG 1, CT 730.06 | 76%                         | 3%                        | 0%                               | 0%    | 0%                                        | 13%                   | 7%             | 0%                               | 100%               | 65.5%                                        | \$14,130                |
| BG 2, CT 730.06 | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 9%                    | 1%             | 0%                               | 100%               | 52.0%                                        | \$16,914                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 730.08 | 60%                         | 16%                       | 0%                               | 0%    | 0%                                        | 8%                    | 16%            | 2%                               | 98%                | 0.0%                                         | ND                      |
| BG 1, CT 730.09 | 74%                         | 6%                        | 0%                               | 0%    | 0%                                        | 15%                   | 5%             | 1%                               | 99%                | 70.5%                                        | \$8,536                 |
| BG 2, CT 730.09 | 60%                         | 0%                        | 0%                               | 0%    | 0%                                        | 24%                   | 16%            | 0%                               | 100%               | 76.4%                                        | \$11,906                |
| BG 3, CT 730.09 | 85%                         | 1%                        | 0%                               | 0%    | 0%                                        | 8%                    | 6%             | 0%                               | 100%               | 83.6%                                        | \$10,188                |
| BG 1, CT 730.10 | 93%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 40.8%                                        | \$20,372                |
| BG 2, CT 730.10 | 86%                         | 2%                        | 0%                               | 0%    | 0%                                        | 9%                    | 2%             | 0%                               | 100%               | 35.7%                                        | \$30,630                |
| BG 0, CT 9930   | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 3301   | 71%                         | 0%                        | 0%                               | 2%    | 0%                                        | 21%                   | 6%             | 0%                               | 100%               | 29.0%                                        | \$22,844                |
| BG 2, CT 3301   | 77%                         | 7%                        | 0%                               | 0%    | 0%                                        | 16%                   | 1%             | 0%                               | 100%               | 49.6%                                        | \$14,464                |
| BG 3, CT 3301   | 78%                         | 3%                        | 0%                               | 0%    | 0%                                        | 17%                   | 2%             | 1%                               | 99%                | 53.9%                                        | \$16,298                |
| BG 4, CT 3301   | 72%                         | 0%                        | 0%                               | 0%    | 0%                                        | 27%                   | 1%             | 0%                               | 100%               | 82.2%                                        | \$11,823                |
| BG 1, CT 3302   | 74%                         | 11%                       | 0%                               | 0%    | 0%                                        | 14%                   | 0%             | 1%                               | 99%                | 51.7%                                        | \$18,355                |
| BG 2, CT 3302   | 80%                         | 0%                        | 0%                               | 0%    | 0%                                        | 20%                   | 0%             | 0%                               | 100%               | 80.2%                                        | \$9,149                 |
| BG 3, CT 3302   | 82%                         | 5%                        | 0%                               | 0%    | 0%                                        | 11%                   | 2%             | 0%                               | 100%               | 61.3%                                        | \$13,730                |
| BG 1, CT 3303   | 73%                         | 3%                        | 0%                               | 0%    | 0%                                        | 23%                   | 1%             | 0%                               | 100%               | 54.7%                                        | \$17,473                |
| BG 2, CT 3303   | 67%                         | 3%                        | 0%                               | 0%    | 0%                                        | 23%                   | 8%             | 2%                               | 98%                | 47.0%                                        | \$17,372                |
| BG 3, CT 3303   | 78%                         | 6%                        | 1%                               | 0%    | 0%                                        | 15%                   | 0%             | 0%                               | 100%               | 70.5%                                        | \$11,641                |
| BG 1, CT 3304   | 70%                         | 4%                        | 2%                               | 0%    | 0%                                        | 24%                   | 1%             | 1%                               | 99%                | 41.7%                                        | \$23,293                |
| BG 2, CT 3304   | 66%                         | 1%                        | 0%                               | 0%    | 0%                                        | 31%                   | 2%             | 0%                               | 100%               | 62.6%                                        | \$12,450                |
| BG 3, CT 3304   | 73%                         | 6%                        | 2%                               | 0%    | 0%                                        | 18%                   | 1%             | 1%                               | 99%                | 70.3%                                        | \$12,837                |
| BG 0, CT 9900   | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9594   | 59%                         | 2%                        | 0%                               | 2%    | 0%                                        | 0%                    | 36%            | 13%                              | 87%                | 30.5%                                        | \$19,519                |
| BG 2, CT 9594   | 70%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 26%            | 8%                               | 92%                | 56.9%                                        | \$15,823                |
| BG 3, CT 9594   | 77%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 20%            | 11%                              | 89%                | 46.6%                                        | \$13,080                |
| BG 4, CT 9594   | 65%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 27%            | 9%                               | 91%                | 49.3%                                        | \$20,801                |
| BG 1, CT 9595   | 63%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 31%            | 8%                               | 92%                | 49.8%                                        | \$17,521                |
| BG 2, CT 9595   | 62%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 29%            | 13%                              | 87%                | 63.7%                                        | \$15,657                |
| BG 1, CT 9596   | 74%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 26%            | 3%                               | 97%                | 52.6%                                        | \$15,854                |
| BG 2, CT 9596   | 55%                         | 4%                        | 1%                               | 0%    | 0%                                        | 2%                    | 39%            | 6%                               | 94%                | 50.5%                                        | \$18,150                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 9596    | 51%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 43%            | 7%                               | 93%                | 53.7%                                        | \$15,136                |
| BG 4, CT 9596    | 55%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 37%            | 2%                               | 98%                | 72.5%                                        | \$10,577                |
| BG 0, CT 9904    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 1301.01 | 49%                         | 5%                        | 0%                               | 0%    | 0%                                        | 40%                   | 6%             | 0%                               | 100%               | 46.7%                                        | \$19,417                |
| BG 2, CT 1301.01 | 58%                         | 24%                       | 0%                               | 0%    | 0%                                        | 15%                   | 3%             | 2%                               | 98%                | 58.1%                                        | \$19,282                |
| BG 3, CT 1301.01 | 83%                         | 12%                       | 0%                               | 0%    | 0%                                        | 2%                    | 3%             | 3%                               | 97%                | 13.6%                                        | \$26,848                |
| BG 4, CT 1301.01 | 57%                         | 8%                        | 0%                               | 0%    | 0%                                        | 29%                   | 7%             | 0%                               | 100%               | 53.9%                                        | \$23,922                |
| BG 5, CT 1301.01 | 46%                         | 14%                       | 0%                               | 0%    | 0%                                        | 39%                   | 1%             | 0%                               | 100%               | 60.3%                                        | \$8,933                 |
| BG 1, CT 1301.02 | 65%                         | 7%                        | 0%                               | 2%    | 0%                                        | 19%                   | 7%             | 0%                               | 100%               | 13.6%                                        | \$41,449                |
| BG 2, CT 1301.02 | 55%                         | 24%                       | 0%                               | 0%    | 0%                                        | 21%                   | 0%             | 3%                               | 97%                | 20.6%                                        | \$36,268                |
| BG 3, CT 1301.02 | 81%                         | 4%                        | 0%                               | 0%    | 0%                                        | 15%                   | 0%             | 4%                               | 96%                | 20.2%                                        | \$43,663                |
| BG 1, CT 1302    | 51%                         | 16%                       | 2%                               | 0%    | 0%                                        | 25%                   | 6%             | 0%                               | 100%               | 44.4%                                        | \$16,860                |
| BG 2, CT 1302    | 54%                         | 21%                       | 0%                               | 0%    | 0%                                        | 25%                   | 0%             | 0%                               | 100%               | 49.0%                                        | \$12,237                |
| BG 3, CT 1302    | 56%                         | 4%                        | 0%                               | 0%    | 0%                                        | 32%                   | 8%             | 0%                               | 100%               | 70.9%                                        | \$11,624                |
| BG 1, CT 1303    | 55%                         | 22%                       | 1%                               | 0%    | 0%                                        | 22%                   | 1%             | 0%                               | 100%               | 37.6%                                        | \$20,333                |
| BG 2, CT 1303    | 79%                         | 9%                        | 0%                               | 0%    | 0%                                        | 11%                   | 1%             | 0%                               | 100%               | 42.8%                                        | \$22,829                |
| BG 3, CT 1303    | 69%                         | 13%                       | 0%                               | 0%    | 0%                                        | 18%                   | 0%             | 0%                               | 100%               | 29.3%                                        | \$25,597                |
| BG 1, CT 1304.01 | 35%                         | 13%                       | 0%                               | 0%    | 0%                                        | 50%                   | 3%             | 0%                               | 100%               | 43.7%                                        | \$14,921                |
| BG 2, CT 1304.01 | 52%                         | 14%                       | 0%                               | 1%    | 0%                                        | 31%                   | 1%             | 0%                               | 100%               | 13.2%                                        | \$39,803                |
| BG 1, CT 1304.02 | 35%                         | 23%                       | 0%                               | 0%    | 0%                                        | 39%                   | 3%             | 0%                               | 100%               | 66.1%                                        | \$18,715                |
| BG 2, CT 1304.02 | 49%                         | 22%                       | 0%                               | 0%    | 0%                                        | 25%                   | 4%             | 0%                               | 100%               | 54.0%                                        | \$12,188                |
| BG 3, CT 1304.02 | 46%                         | 24%                       | 0%                               | 0%    | 0%                                        | 22%                   | 8%             | 0%                               | 100%               | 45.4%                                        | \$21,875                |
| BG 1, CT 1305    | 32%                         | 22%                       | 0%                               | 0%    | 0%                                        | 46%                   | 0%             | 0%                               | 100%               | 59.4%                                        | \$19,028                |
| BG 2, CT 1305    | 49%                         | 10%                       | 0%                               | 0%    | 0%                                        | 41%                   | 0%             | 0%                               | 100%               | 28.5%                                        | \$24,506                |
| BG 3, CT 1305    | 58%                         | 16%                       | 0%                               | 0%    | 0%                                        | 23%                   | 3%             | 1%                               | 99%                | 36.5%                                        | \$25,556                |
| BG 4, CT 1305    | 47%                         | 16%                       | 0%                               | 0%    | 0%                                        | 37%                   | 0%             | 0%                               | 100%               | 33.9%                                        | \$26,023                |
| BG 1, CT 1306.01 | 38%                         | 16%                       | 0%                               | 0%    | 0%                                        | 40%                   | 6%             | 1%                               | 99%                | 59.6%                                        | \$16,735                |
| BG 2, CT 1306.01 | 59%                         | 6%                        | 0%                               | 0%    | 0%                                        | 33%                   | 1%             | 1%                               | 99%                | 26.0%                                        | \$23,814                |
| BG 1, CT 1306.02 | 58%                         | 8%                        | 0%                               | 0%    | 0%                                        | 26%                   | 9%             | 2%                               | 98%                | 36.5%                                        | \$26,296                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 1306.02 | 48%                         | 7%                        | 0%                               | 1%    | 0%                                        | 44%                   | 0%             | 0%                               | 100%               | 45.0%                                        | \$31,848                |
| BG 1, CT 1307.01 | 64%                         | 8%                        | 0%                               | 2%    | 0%                                        | 24%                   | 2%             | 0%                               | 100%               | 38.7%                                        | \$21,915                |
| BG 2, CT 1307.01 | 60%                         | 1%                        | 0%                               | 0%    | 0%                                        | 38%                   | 2%             | 0%                               | 100%               | 42.1%                                        | \$24,063                |
| BG 3, CT 1307.01 | 47%                         | 12%                       | 1%                               | 0%    | 0%                                        | 39%                   | 2%             | 0%                               | 100%               | 41.2%                                        | \$31,489                |
| BG 1, CT 1307.02 | 43%                         | 16%                       | 0%                               | 0%    | 0%                                        | 36%                   | 5%             | 0%                               | 100%               | 37.2%                                        | \$26,471                |
| BG 2, CT 1307.02 | 51%                         | 12%                       | 0%                               | 0%    | 0%                                        | 30%                   | 7%             | 0%                               | 100%               | 53.1%                                        | \$17,077                |
| BG 3, CT 1307.02 | 44%                         | 16%                       | 0%                               | 0%    | 0%                                        | 39%                   | 1%             | 0%                               | 100%               | 42.5%                                        | \$17,976                |
| BG 0, CT 9927    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9603    | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 5%             | 0%                               | 100%               | 60.8%                                        | \$14,821                |
| BG 2, CT 9603    | 95%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 4%                               | 96%                | 59.8%                                        | \$19,269                |
| BG 3, CT 9603    | 89%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 2%             | 0%                               | 100%               | 58.2%                                        | \$14,958                |
| BG 4, CT 9603    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 7.9%                                         | \$28,500                |
| BG 1, CT 9604    | 86%                         | 7%                        | 0%                               | 0%    | 0%                                        | 6%                    | 2%             | 2%                               | 98%                | 60.4%                                        | \$10,221                |
| BG 2, CT 9604    | 92%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 1%             | 2%                               | 98%                | 25.2%                                        | \$29,015                |
| BG 3, CT 9604    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 6%                               | 94%                | 34.5%                                        | \$25,726                |
| BG 1, CT 9605    | 95%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 1%             | 4%                               | 96%                | 52.9%                                        | \$10,640                |
| BG 2, CT 9605    | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 2%                               | 98%                | 64.6%                                        | \$11,205                |
| BG 1, CT 9606    | 95%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 0%                               | 100%               | 50.4%                                        | \$15,795                |
| BG 2, CT 9606    | 96%                         | 0%                        | 1%                               | 0%    | 0%                                        | 1%                    | 3%             | 0%                               | 100%               | 37.4%                                        | \$23,750                |
| BG 1, CT 9607    | 89%                         | 4%                        | 4%                               | 0%    | 0%                                        | 0%                    | 3%             | 1%                               | 99%                | 63.6%                                        | \$12,093                |
| BG 2, CT 9607    | 91%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 3%                               | 97%                | 44.2%                                        | \$17,039                |
| BG 3, CT 9607    | 87%                         | 5%                        | 0%                               | 0%    | 0%                                        | 4%                    | 3%             | 0%                               | 100%               | 54.0%                                        | \$16,691                |
| BG 1, CT 9608    | 87%                         | 1%                        | 0%                               | 0%    | 0%                                        | 10%                   | 2%             | 0%                               | 100%               | 60.4%                                        | \$13,173                |
| BG 2, CT 9608    | 91%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 9%             | 0%                               | 100%               | 51.5%                                        | \$12,700                |
| BG 3, CT 9608    | 95%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 1%                               | 99%                | 56.3%                                        | \$18,000                |
| BG 1, CT 9526    | 76%                         | 1%                        | 0%                               | 0%    | 0%                                        | 16%                   | 7%             | 1%                               | 99%                | 68.4%                                        | \$10,393                |
| BG 2, CT 9526    | 70%                         | 3%                        | 0%                               | 0%    | 0%                                        | 21%                   | 7%             | 1%                               | 99%                | 69.4%                                        | \$13,986                |
| BG 3, CT 9526    | 67%                         | 0%                        | 0%                               | 0%    | 0%                                        | 12%                   | 21%            | 0%                               | 100%               | 52.4%                                        | \$12,813                |
| BG 1, CT 9527    | 50%                         | 4%                        | 0%                               | 0%    | 0%                                        | 24%                   | 22%            | 0%                               | 100%               | 54.8%                                        | \$12,336                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 9527 | 38%                         | 11%                       | 0%                               | 0%    | 0%                                        | 40%                   | 11%            | 0%                               | 100%               | 56.9%                                        | \$9,432                 |
| BG 3, CT 9527 | 52%                         | 10%                       | 0%                               | 0%    | 0%                                        | 20%                   | 17%            | 0%                               | 100%               | 84.9%                                        | \$6,398                 |
| BG 1, CT 9528 | 67%                         | 3%                        | 0%                               | 0%    | 0%                                        | 20%                   | 10%            | 2%                               | 98%                | 52.4%                                        | \$22,986                |
| BG 2, CT 9528 | 51%                         | 4%                        | 0%                               | 0%    | 0%                                        | 38%                   | 7%             | 0%                               | 100%               | 76.4%                                        | \$10,806                |
| BG 3, CT 9528 | 55%                         | 13%                       | 0%                               | 0%    | 0%                                        | 20%                   | 12%            | 0%                               | 100%               | 75.1%                                        | \$9,118                 |
| BG 4, CT 9528 | 41%                         | 7%                        | 0%                               | 0%    | 0%                                        | 34%                   | 18%            | 0%                               | 100%               | 35.2%                                        | \$31,829                |
| BG 5, CT 9528 | 49%                         | 2%                        | 0%                               | 0%    | 0%                                        | 40%                   | 10%            | 0%                               | 100%               | 49.7%                                        | \$18,902                |
| BG 1, CT 9529 | 53%                         | 3%                        | 0%                               | 0%    | 0%                                        | 32%                   | 12%            | 0%                               | 100%               | 48.9%                                        | \$17,288                |
| BG 2, CT 9529 | 57%                         | 7%                        | 0%                               | 0%    | 0%                                        | 16%                   | 19%            | 0%                               | 100%               | 40.6%                                        | \$27,418                |
| BG 3, CT 9529 | 59%                         | 0%                        | 0%                               | 0%    | 0%                                        | 19%                   | 22%            | 0%                               | 100%               | 52.2%                                        | \$14,183                |
| BG 4, CT 9529 | 62%                         | 7%                        | 0%                               | 0%    | 0%                                        | 20%                   | 11%            | 0%                               | 100%               | 83.3%                                        | \$6,523                 |
| BG 1, CT 9530 | 41%                         | 3%                        | 0%                               | 0%    | 0%                                        | 43%                   | 13%            | 0%                               | 100%               | 81.2%                                        | \$10,486                |
| BG 2, CT 9530 | 60%                         | 14%                       | 0%                               | 0%    | 0%                                        | 12%                   | 14%            | 0%                               | 100%               | 51.8%                                        | \$14,500                |
| BG 1, CT 9531 | 63%                         | 4%                        | 0%                               | 0%    | 0%                                        | 28%                   | 4%             | 0%                               | 100%               | 63.9%                                        | \$11,080                |
| BG 2, CT 9531 | 56%                         | 5%                        | 0%                               | 0%    | 0%                                        | 26%                   | 12%            | 2%                               | 98%                | 57.8%                                        | \$18,477                |
| BG 1, CT 9532 | 50%                         | 9%                        | 0%                               | 0%    | 0%                                        | 24%                   | 17%            | 2%                               | 98%                | 61.2%                                        | \$15,589                |
| BG 2, CT 9532 | 56%                         | 13%                       | 0%                               | 0%    | 0%                                        | 22%                   | 8%             | 1%                               | 99%                | 51.7%                                        | \$18,939                |
| BG 3, CT 9532 | 53%                         | 5%                        | 0%                               | 0%    | 0%                                        | 22%                   | 20%            | 0%                               | 100%               | 62.3%                                        | \$9,385                 |
| BG 0, CT 9928 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 8401 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 51.8%                                        | \$11,857                |
| BG 2, CT 8401 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 75.7%                                        | \$10,613                |
| BG 3, CT 8401 | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 5%                               | 95%                | 54.1%                                        | \$13,387                |
| BG 1, CT 8402 | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 0%                               | 100%               | 61.7%                                        | \$12,355                |
| BG 2, CT 8402 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 49.0%                                        | \$12,000                |
| BG 3, CT 8402 | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 46.4%                                        | \$15,598                |
| BG 4, CT 8402 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 40.6%                                        | \$25,580                |
| BG 1, CT 8403 | 85%                         | 13%                       | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 0%                               | 100%               | 53.7%                                        | \$15,508                |
| BG 2, CT 8403 | 93%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 47.2%                                        | \$19,009                |
| BG 3, CT 8403 | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 34.1%                                        | \$18,700                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 8404 | 93%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 0%                               | 100%               | 29.1%                                        | \$30,203                |
| BG 2, CT 8404 | 91%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 0%                               | 100%               | 92.5%                                        | ND                      |
| BG 3, CT 8404 | 92%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 2%             | 1%                               | 99%                | 36.2%                                        | \$17,407                |
| BG 1, CT 8405 | 97%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 1%                               | 99%                | 55.2%                                        | \$10,436                |
| BG 2, CT 8405 | 92%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 3%             | 0%                               | 100%               | 43.7%                                        | \$17,891                |
| BG 3, CT 8405 | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 24.8%                                        | \$31,250                |
| BG 1, CT 8406 | 87%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 1%                               | 99%                | 35.9%                                        | \$21,917                |
| BG 2, CT 8406 | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 56.8%                                        | \$10,479                |
| BG 3, CT 8406 | 95%                         | 1%                        | 2%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 51.9%                                        | \$15,878                |
| BG 1, CT 8407 | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 9%             | 0%                               | 100%               | 51.0%                                        | \$19,405                |
| BG 2, CT 8407 | 92%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 5%             | 0%                               | 100%               | 23.7%                                        | \$21,741                |
| BG 3, CT 8407 | 94%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 1%                               | 99%                | 48.8%                                        | \$13,583                |
| BG 4, CT 8407 | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 42.9%                                        | \$15,375                |
| BG 1, CT 4    | 61%                         | 27%                       | 0%                               | 0%    | 0%                                        | 4%                    | 8%             | 0%                               | 100%               | 63.0%                                        | \$3,375                 |
| BG 2, CT 4    | 63%                         | 16%                       | 0%                               | 0%    | 0%                                        | 5%                    | 17%            | 5%                               | 95%                | 47.7%                                        | \$16,375                |
| BG 1, CT 5.06 | 75%                         | 0%                        | 1%                               | 3%    | 0%                                        | 15%                   | 6%             | 18%                              | 82%                | 45.3%                                        | \$15,833                |
| BG 2, CT 5.06 | 82%                         | 5%                        | 1%                               | 0%    | 0%                                        | 8%                    | 5%             | 8%                               | 92%                | 19.6%                                        | \$27,461                |
| BG 1, CT 6    | 73%                         | 17%                       | 0%                               | 0%    | 0%                                        | 7%                    | 4%             | 2%                               | 98%                | 69.0%                                        | \$5,784                 |
| BG 2, CT 6    | 78%                         | 4%                        | 0%                               | 0%    | 0%                                        | 10%                   | 7%             | 4%                               | 96%                | 19.0%                                        | \$63,333                |
| BG 3, CT 6    | 30%                         | 38%                       | 0%                               | 0%    | 0%                                        | 0%                    | 32%            | 0%                               | 100%               | 80.5%                                        | \$7,333                 |
| BG 1, CT 7    | 73%                         | 18%                       | 0%                               | 1%    | 0%                                        | 6%                    | 3%             | 0%                               | 100%               | 66.7%                                        | \$9,211                 |
| BG 2, CT 7    | 66%                         | 16%                       | 0%                               | 0%    | 0%                                        | 8%                    | 9%             | 2%                               | 98%                | 41.8%                                        | \$26,528                |
| BG 1, CT 9    | 83%                         | 5%                        | 0%                               | 0%    | 0%                                        | 9%                    | 3%             | 11%                              | 89%                | 27.3%                                        | \$31,424                |
| BG 2, CT 9    | 90%                         | 2%                        | 0%                               | 3%    | 0%                                        | 0%                    | 5%             | 11%                              | 89%                | 4.8%                                         | \$80,370                |
| BG 3, CT 9    | 77%                         | 15%                       | 0%                               | 2%    | 0%                                        | 3%                    | 3%             | 2%                               | 98%                | 29.8%                                        | \$38,750                |
| BG 4, CT 9    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 18%                              | 82%                | 8.2%                                         | \$67,500                |
| BG 1, CT 10   | 89%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 37%                              | 63%                | 6.2%                                         | \$50,517                |
| BG 2, CT 10   | 93%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 12%                              | 88%                | 13.3%                                        | \$49,844                |
| BG 3, CT 10   | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 2.8%                                         | \$74,191                |



| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 4, CT 10    | 81%                         | 11%                       | 1%                               | 0%    | 0%                                        | 0%                    | 7%             | 4%                               | 96%                | 21.6%                                        | \$34,286                |
| BG 5, CT 10    | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 3%                               | 97%                | 20.8%                                        | \$47,333                |
| BG 6, CT 10    | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 5%             | 7%                               | 93%                | 16.0%                                        | \$68,073                |
| BG 1, CT 11    | 80%                         | 4%                        | 1%                               | 0%    | 0%                                        | 1%                    | 14%            | 15%                              | 85%                | 9.2%                                         | \$48,512                |
| BG 2, CT 11    | 90%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 2%             | 8%                               | 92%                | 24.4%                                        | \$33,839                |
| BG 1, CT 12    | 81%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 15%            | 8%                               | 92%                | 17.2%                                        | \$36,184                |
| BG 2, CT 12    | 90%                         | 6%                        | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 7%                               | 93%                | 11.7%                                        | \$55,417                |
| BG 1, CT 13.01 | 46%                         | 38%                       | 1%                               | 0%    | 0%                                        | 4%                    | 11%            | 0%                               | 100%               | 79.2%                                        | \$4,960                 |
| BG 1, CT 13.02 | 45%                         | 36%                       | 0%                               | 0%    | 0%                                        | 7%                    | 12%            | 2%                               | 98%                | 81.7%                                        | \$2,901                 |
| BG 2, CT 13.02 | 56%                         | 32%                       | 0%                               | 0%    | 0%                                        | 8%                    | 4%             | 2%                               | 98%                | 96.1%                                        | \$2,534                 |
| BG 3, CT 13.02 | 44%                         | 42%                       | 0%                               | 0%    | 0%                                        | 4%                    | 10%            | 0%                               | 100%               | 90.2%                                        | ND                      |
| BG 1, CT 14    | 27%                         | 45%                       | 0%                               | 0%    | 0%                                        | 8%                    | 21%            | 1%                               | 99%                | 44.9%                                        | \$15,865                |
| BG 2, CT 14    | 53%                         | 30%                       | 0%                               | 0%    | 0%                                        | 2%                    | 15%            | 1%                               | 99%                | 49.7%                                        | \$13,348                |
| BG 1, CT 15    | 52%                         | 23%                       | 0%                               | 0%    | 0%                                        | 4%                    | 20%            | 6%                               | 94%                | 45.3%                                        | \$19,961                |
| BG 2, CT 15    | 81%                         | 13%                       | 0%                               | 0%    | 0%                                        | 3%                    | 3%             | 2%                               | 98%                | 32.1%                                        | \$21,977                |
| BG 1, CT 16    | 78%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 18%            | 0%                               | 100%               | 17.9%                                        | \$39,375                |
| BG 2, CT 16    | 73%                         | 18%                       | 1%                               | 0%    | 0%                                        | 2%                    | 6%             | 0%                               | 100%               | 9.3%                                         | \$43,438                |
| BG 3, CT 16    | 77%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 14%            | 0%                               | 100%               | 36.9%                                        | \$22,321                |
| BG 1, CT 18    | 44%                         | 20%                       | 0%                               | 0%    | 0%                                        | 13%                   | 23%            | 2%                               | 98%                | 47.6%                                        | \$27,056                |
| BG 2, CT 18    | 89%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 4%             | 3%                               | 97%                | 16.5%                                        | \$30,855                |
| BG 1, CT 19    | 85%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 5%                               | 95%                | 9.7%                                         | \$65,170                |
| BG 2, CT 19    | 88%                         | 0%                        | 0%                               | 1%    | 0%                                        | 0%                    | 11%            | 1%                               | 99%                | 29.6%                                        | \$32,991                |
| BG 3, CT 19    | 82%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 6%             | 6%                               | 94%                | 5.8%                                         | \$47,083                |
| BG 4, CT 19    | 80%                         | 11%                       | 0%                               | 0%    | 0%                                        | 2%                    | 6%             | 3%                               | 97%                | 13.0%                                        | \$44,028                |
| BG 5, CT 19    | 94%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 0%                               | 100%               | 20.9%                                        | \$29,167                |
| BG 1, CT 20.02 | 36%                         | 19%                       | 1%                               | 0%    | 0%                                        | 1%                    | 43%            | 0%                               | 100%               | 39.6%                                        | \$16,064                |
| BG 2, CT 20.02 | 78%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 14%            | 0%                               | 100%               | 37.9%                                        | \$22,557                |
| BG 1, CT 21    | 51%                         | 23%                       | 3%                               | 0%    | 0%                                        | 5%                    | 18%            | 7%                               | 93%                | 50.6%                                        | \$15,688                |
| BG 2, CT 21    | 47%                         | 28%                       | 11%                              | 0%    | 0%                                        | 2%                    | 11%            | 0%                               | 100%               | 43.9%                                        | \$24,511                |

| Block Group | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|             | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 22 | 48%                         | 27%                       | 0%                               | 1%    | 0%                                        | 0%                    | 24%            | 4%                               | 96%                | 55.5%                                        | \$17,386                |
| BG 2, CT 22 | 40%                         | 30%                       | 0%                               | 0%    | 0%                                        | 10%                   | 20%            | 0%                               | 100%               | 50.4%                                        | \$14,635                |
| BG 1, CT 23 | 48%                         | 33%                       | 0%                               | 0%    | 0%                                        | 4%                    | 15%            | 0%                               | 100%               | 25.0%                                        | \$23,750                |
| BG 2, CT 23 | 28%                         | 25%                       | 1%                               | 0%    | 0%                                        | 9%                    | 37%            | 0%                               | 100%               | 63.3%                                        | \$15,550                |
| BG 3, CT 23 | 29%                         | 32%                       | 2%                               | 0%    | 0%                                        | 11%                   | 25%            | 4%                               | 96%                | 41.8%                                        | \$17,361                |
| BG 1, CT 24 | 77%                         | 11%                       | 0%                               | 0%    | 0%                                        | 2%                    | 10%            | 4%                               | 96%                | 46.8%                                        | \$16,500                |
| BG 2, CT 24 | 53%                         | 11%                       | 2%                               | 1%    | 0%                                        | 12%                   | 20%            | 7%                               | 93%                | 46.7%                                        | \$16,765                |
| BG 1, CT 25 | 49%                         | 40%                       | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 3%                               | 97%                | 41.7%                                        | \$19,352                |
| BG 2, CT 25 | 59%                         | 23%                       | 4%                               | 0%    | 0%                                        | 4%                    | 10%            | 1%                               | 99%                | 38.0%                                        | \$19,762                |
| BG 3, CT 25 | 30%                         | 56%                       | 0%                               | 0%    | 0%                                        | 14%                   | 0%             | 0%                               | 100%               | 67.3%                                        | \$6,705                 |
| BG 1, CT 26 | 31%                         | 47%                       | 0%                               | 0%    | 0%                                        | 0%                    | 22%            | 0%                               | 100%               | 42.6%                                        | \$18,750                |
| BG 2, CT 26 | 29%                         | 34%                       | 0%                               | 4%    | 0%                                        | 9%                    | 24%            | 0%                               | 100%               | 68.5%                                        | \$12,446                |
| BG 3, CT 26 | 51%                         | 22%                       | 0%                               | 0%    | 0%                                        | 0%                    | 28%            | 0%                               | 100%               | 48.7%                                        | \$16,250                |
| BG 4, CT 26 | 44%                         | 21%                       | 0%                               | 0%    | 0%                                        | 0%                    | 34%            | 0%                               | 100%               | 40.0%                                        | \$14,250                |
| BG 1, CT 28 | 66%                         | 18%                       | 0%                               | 0%    | 0%                                        | 0%                    | 16%            | 0%                               | 100%               | 72.5%                                        | \$13,221                |
| BG 2, CT 28 | 37%                         | 38%                       | 0%                               | 0%    | 0%                                        | 9%                    | 16%            | 1%                               | 99%                | 32.4%                                        | \$14,426                |
| BG 3, CT 28 | 31%                         | 37%                       | 0%                               | 0%    | 0%                                        | 9%                    | 23%            | 0%                               | 100%               | 65.8%                                        | \$13,369                |
| BG 1, CT 29 | 48%                         | 39%                       | 0%                               | 0%    | 0%                                        | 2%                    | 11%            | 0%                               | 100%               | 51.2%                                        | \$11,484                |
| BG 2, CT 29 | 53%                         | 21%                       | 0%                               | 0%    | 0%                                        | 3%                    | 23%            | 1%                               | 99%                | 45.3%                                        | \$17,667                |
| BG 1, CT 30 | 50%                         | 17%                       | 0%                               | 0%    | 0%                                        | 12%                   | 21%            | 0%                               | 100%               | 51.0%                                        | \$17,750                |
| BG 2, CT 30 | 29%                         | 42%                       | 2%                               | 0%    | 0%                                        | 9%                    | 18%            | 1%                               | 99%                | 58.3%                                        | \$16,409                |
| BG 1, CT 31 | 46%                         | 37%                       | 0%                               | 0%    | 0%                                        | 2%                    | 15%            | 0%                               | 100%               | 67.9%                                        | \$16,563                |
| BG 2, CT 31 | 27%                         | 51%                       | 0%                               | 0%    | 0%                                        | 2%                    | 20%            | 3%                               | 97%                | 51.4%                                        | \$19,399                |
| BG 3, CT 31 | 59%                         | 33%                       | 0%                               | 0%    | 0%                                        | 6%                    | 1%             | 6%                               | 94%                | 42.9%                                        | \$15,368                |
| BG 1, CT 32 | 33%                         | 38%                       | 0%                               | 0%    | 0%                                        | 0%                    | 29%            | 7%                               | 93%                | 53.3%                                        | \$14,403                |
| BG 2, CT 32 | 43%                         | 49%                       | 0%                               | 0%    | 0%                                        | 0%                    | 9%             | 1%                               | 99%                | 59.4%                                        | \$12,396                |
| BG 1, CT 33 | 49%                         | 25%                       | 1%                               | 5%    | 0%                                        | 11%                   | 9%             | 4%                               | 96%                | 23.7%                                        | \$19,821                |
| BG 2, CT 33 | 43%                         | 22%                       | 4%                               | 0%    | 0%                                        | 0%                    | 31%            | 0%                               | 100%               | 48.2%                                        | \$12,218                |
| BG 1, CT 34 | 65%                         | 22%                       | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 2%                               | 98%                | 52.2%                                        | \$11,731                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 34    | 75%                         | 19%                       | 0%                               | 0%    | 0%                                        | 3%                    | 3%             | 0%                               | 100%               | 84.5%                                        | \$2,810                 |
| BG 1, CT 35.01 | 64%                         | 31%                       | 0%                               | 0%    | 0%                                        | 3%                    | 2%             | 0%                               | 100%               | 73.5%                                        | \$13,393                |
| BG 2, CT 35.01 | 63%                         | 18%                       | 0%                               | 0%    | 0%                                        | 15%                   | 4%             | 2%                               | 98%                | 96.4%                                        | ND                      |
| BG 3, CT 35.01 | 46%                         | 22%                       | 0%                               | 0%    | 0%                                        | 27%                   | 5%             | 2%                               | 98%                | 84.7%                                        | \$5,761                 |
| BG 4, CT 35.01 | 60%                         | 20%                       | 0%                               | 0%    | 0%                                        | 15%                   | 5%             | 0%                               | 100%               | 42.2%                                        | \$8,839                 |
| BG 1, CT 35.02 | 53%                         | 20%                       | 0%                               | 0%    | 0%                                        | 13%                   | 14%            | 0%                               | 100%               | 50.8%                                        | \$15,734                |
| BG 2, CT 35.02 | 59%                         | 30%                       | 0%                               | 0%    | 0%                                        | 5%                    | 5%             | 4%                               | 96%                | 55.3%                                        | \$14,397                |
| BG 1, CT 36    | 51%                         | 31%                       | 2%                               | 0%    | 0%                                        | 6%                    | 10%            | 0%                               | 100%               | 69.2%                                        | \$9,737                 |
| BG 2, CT 36    | 68%                         | 17%                       | 3%                               | 1%    | 0%                                        | 7%                    | 5%             | 0%                               | 100%               | 41.3%                                        | \$13,892                |
| BG 1, CT 37    | 34%                         | 33%                       | 0%                               | 0%    | 0%                                        | 3%                    | 30%            | 0%                               | 100%               | 63.8%                                        | \$14,242                |
| BG 2, CT 37    | 15%                         | 63%                       | 0%                               | 0%    | 0%                                        | 0%                    | 22%            | 0%                               | 100%               | 83.5%                                        | \$7,096                 |
| BG 3, CT 37    | 50%                         | 26%                       | 0%                               | 0%    | 0%                                        | 10%                   | 14%            | 0%                               | 100%               | 61.3%                                        | \$15,430                |
| BG 4, CT 37    | 42%                         | 29%                       | 3%                               | 0%    | 0%                                        | 5%                    | 22%            | 0%                               | 100%               | 59.3%                                        | \$16,563                |
| BG 5, CT 37    | 52%                         | 36%                       | 0%                               | 0%    | 0%                                        | 3%                    | 9%             | 1%                               | 99%                | 65.6%                                        | \$12,281                |
| BG 1, CT 38    | 31%                         | 38%                       | 9%                               | 0%    | 0%                                        | 3%                    | 19%            | 1%                               | 99%                | 38.6%                                        | \$19,167                |
| BG 2, CT 38    | 29%                         | 36%                       | 10%                              | 2%    | 0%                                        | 8%                    | 15%            | 6%                               | 94%                | 59.9%                                        | \$11,913                |
| BG 1, CT 39.02 | 62%                         | 19%                       | 0%                               | 0%    | 0%                                        | 5%                    | 14%            | 1%                               | 99%                | 52.0%                                        | \$15,484                |
| BG 2, CT 39.02 | 58%                         | 31%                       | 0%                               | 1%    | 0%                                        | 3%                    | 6%             | 1%                               | 99%                | 47.6%                                        | \$21,629                |
| BG 3, CT 39.02 | 68%                         | 16%                       | 0%                               | 0%    | 0%                                        | 7%                    | 9%             | 1%                               | 99%                | 67.7%                                        | \$14,949                |
| BG 1, CT 42    | 56%                         | 20%                       | 0%                               | 0%    | 0%                                        | 10%                   | 15%            | 11%                              | 89%                | 2.8%                                         | \$25,268                |
| BG 2, CT 42    | 36%                         | 52%                       | 0%                               | 0%    | 0%                                        | 2%                    | 10%            | 0%                               | 100%               | 64.1%                                        | \$15,739                |
| BG 3, CT 42    | 63%                         | 24%                       | 0%                               | 0%    | 0%                                        | 5%                    | 8%             | 3%                               | 97%                | 45.3%                                        | \$21,875                |
| BG 1, CT 43.06 | 65%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 28%            | 0%                               | 100%               | 95.4%                                        | \$4,596                 |
| BG 2, CT 43.06 | 62%                         | 15%                       | 0%                               | 0%    | 0%                                        | 3%                    | 21%            | 1%                               | 99%                | 85.2%                                        | \$5,543                 |
| BG 3, CT 43.06 | 49%                         | 8%                        | 0%                               | 0%    | 0%                                        | 2%                    | 40%            | 0%                               | 100%               | 100.0%                                       | ND                      |
| BG 1, CT 44    | 48%                         | 25%                       | 5%                               | 0%    | 0%                                        | 4%                    | 18%            | 3%                               | 97%                | 39.0%                                        | \$14,528                |
| BG 2, CT 44    | 86%                         | 14%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 85.7%                                        | ND                      |
| BG 3, CT 44    | 57%                         | 20%                       | 1%                               | 0%    | 0%                                        | 1%                    | 21%            | 0%                               | 100%               | 67.0%                                        | \$16,200                |
| BG 1, CT 45    | 38%                         | 19%                       | 6%                               | 0%    | 0%                                        | 17%                   | 20%            | 1%                               | 99%                | 66.5%                                        | \$14,479                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 45    | 53%                         | 15%                       | 3%                               | 0%    | 0%                                        | 0%                    | 29%            | 0%                               | 100%               | 59.6%                                        | \$7,875                 |
| BG 3, CT 45    | 61%                         | 24%                       | 0%                               | 2%    | 0%                                        | 3%                    | 10%            | 0%                               | 100%               | 41.3%                                        | \$23,173                |
| BG 1, CT 46    | 67%                         | 20%                       | 0%                               | 0%    | 0%                                        | 0%                    | 13%            | 1%                               | 99%                | 53.2%                                        | \$15,956                |
| BG 2, CT 46    | 72%                         | 9%                        | 3%                               | 0%    | 0%                                        | 0%                    | 16%            | 0%                               | 100%               | 65.1%                                        | \$14,293                |
| BG 3, CT 46    | 68%                         | 8%                        | 0%                               | 0%    | 0%                                        | 2%                    | 22%            | 1%                               | 99%                | 26.5%                                        | \$12,115                |
| BG 4, CT 46    | 68%                         | 12%                       | 4%                               | 0%    | 0%                                        | 0%                    | 15%            | 2%                               | 98%                | 29.3%                                        | \$22,417                |
| BG 5, CT 46    | 64%                         | 6%                        | 0%                               | 0%    | 0%                                        | 24%                   | 6%             | 0%                               | 100%               | 54.6%                                        | \$18,015                |
| BG 1, CT 47    | 49%                         | 19%                       | 0%                               | 1%    | 0%                                        | 32%                   | 0%             | 0%                               | 100%               | 66.4%                                        | \$15,847                |
| BG 2, CT 47    | 69%                         | 12%                       | 1%                               | 5%    | 0%                                        | 7%                    | 6%             | 3%                               | 97%                | 29.2%                                        | \$21,417                |
| BG 3, CT 47    | 59%                         | 19%                       | 0%                               | 0%    | 0%                                        | 13%                   | 9%             | 0%                               | 100%               | 33.4%                                        | \$16,786                |
| BG 4, CT 47    | 80%                         | 7%                        | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 2%                               | 98%                | 54.2%                                        | \$20,208                |
| BG 5, CT 47    | 87%                         | 1%                        | 0%                               | 0%    | 0%                                        | 12%                   | 0%             | 2%                               | 98%                | 64.5%                                        | \$18,730                |
| BG 1, CT 48    | 47%                         | 17%                       | 1%                               | 1%    | 0%                                        | 34%                   | 1%             | 1%                               | 99%                | 91.0%                                        | ND                      |
| BG 2, CT 48    | 53%                         | 24%                       | 0%                               | 0%    | 0%                                        | 20%                   | 2%             | 0%                               | 100%               | 90.5%                                        | ND                      |
| BG 1, CT 49    | 57%                         | 29%                       | 0%                               | 0%    | 0%                                        | 8%                    | 7%             | 3%                               | 97%                | 61.1%                                        | \$12,279                |
| BG 2, CT 49    | 40%                         | 43%                       | 0%                               | 0%    | 0%                                        | 5%                    | 11%            | 1%                               | 99%                | 75.7%                                        | \$8,939                 |
| BG 3, CT 49    | 56%                         | 40%                       | 1%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 96.6%                                        | ND                      |
| BG 4, CT 49    | 32%                         | 44%                       | 0%                               | 7%    | 0%                                        | 12%                   | 5%             | 0%                               | 100%               | 82.9%                                        | \$2,895                 |
| BG 1, CT 50    | 54%                         | 11%                       | 0%                               | 0%    | 0%                                        | 27%                   | 8%             | 0%                               | 100%               | 77.8%                                        | \$5,000                 |
| BG 2, CT 50    | 55%                         | 18%                       | 0%                               | 2%    | 0%                                        | 17%                   | 8%             | 1%                               | 99%                | 28.1%                                        | \$28,581                |
| BG 3, CT 50    | 58%                         | 21%                       | 0%                               | 0%    | 0%                                        | 15%                   | 6%             | 3%                               | 97%                | 37.8%                                        | \$13,529                |
| BG 4, CT 50    | 40%                         | 31%                       | 0%                               | 5%    | 0%                                        | 17%                   | 7%             | 4%                               | 96%                | 90.9%                                        | ND                      |
| BG 5, CT 50    | 61%                         | 22%                       | 1%                               | 1%    | 0%                                        | 10%                   | 5%             | 1%                               | 99%                | 32.8%                                        | \$24,565                |
| BG 1, CT 51.01 | 60%                         | 9%                        | 0%                               | 5%    | 0%                                        | 10%                   | 16%            | 1%                               | 99%                | 23.0%                                        | \$26,000                |
| BG 2, CT 51.01 | 58%                         | 25%                       | 0%                               | 0%    | 0%                                        | 16%                   | 1%             | 0%                               | 100%               | 35.7%                                        | \$18,636                |
| BG 3, CT 51.01 | 66%                         | 12%                       | 0%                               | 6%    | 0%                                        | 16%                   | 0%             | 0%                               | 100%               | 51.1%                                        | \$10,156                |
| BG 1, CT 51.02 | 51%                         | 15%                       | 0%                               | 2%    | 0%                                        | 27%                   | 5%             | 1%                               | 99%                | 57.0%                                        | \$14,529                |
| BG 2, CT 51.02 | 68%                         | 12%                       | 0%                               | 4%    | 0%                                        | 10%                   | 5%             | 5%                               | 95%                | 55.7%                                        | \$15,500                |
| BG 1, CT 51.03 | 53%                         | 6%                        | 1%                               | 4%    | 0%                                        | 35%                   | 1%             | 0%                               | 100%               | 99.4%                                        | \$3,093                 |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 51.03 | 52%                         | 21%                       | 0%                               | 0%    | 0%                                        | 16%                   | 11%            | 2%                               | 98%                | 82.0%                                        | \$5,661                 |
| BG 3, CT 51.03 | 51%                         | 32%                       | 0%                               | 0%    | 0%                                        | 17%                   | 0%             | 8%                               | 92%                | 47.1%                                        | \$10,000                |
| BG 4, CT 51.03 | 68%                         | 25%                       | 0%                               | 2%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 45.0%                                        | \$18,534                |
| BG 1, CT 52.01 | 65%                         | 24%                       | 0%                               | 5%    | 0%                                        | 5%                    | 1%             | 1%                               | 99%                | 25.7%                                        | \$22,465                |
| BG 2, CT 52.01 | 58%                         | 14%                       | 0%                               | 0%    | 0%                                        | 25%                   | 3%             | 3%                               | 97%                | 27.8%                                        | \$26,554                |
| BG 3, CT 52.01 | 62%                         | 28%                       | 0%                               | 0%    | 0%                                        | 8%                    | 2%             | 3%                               | 97%                | 33.8%                                        | \$25,000                |
| BG 1, CT 52.02 | 52%                         | 28%                       | 0%                               | 0%    | 0%                                        | 11%                   | 8%             | 1%                               | 99%                | 64.3%                                        | \$17,107                |
| BG 2, CT 52.02 | 74%                         | 26%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 2%                               | 98%                | 22.8%                                        | \$32,188                |
| BG 3, CT 52.02 | 79%                         | 10%                       | 0%                               | 0%    | 0%                                        | 2%                    | 9%             | 4%                               | 96%                | 29.3%                                        | \$24,081                |
| BG 1, CT 52.04 | 62%                         | 16%                       | 0%                               | 11%   | 0%                                        | 10%                   | 2%             | 0%                               | 100%               | 54.3%                                        | \$19,527                |
| BG 2, CT 52.04 | 74%                         | 14%                       | 0%                               | 0%    | 0%                                        | 4%                    | 8%             | 0%                               | 100%               | 7.3%                                         | \$33,466                |
| BG 1, CT 52.14 | 47%                         | 23%                       | 1%                               | 5%    | 0%                                        | 13%                   | 12%            | 0%                               | 100%               | 60.1%                                        | \$8,750                 |
| BG 2, CT 52.14 | 62%                         | 14%                       | 1%                               | 2%    | 0%                                        | 17%                   | 5%             | 1%                               | 99%                | 24.9%                                        | \$23,455                |
| BG 3, CT 52.14 | 65%                         | 11%                       | 0%                               | 2%    | 0%                                        | 18%                   | 4%             | 3%                               | 97%                | 43.3%                                        | \$25,375                |
| BG 1, CT 52.15 | 46%                         | 22%                       | 0%                               | 3%    | 0%                                        | 23%                   | 7%             | 3%                               | 97%                | 65.6%                                        | \$15,290                |
| BG 2, CT 52.15 | 62%                         | 29%                       | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 3%                               | 97%                | 26.5%                                        | \$26,359                |
| BG 1, CT 53    | 65%                         | 20%                       | 0%                               | 3%    | 0%                                        | 11%                   | 2%             | 0%                               | 100%               | 39.2%                                        | \$22,639                |
| BG 2, CT 53    | 52%                         | 27%                       | 3%                               | 1%    | 0%                                        | 11%                   | 6%             | 4%                               | 96%                | 38.7%                                        | \$25,921                |
| BG 3, CT 53    | 41%                         | 31%                       | 1%                               | 6%    | 0%                                        | 21%                   | 0%             | 10%                              | 90%                | 49.6%                                        | \$18,264                |
| BG 1, CT 54.01 | 76%                         | 6%                        | 0%                               | 0%    | 0%                                        | 16%                   | 2%             | 2%                               | 98%                | 26.7%                                        | \$41,339                |
| BG 2, CT 54.01 | 81%                         | 6%                        | 0%                               | 5%    | 0%                                        | 7%                    | 1%             | 2%                               | 98%                | 21.3%                                        | \$36,019                |
| BG 3, CT 54.01 | 68%                         | 15%                       | 0%                               | 0%    | 0%                                        | 2%                    | 15%            | 0%                               | 100%               | 27.0%                                        | \$44,957                |
| BG 4, CT 54.01 | 66%                         | 12%                       | 0%                               | 0%    | 0%                                        | 5%                    | 17%            | 1%                               | 99%                | 41.1%                                        | \$24,679                |
| BG 1, CT 54.02 | 49%                         | 18%                       | 0%                               | 4%    | 0%                                        | 26%                   | 3%             | 1%                               | 99%                | 86.9%                                        | \$2,896                 |
| BG 1, CT 54.03 | 69%                         | 4%                        | 0%                               | 4%    | 0%                                        | 14%                   | 9%             | 3%                               | 97%                | 12.1%                                        | \$50,227                |
| BG 2, CT 54.03 | 78%                         | 7%                        | 0%                               | 0%    | 0%                                        | 9%                    | 5%             | 1%                               | 99%                | 36.8%                                        | \$40,250                |
| BG 3, CT 54.03 | 51%                         | 26%                       | 3%                               | 2%    | 0%                                        | 14%                   | 3%             | 1%                               | 99%                | 81.0%                                        | \$4,523                 |
| BG 1, CT 55    | 52%                         | 23%                       | 0%                               | 6%    | 0%                                        | 17%                   | 2%             | 2%                               | 98%                | 31.1%                                        | \$16,961                |
| BG 2, CT 55    | 40%                         | 17%                       | 0%                               | 10%   | 0%                                        | 21%                   | 12%            | 3%                               | 97%                | 36.4%                                        | \$17,946                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 55    | 61%                         | 17%                       | 1%                               | 4%    | 0%                                        | 8%                    | 10%            | 0%                               | 100%               | 27.7%                                        | \$27,637                |
| BG 4, CT 55    | 55%                         | 5%                        | 0%                               | 5%    | 0%                                        | 23%                   | 12%            | 5%                               | 95%                | 58.5%                                        | \$8,317                 |
| BG 1, CT 56.01 | 52%                         | 21%                       | 0%                               | 6%    | 0%                                        | 15%                   | 5%             | 2%                               | 98%                | 29.9%                                        | \$26,522                |
| BG 2, CT 56.01 | 80%                         | 17%                       | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 3%                               | 97%                | 12.7%                                        | \$31,698                |
| BG 1, CT 56.02 | 41%                         | 38%                       | 0%                               | 2%    | 0%                                        | 7%                    | 11%            | 5%                               | 95%                | 74.7%                                        | \$4,940                 |
| BG 2, CT 56.02 | 89%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 2%             | 0%                               | 100%               | 28.4%                                        | \$26,350                |
| BG 3, CT 56.02 | 43%                         | 41%                       | 0%                               | 5%    | 0%                                        | 8%                    | 3%             | 1%                               | 99%                | 58.2%                                        | \$13,958                |
| BG 4, CT 56.02 | 73%                         | 5%                        | 0%                               | 9%    | 0%                                        | 6%                    | 7%             | 4%                               | 96%                | 32.6%                                        | \$24,219                |
| BG 1, CT 58    | 70%                         | 11%                       | 0%                               | 5%    | 0%                                        | 12%                   | 2%             | 8%                               | 92%                | 29.0%                                        | \$23,517                |
| BG 2, CT 58    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 3, CT 58    | 63%                         | 13%                       | 0%                               | 1%    | 0%                                        | 8%                    | 15%            | 6%                               | 94%                | 5.5%                                         | \$75,147                |
| BG 1, CT 59    | 75%                         | 10%                       | 0%                               | 0%    | 0%                                        | 8%                    | 6%             | 0%                               | 100%               | 56.8%                                        | \$15,900                |
| BG 2, CT 59    | 73%                         | 4%                        | 1%                               | 4%    | 0%                                        | 18%                   | 0%             | 0%                               | 100%               | 35.2%                                        | \$17,656                |
| BG 1, CT 60    | 49%                         | 11%                       | 0%                               | 0%    | 0%                                        | 34%                   | 6%             | 2%                               | 98%                | 75.2%                                        | \$12,311                |
| BG 2, CT 60    | 50%                         | 18%                       | 0%                               | 0%    | 0%                                        | 22%                   | 10%            | 1%                               | 99%                | 60.0%                                        | \$10,707                |
| BG 1, CT 61.01 | 53%                         | 13%                       | 2%                               | 0%    | 0%                                        | 13%                   | 19%            | 2%                               | 98%                | 68.2%                                        | \$14,328                |
| BG 2, CT 61.01 | 63%                         | 13%                       | 3%                               | 0%    | 0%                                        | 12%                   | 8%             | 0%                               | 100%               | 57.7%                                        | \$15,625                |
| BG 3, CT 61.01 | 66%                         | 15%                       | 0%                               | 0%    | 0%                                        | 2%                    | 17%            | 1%                               | 99%                | 73.8%                                        | \$4,266                 |
| BG 1, CT 61.02 | 73%                         | 10%                       | 0%                               | 0%    | 0%                                        | 8%                    | 8%             | 0%                               | 100%               | 27.0%                                        | \$16,696                |
| BG 2, CT 61.02 | 57%                         | 12%                       | 0%                               | 0%    | 0%                                        | 19%                   | 12%            | 0%                               | 100%               | 45.9%                                        | \$16,648                |
| BG 1, CT 62    | 72%                         | 16%                       | 0%                               | 0%    | 0%                                        | 4%                    | 7%             | 1%                               | 99%                | 46.0%                                        | \$15,761                |
| BG 2, CT 62    | 73%                         | 17%                       | 1%                               | 0%    | 0%                                        | 5%                    | 4%             | 3%                               | 97%                | 51.5%                                        | \$20,852                |
| BG 3, CT 62    | 67%                         | 14%                       | 0%                               | 0%    | 0%                                        | 14%                   | 5%             | 0%                               | 100%               | 58.9%                                        | \$7,052                 |
| BG 1, CT 63    | 73%                         | 4%                        | 0%                               | 0%    | 0%                                        | 17%                   | 6%             | 0%                               | 100%               | 27.3%                                        | \$45,294                |
| BG 2, CT 63    | 64%                         | 12%                       | 9%                               | 3%    | 0%                                        | 1%                    | 10%            | 3%                               | 97%                | 11.4%                                        | \$42,500                |
| BG 3, CT 63    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 4%                               | 96%                | 34.0%                                        | \$33,911                |
| BG 4, CT 63    | 90%                         | 9%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 5%                               | 95%                | 26.5%                                        | \$33,000                |
| BG 5, CT 63    | 83%                         | 9%                        | 3%                               | 3%    | 0%                                        | 0%                    | 1%             | 3%                               | 97%                | 74.2%                                        | \$9,442                 |
| BG 6, CT 63    | 84%                         | 8%                        | 0%                               | 0%    | 0%                                        | 5%                    | 3%             | 0%                               | 100%               | 30.8%                                        | \$26,116                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 65    | 82%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 18%            | 2%                               | 98%                | 30.1%                                        | \$21,563                |
| BG 2, CT 65    | 88%                         | 5%                        | 0%                               | 3%    | 0%                                        | 4%                    | 0%             | 7%                               | 93%                | 15.0%                                        | \$43,542                |
| BG 3, CT 65    | 91%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 4%             | 5%                               | 95%                | 12.5%                                        | \$37,344                |
| BG 1, CT 66    | 80%                         | 7%                        | 0%                               | 0%    | 0%                                        | 8%                    | 5%             | 2%                               | 98%                | 51.7%                                        | \$14,223                |
| BG 2, CT 66    | 53%                         | 9%                        | 0%                               | 2%    | 0%                                        | 19%                   | 17%            | 6%                               | 94%                | 63.2%                                        | \$15,938                |
| BG 1, CT 67    | 85%                         | 9%                        | 2%                               | 0%    | 0%                                        | 1%                    | 4%             | 2%                               | 98%                | 19.6%                                        | \$48,194                |
| BG 2, CT 67    | 68%                         | 9%                        | 0%                               | 0%    | 0%                                        | 21%                   | 2%             | 0%                               | 100%               | 16.4%                                        | \$45,938                |
| BG 3, CT 67    | 73%                         | 4%                        | 0%                               | 0%    | 0%                                        | 7%                    | 15%            | 0%                               | 100%               | 41.3%                                        | \$21,328                |
| BG 4, CT 67    | 98%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 24.9%                                        | \$27,091                |
| BG 1, CT 68    | 86%                         | 6%                        | 0%                               | 0%    | 0%                                        | 4%                    | 5%             | 1%                               | 99%                | 26.0%                                        | \$24,896                |
| BG 1, CT 69    | 47%                         | 34%                       | 0%                               | 0%    | 0%                                        | 5%                    | 14%            | 1%                               | 99%                | 49.3%                                        | \$16,250                |
| BG 2, CT 69    | 68%                         | 32%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 4.8%                                         | \$25,711                |
| BG 3, CT 69    | 70%                         | 11%                       | 3%                               | 1%    | 0%                                        | 7%                    | 7%             | 0%                               | 100%               | 41.7%                                        | \$23,333                |
| BG 4, CT 69    | 47%                         | 38%                       | 0%                               | 0%    | 0%                                        | 8%                    | 7%             | 1%                               | 99%                | 45.9%                                        | \$14,525                |
| BG 1, CT 70.04 | 79%                         | 12%                       | 0%                               | 0%    | 0%                                        | 1%                    | 7%             | 0%                               | 100%               | 18.4%                                        | \$14,697                |
| BG 2, CT 70.04 | 80%                         | 16%                       | 0%                               | 1%    | 0%                                        | 0%                    | 3%             | 0%                               | 100%               | 37.1%                                        | \$17,171                |
| BG 3, CT 70.04 | 66%                         | 18%                       | 4%                               | 0%    | 0%                                        | 6%                    | 7%             | 2%                               | 98%                | 38.5%                                        | \$21,705                |
| BG 1, CT 71    | 60%                         | 26%                       | 0%                               | 0%    | 0%                                        | 5%                    | 9%             | 1%                               | 99%                | 21.0%                                        | \$25,833                |
| BG 2, CT 71    | 51%                         | 42%                       | 0%                               | 0%    | 0%                                        | 1%                    | 6%             | 2%                               | 98%                | 29.8%                                        | \$29,509                |
| BG 1, CT 73    | 62%                         | 19%                       | 0%                               | 0%    | 0%                                        | 13%                   | 7%             | 1%                               | 99%                | 23.4%                                        | \$27,569                |
| BG 2, CT 73    | 89%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 9%             | 2%                               | 98%                | 11.4%                                        | \$31,940                |
| BG 3, CT 73    | 66%                         | 8%                        | 0%                               | 0%    | 0%                                        | 12%                   | 15%            | 2%                               | 98%                | 28.8%                                        | \$26,000                |
| BG 4, CT 73    | 90%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 0%                               | 100%               | 13.4%                                        | \$30,962                |
| BG 1, CT 74    | 65%                         | 20%                       | 0%                               | 0%    | 0%                                        | 2%                    | 13%            | 4%                               | 96%                | 39.2%                                        | \$26,500                |
| BG 2, CT 74    | 54%                         | 38%                       | 1%                               | 0%    | 0%                                        | 0%                    | 8%             | 2%                               | 98%                | 33.4%                                        | \$15,917                |
| BG 3, CT 74    | 64%                         | 16%                       | 4%                               | 0%    | 0%                                        | 2%                    | 15%            | 1%                               | 99%                | 46.7%                                        | \$18,824                |
| BG 1, CT 75    | 48%                         | 34%                       | 2%                               | 0%    | 0%                                        | 3%                    | 13%            | 0%                               | 100%               | 40.9%                                        | \$20,357                |
| BG 2, CT 75    | 51%                         | 27%                       | 14%                              | 0%    | 0%                                        | 6%                    | 3%             | 0%                               | 100%               | 70.1%                                        | \$17,460                |
| BG 1, CT 76    | 66%                         | 21%                       | 7%                               | 0%    | 0%                                        | 4%                    | 2%             | 3%                               | 97%                | 48.4%                                        | \$18,796                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 76    | 50%                         | 50%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 47.2%                                        | \$16,993                |
| BG 3, CT 76    | 43%                         | 53%                       | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 46.7%                                        | \$11,250                |
| BG 4, CT 76    | 66%                         | 27%                       | 0%                               | 0%    | 0%                                        | 5%                    | 2%             | 0%                               | 100%               | 58.2%                                        | \$12,917                |
| BG 1, CT 77    | 43%                         | 41%                       | 0%                               | 0%    | 0%                                        | 15%                   | 2%             | 0%                               | 100%               | 51.6%                                        | \$9,956                 |
| BG 2, CT 77    | 41%                         | 48%                       | 0%                               | 10%   | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 53.7%                                        | \$16,313                |
| BG 3, CT 77    | 57%                         | 29%                       | 0%                               | 0%    | 0%                                        | 4%                    | 10%            | 0%                               | 100%               | 66.7%                                        | \$14,302                |
| BG 4, CT 77    | 63%                         | 36%                       | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 21.6%                                        | \$24,844                |
| BG 1, CT 78    | 51%                         | 46%                       | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 31.1%                                        | \$19,402                |
| BG 2, CT 78    | 66%                         | 31%                       | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 0%                               | 100%               | 38.7%                                        | \$26,176                |
| BG 3, CT 78    | 38%                         | 62%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 38.2%                                        | \$19,167                |
| BG 4, CT 78    | 87%                         | 7%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 2%                               | 98%                | 46.7%                                        | \$20,203                |
| BG 5, CT 78    | 59%                         | 33%                       | 2%                               | 1%    | 0%                                        | 0%                    | 5%             | 0%                               | 100%               | 93.4%                                        | \$5,000                 |
| BG 1, CT 79    | 86%                         | 13%                       | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 5%                               | 95%                | 16.5%                                        | \$37,938                |
| BG 2, CT 79    | 77%                         | 11%                       | 0%                               | 0%    | 0%                                        | 7%                    | 5%             | 3%                               | 97%                | 20.4%                                        | \$46,705                |
| BG 3, CT 79    | 95%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 4%                               | 96%                | 20.0%                                        | \$36,360                |
| BG 1, CT 80.01 | 69%                         | 24%                       | 0%                               | 0%    | 0%                                        | 3%                    | 4%             | 0%                               | 100%               | 31.1%                                        | \$31,105                |
| BG 2, CT 80.01 | 72%                         | 21%                       | 1%                               | 0%    | 0%                                        | 1%                    | 5%             | 5%                               | 95%                | 26.8%                                        | \$24,180                |
| BG 3, CT 80.01 | 47%                         | 45%                       | 0%                               | 0%    | 0%                                        | 3%                    | 5%             | 2%                               | 98%                | 83.5%                                        | ND                      |
| BG 1, CT 80.02 | 53%                         | 39%                       | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 0%                               | 100%               | 62.8%                                        | \$14,129                |
| BG 2, CT 80.02 | 55%                         | 36%                       | 0%                               | 0%    | 0%                                        | 1%                    | 8%             | 2%                               | 98%                | 57.6%                                        | \$14,297                |
| BG 3, CT 80.02 | 68%                         | 27%                       | 0%                               | 0%    | 0%                                        | 3%                    | 2%             | 1%                               | 99%                | 60.9%                                        | \$18,361                |
| BG 1, CT 81    | 82%                         | 4%                        | 0%                               | 0%    | 0%                                        | 5%                    | 8%             | 11%                              | 89%                | 21.7%                                        | \$25,859                |
| BG 2, CT 81    | 89%                         | 8%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 11.4%                                        | \$43,633                |
| BG 1, CT 82.01 | 81%                         | 19%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 8%                               | 92%                | 68.8%                                        | \$4,018                 |
| BG 2, CT 82.01 | 60%                         | 34%                       | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 92.3%                                        | \$2,549                 |
| BG 3, CT 82.01 | 50%                         | 41%                       | 0%                               | 0%    | 0%                                        | 3%                    | 7%             | 0%                               | 100%               | 87.7%                                        | \$3,621                 |
| BG 1, CT 82.02 | 78%                         | 8%                        | 0%                               | 0%    | 0%                                        | 3%                    | 11%            | 1%                               | 99%                | 14.5%                                        | \$48,295                |
| BG 2, CT 82.02 | 47%                         | 33%                       | 0%                               | 0%    | 0%                                        | 4%                    | 16%            | 3%                               | 98%                | 44.3%                                        | \$22,697                |
| BG 3, CT 82.02 | 60%                         | 37%                       | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 84.3%                                        | \$2,734                 |



| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 83    | 52%                         | 41%                       | 0%                               | 0%    | 0%                                        | 5%                    | 3%             | 0%                               | 100%               | 61.8%                                        | \$17,333                |
| BG 2, CT 83    | 65%                         | 12%                       | 0%                               | 0%    | 0%                                        | 21%                   | 2%             | 0%                               | 100%               | 38.3%                                        | \$25,240                |
| BG 3, CT 83    | 44%                         | 42%                       | 0%                               | 0%    | 0%                                        | 8%                    | 5%             | 0%                               | 100%               | 40.0%                                        | \$29,007                |
| BG 4, CT 83    | 47%                         | 33%                       | 0%                               | 0%    | 0%                                        | 17%                   | 3%             | 0%                               | 100%               | 53.6%                                        | \$17,578                |
| BG 1, CT 84    | 65%                         | 31%                       | 0%                               | 0%    | 0%                                        | 1%                    | 3%             | 3%                               | 97%                | 45.2%                                        | \$22,260                |
| BG 2, CT 84    | 55%                         | 19%                       | 0%                               | 3%    | 0%                                        | 15%                   | 9%             | 3%                               | 97%                | 40.3%                                        | \$19,688                |
| BG 3, CT 84    | 71%                         | 22%                       | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 2%                               | 98%                | 9.1%                                         | \$33,900                |
| BG 4, CT 84    | 76%                         | 14%                       | 0%                               | 0%    | 0%                                        | 0%                    | 10%            | 0%                               | 100%               | 19.1%                                        | \$22,321                |
| BG 1, CT 85    | 70%                         | 25%                       | 1%                               | 0%    | 0%                                        | 2%                    | 2%             | 1%                               | 99%                | 43.9%                                        | \$14,674                |
| BG 2, CT 85    | 72%                         | 24%                       | 3%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 30.9%                                        | \$19,939                |
| BG 3, CT 85    | 76%                         | 19%                       | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 0%                               | 100%               | 22.6%                                        | \$18,643                |
| BG 4, CT 85    | 75%                         | 19%                       | 0%                               | 0%    | 0%                                        | 3%                    | 3%             | 0%                               | 100%               | 46.8%                                        | \$16,014                |
| BG 5, CT 85    | 89%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 3%             | 3%                               | 97%                | 6.0%                                         | \$48,333                |
| BG 1, CT 86.01 | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 7%             | 0%                               | 100%               | 10.4%                                        | \$48,843                |
| BG 2, CT 86.01 | 92%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 6%                               | 94%                | 10.3%                                        | \$46,985                |
| BG 3, CT 86.01 | 81%                         | 19%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 15.1%                                        | \$33,750                |
| BG 1, CT 86.02 | 91%                         | 5%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 9%                               | 91%                | 25.9%                                        | \$35,395                |
| BG 2, CT 86.02 | 87%                         | 6%                        | 0%                               | 0%    | 0%                                        | 6%                    | 2%             | 2%                               | 98%                | 14.4%                                        | \$33,477                |
| BG 3, CT 86.02 | 87%                         | 4%                        | 0%                               | 0%    | 0%                                        | 3%                    | 6%             | 3%                               | 97%                | 37.6%                                        | \$26,367                |
| BG 4, CT 86.02 | 90%                         | 2%                        | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 4%                               | 96%                | 26.2%                                        | \$22,059                |
| BG 5, CT 86.02 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 86.03 | 93%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 10.9%                                        | \$38,125                |
| BG 2, CT 86.03 | 86%                         | 9%                        | 0%                               | 0%    | 0%                                        | 3%                    | 2%             | 1%                               | 99%                | 23.4%                                        | \$34,394                |
| BG 1, CT 87    | 47%                         | 21%                       | 0%                               | 8%    | 0%                                        | 9%                    | 14%            | 6%                               | 94%                | 65.1%                                        | \$12,462                |
| BG 2, CT 87    | 66%                         | 15%                       | 0%                               | 4%    | 0%                                        | 15%                   | 1%             | 5%                               | 95%                | 57.4%                                        | \$11,168                |
| BG 3, CT 87    | 57%                         | 14%                       | 2%                               | 16%   | 0%                                        | 8%                    | 3%             | 5%                               | 95%                | 49.6%                                        | \$19,022                |
| BG 1, CT 89    | 38%                         | 23%                       | 0%                               | 10%   | 0%                                        | 12%                   | 17%            | 2%                               | 98%                | 57.0%                                        | \$14,963                |
| BG 2, CT 89    | 41%                         | 15%                       | 0%                               | 7%    | 0%                                        | 25%                   | 11%            | 2%                               | 98%                | 72.4%                                        | \$11,563                |
| BG 3, CT 89    | 25%                         | 34%                       | 1%                               | 9%    | 0%                                        | 22%                   | 9%             | 2%                               | 98%                | 52.4%                                        | \$11,866                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 90    | 53%                         | 9%                        | 0%                               | 6%    | 0%                                        | 29%                   | 3%             | 1%                               | 99%                | 53.6%                                        | \$13,448                |
| BG 2, CT 90    | 41%                         | 41%                       | 0%                               | 4%    | 0%                                        | 8%                    | 5%             | 0%                               | 100%               | 71.5%                                        | \$12,467                |
| BG 3, CT 90    | 48%                         | 26%                       | 0%                               | 4%    | 0%                                        | 20%                   | 2%             | 0%                               | 100%               | 58.8%                                        | \$14,883                |
| BG 1, CT 91.11 | 50%                         | 23%                       | 0%                               | 1%    | 0%                                        | 9%                    | 18%            | 5%                               | 95%                | 27.7%                                        | \$27,417                |
| BG 2, CT 91.11 | 71%                         | 13%                       | 2%                               | 2%    | 0%                                        | 3%                    | 10%            | 3%                               | 97%                | 30.4%                                        | \$25,241                |
| BG 1, CT 91.12 | 42%                         | 40%                       | 0%                               | 0%    | 0%                                        | 18%                   | 0%             | 0%                               | 100%               | 57.5%                                        | \$17,411                |
| BG 2, CT 91.12 | 69%                         | 7%                        | 0%                               | 8%    | 0%                                        | 6%                    | 11%            | 5%                               | 95%                | 18.5%                                        | \$37,989                |
| BG 3, CT 91.12 | 69%                         | 13%                       | 0%                               | 6%    | 0%                                        | 4%                    | 8%             | 3%                               | 97%                | 45.3%                                        | \$26,580                |
| BG 4, CT 91.12 | 70%                         | 13%                       | 3%                               | 3%    | 0%                                        | 4%                    | 7%             | 8%                               | 92%                | 32.7%                                        | \$26,154                |
| BG 1, CT 91.21 | 80%                         | 5%                        | 1%                               | 0%    | 0%                                        | 14%                   | 0%             | 4%                               | 96%                | 46.2%                                        | \$17,969                |
| BG 2, CT 91.21 | 81%                         | 11%                       | 0%                               | 0%    | 0%                                        | 4%                    | 4%             | 4%                               | 96%                | 35.5%                                        | \$29,186                |
| BG 3, CT 91.21 | 75%                         | 6%                        | 1%                               | 4%    | 0%                                        | 6%                    | 8%             | 4%                               | 96%                | 16.9%                                        | \$40,331                |
| BG 1, CT 91.22 | 51%                         | 15%                       | 0%                               | 0%    | 0%                                        | 26%                   | 9%             | 11%                              | 89%                | 57.9%                                        | \$18,482                |
| BG 2, CT 91.22 | 55%                         | 13%                       | 0%                               | 2%    | 0%                                        | 16%                   | 14%            | 2%                               | 98%                | 34.4%                                        | \$32,625                |
| BG 3, CT 91.22 | 71%                         | 15%                       | 0%                               | 0%    | 0%                                        | 5%                    | 9%             | 3%                               | 97%                | 30.3%                                        | \$38,608                |
| BG 4, CT 91.22 | 69%                         | 7%                        | 0%                               | 4%    | 0%                                        | 13%                   | 7%             | 5%                               | 95%                | 17.0%                                        | \$37,330                |
| BG 1, CT 91.23 | 75%                         | 9%                        | 0%                               | 5%    | 0%                                        | 9%                    | 2%             | 3%                               | 97%                | 19.6%                                        | \$38,917                |
| BG 2, CT 91.23 | 65%                         | 10%                       | 0%                               | 6%    | 0%                                        | 5%                    | 15%            | 0%                               | 100%               | 16.3%                                        | \$45,156                |
| BG 1, CT 93    | 32%                         | 29%                       | 0%                               | 9%    | 0%                                        | 20%                   | 10%            | 1%                               | 99%                | 46.0%                                        | \$22,803                |
| BG 2, CT 93    | 54%                         | 14%                       | 0%                               | 3%    | 0%                                        | 18%                   | 10%            | 2%                               | 98%                | 42.1%                                        | \$18,362                |
| BG 3, CT 93    | 50%                         | 4%                        | 0%                               | 9%    | 0%                                        | 35%                   | 2%             | 4%                               | 96%                | 58.2%                                        | \$13,045                |
| BG 1, CT 94    | 47%                         | 23%                       | 0%                               | 2%    | 0%                                        | 14%                   | 13%            | 0%                               | 100%               | 44.0%                                        | \$14,965                |
| BG 2, CT 94    | 66%                         | 11%                       | 0%                               | 1%    | 0%                                        | 9%                    | 13%            | 1%                               | 99%                | 27.5%                                        | \$24,583                |
| BG 1, CT 96.01 | 89%                         | 1%                        | 1%                               | 0%    | 0%                                        | 4%                    | 6%             | 6%                               | 94%                | 17.7%                                        | \$47,750                |
| BG 2, CT 96.01 | 88%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 2%             | 2%                               | 98%                | 17.5%                                        | \$34,318                |
| BG 1, CT 96.02 | 66%                         | 11%                       | 0%                               | 0%    | 0%                                        | 6%                    | 17%            | 1%                               | 99%                | 33.6%                                        | \$41,591                |
| BG 2, CT 96.02 | 85%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 3%             | 0%                               | 100%               | 13.3%                                        | \$40,588                |
| BG 1, CT 96.03 | 84%                         | 8%                        | 0%                               | 0%    | 0%                                        | 1%                    | 8%             | 0%                               | 100%               | 17.6%                                        | \$41,111                |
| BG 2, CT 96.03 | 84%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 12%            | 0%                               | 100%               | 12.6%                                        | \$73,269                |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 96.03  | 71%                         | 6%                        | 11%                              | 0%    | 0%                                        | 1%                    | 12%            | 3%                               | 97%                | 34.1%                                        | \$17,381                |
| BG 1, CT 96.14  | 86%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 3%                               | 97%                | 13.5%                                        | \$61,705                |
| BG 2, CT 96.14  | 91%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 4%             | 4%                               | 96%                | 5.0%                                         | \$58,083                |
| BG 1, CT 96.24  | 61%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 31%            | 2%                               | 98%                | 60.3%                                        | \$15,556                |
| BG 2, CT 96.24  | 69%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 29%            | 2%                               | 98%                | 24.6%                                        | \$33,393                |
| BG 3, CT 96.24  | 72%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 25%            | 1%                               | 99%                | 20.9%                                        | \$37,400                |
| BG 1, CT 98     | 79%                         | 12%                       | 0%                               | 0%    | 0%                                        | 7%                    | 2%             | 0%                               | 100%               | 8.4%                                         | \$44,125                |
| BG 2, CT 98     | 92%                         | 4%                        | 0%                               | 1%    | 0%                                        | 0%                    | 3%             | 2%                               | 98%                | 3.4%                                         | \$97,756                |
| BG 3, CT 98     | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 1%             | 7%                               | 93%                | 3.1%                                         | \$210,804               |
| BG 4, CT 98     | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 0%                               | 100%               | 0.0%                                         | \$122,000               |
| BG 5, CT 98     | 84%                         | 9%                        | 0%                               | 0%    | 0%                                        | 5%                    | 2%             | 1%                               | 99%                | 27.1%                                        | \$31,372                |
| BG 1, CT 99.01  | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 1%                               | 99%                | 2.8%                                         | \$65,909                |
| BG 2, CT 99.01  | 69%                         | 12%                       | 0%                               | 0%    | 0%                                        | 0%                    | 19%            | 3%                               | 97%                | 40.5%                                        | \$36,607                |
| BG 3, CT 99.01  | 73%                         | 13%                       | 0%                               | 0%    | 0%                                        | 3%                    | 12%            | 0%                               | 100%               | 4.1%                                         | \$63,083                |
| BG 1, CT 99.02  | 63%                         | 14%                       | 0%                               | 0%    | 0%                                        | 1%                    | 22%            | 1%                               | 99%                | 45.6%                                        | \$24,143                |
| BG 2, CT 99.02  | 62%                         | 9%                        | 0%                               | 0%    | 0%                                        | 4%                    | 26%            | 0%                               | 100%               | 44.6%                                        | \$24,792                |
| BG 3, CT 99.02  | 76%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 18%            | 1%                               | 99%                | 23.2%                                        | \$35,568                |
| BG 1, CT 99.03  | 84%                         | 0%                        | 0%                               | 0%    | 0%                                        | 4%                    | 12%            | 4%                               | 96%                | 11.2%                                        | \$88,906                |
| BG 2, CT 99.03  | 67%                         | 12%                       | 0%                               | 0%    | 0%                                        | 0%                    | 21%            | 4%                               | 96%                | 7.1%                                         | \$50,469                |
| BG 3, CT 99.03  | 77%                         | 6%                        | 0%                               | 2%    | 0%                                        | 0%                    | 15%            | 3%                               | 97%                | 13.1%                                        | \$56,719                |
| BG 4, CT 99.03  | 75%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 15%            | 1%                               | 99%                | 18.6%                                        | \$52,574                |
| BG 1, CT 99.04  | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 11%            | 0%                               | 100%               | 14.4%                                        | \$35,344                |
| BG 2, CT 99.04  | 92%                         | 3%                        | 0%                               | 1%    | 0%                                        | 0%                    | 4%             | 0%                               | 100%               | 4.6%                                         | \$55,577                |
| BG 1, CT 100.01 | 77%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 13%            | 1%                               | 99%                | 7.7%                                         | \$50,313                |
| BG 2, CT 100.01 | 70%                         | 6%                        | 0%                               | 0%    | 0%                                        | 2%                    | 22%            | 0%                               | 100%               | 13.7%                                        | \$52,350                |
| BG 3, CT 100.01 | 64%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 24%            | 1%                               | 99%                | 20.9%                                        | \$57,404                |
| BG 4, CT 100.01 | 82%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 17%            | 3%                               | 97%                | 8.6%                                         | \$49,512                |
| BG 1, CT 100.02 | 92%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 2%             | 1%                               | 99%                | 4.5%                                         | \$138,203               |
| BG 2, CT 100.02 | 82%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 15%            | 0%                               | 100%               | 4.7%                                         | \$61,453                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 100.12  | 72%                         | 2%                        | 0%                               | 0%    | 0%                                        | 4%                    | 22%            | 0%                               | 100%               | 14.4%                                        | \$43,560                |
| BG 2, CT 100.12  | 48%                         | 27%                       | 0%                               | 0%    | 0%                                        | 0%                    | 25%            | 0%                               | 100%               | 48.2%                                        | \$40,250                |
| BG 3, CT 100.12  | 77%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 15%            | 0%                               | 100%               | 5.1%                                         | \$44,250                |
| BG 4, CT 100.12  | 62%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 31%            | 0%                               | 100%               | 37.4%                                        | \$29,925                |
| BG 1, CT 100.22  | 61%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 28%            | 0%                               | 100%               | 23.1%                                        | \$36,406                |
| BG 2, CT 100.22  | 76%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 18%            | 1%                               | 99%                | 21.0%                                        | \$53,209                |
| BG 1, CT 100.32  | 54%                         | 10%                       | 0%                               | 0%    | 0%                                        | 1%                    | 34%            | 0%                               | 100%               | 59.4%                                        | \$16,875                |
| BG 2, CT 100.32  | 58%                         | 8%                        | 0%                               | 0%    | 0%                                        | 1%                    | 33%            | 0%                               | 100%               | 34.9%                                        | \$35,114                |
| BG 3, CT 100.32  | 60%                         | 2%                        | 0%                               | 2%    | 0%                                        | 0%                    | 36%            | 2%                               | 98%                | 37.5%                                        | \$31,487                |
| BG 4, CT 100.32  | 25%                         | 69%                       | 0%                               | 0%    | 0%                                        | 0%                    | 6%             | 0%                               | 100%               | 10.8%                                        | \$35,329                |
| BG 1, CT 100.42  | 60%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 32%            | 1%                               | 99%                | 26.6%                                        | \$42,721                |
| BG 2, CT 100.42  | 64%                         | 3%                        | 0%                               | 0%    | 0%                                        | 9%                    | 24%            | 1%                               | 99%                | 17.0%                                        | \$39,702                |
| BG 3, CT 100.42  | 55%                         | 8%                        | 0%                               | 0%    | 0%                                        | 5%                    | 32%            | 0%                               | 100%               | 27.9%                                        | \$29,229                |
| BG 4, CT 100.42  | 54%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 40%            | 0%                               | 100%               | 24.7%                                        | \$23,851                |
| BG 1, CT 101     | 79%                         | 6%                        | 0%                               | 0%    | 0%                                        | 2%                    | 13%            | 0%                               | 100%               | 13.8%                                        | \$95,750                |
| BG 2, CT 101     | 62%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 32%            | 1%                               | 99%                | 35.2%                                        | \$25,205                |
| BG 3, CT 101     | 49%                         | 10%                       | 2%                               | 0%    | 0%                                        | 1%                    | 38%            | 0%                               | 100%               | 36.7%                                        | \$23,412                |
| BG 1, CT 102     | 70%                         | 14%                       | 0%                               | 0%    | 0%                                        | 2%                    | 15%            | 0%                               | 100%               | 21.6%                                        | \$47,831                |
| BG 2, CT 102     | 40%                         | 23%                       | 0%                               | 0%    | 0%                                        | 2%                    | 34%            | 2%                               | 98%                | 34.5%                                        | \$19,000                |
| BG 3, CT 102     | 54%                         | 10%                       | 0%                               | 0%    | 0%                                        | 3%                    | 32%            | 0%                               | 100%               | 47.5%                                        | \$19,083                |
| BG 1, CT 105     | 65%                         | 11%                       | 1%                               | 0%    | 0%                                        | 8%                    | 15%            | 3%                               | 97%                | 47.7%                                        | \$12,008                |
| BG 2, CT 105     | 73%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 23%            | 0%                               | 100%               | 12.0%                                        | \$49,386                |
| BG 3, CT 105     | 91%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 9%             | 3%                               | 97%                | 21.7%                                        | \$44,449                |
| BG 1, CT 9800    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9801.01 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9801.02 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9801.03 | 69%                         | 0%                        | 0%                               | 0%    | 0%                                        | 14%                   | 17%            | 0%                               | 100%               | 93.6%                                        | ND                      |
| BG 1, CT 9801.04 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9801.05 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 9801.07 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9801.08 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 9802    | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 100.0%                                       | ND                      |
| BG 1, CT 9803    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 2201    | 68%                         | 10%                       | 0%                               | 0%    | 0%                                        | 1%                    | 21%            | 1%                               | 99%                | 33.7%                                        | \$29,390                |
| BG 2, CT 2201    | 70%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 19%            | 0%                               | 100%               | 27.9%                                        | \$25,461                |
| BG 3, CT 2201    | 67%                         | 11%                       | 0%                               | 0%    | 0%                                        | 2%                    | 20%            | 0%                               | 100%               | 38.0%                                        | \$17,931                |
| BG 1, CT 2202    | 81%                         | 4%                        | 0%                               | 0%    | 0%                                        | 4%                    | 12%            | 1%                               | 99%                | 80.0%                                        | \$8,420                 |
| BG 2, CT 2202    | 75%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 17%            | 0%                               | 100%               | 63.1%                                        | \$13,918                |
| BG 1, CT 2203    | 90%                         | 0%                        | 0%                               | 8%    | 0%                                        | 0%                    | 2%             | 9%                               | 91%                | 53.7%                                        | \$16,773                |
| BG 2, CT 2203    | 86%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 13%            | 0%                               | 100%               | 62.0%                                        | \$12,019                |
| BG 1, CT 2204.01 | 81%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 17%            | 0%                               | 100%               | 23.7%                                        | \$27,456                |
| BG 2, CT 2204.01 | 69%                         | 15%                       | 0%                               | 0%    | 0%                                        | 3%                    | 13%            | 0%                               | 100%               | 36.8%                                        | \$20,029                |
| BG 1, CT 2204.02 | 74%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 20%            | 0%                               | 100%               | 47.3%                                        | \$18,135                |
| BG 2, CT 2204.02 | 91%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 4%             | 1%                               | 99%                | 52.1%                                        | \$20,337                |
| BG 3, CT 2204.02 | 88%                         | 8%                        | 0%                               | 0%    | 0%                                        | 1%                    | 3%             | 1%                               | 99%                | 24.3%                                        | \$34,779                |
| BG 1, CT 2205.01 | 83%                         | 3%                        | 0%                               | 0%    | 0%                                        | 5%                    | 9%             | 3%                               | 97%                | 53.1%                                        | \$14,185                |
| BG 2, CT 2205.01 | 83%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 13%            | 0%                               | 100%               | 48.3%                                        | \$17,813                |
| BG 1, CT 2205.02 | 75%                         | 1%                        | 0%                               | 0%    | 0%                                        | 4%                    | 20%            | 0%                               | 100%               | 38.2%                                        | \$23,587                |
| BG 2, CT 2205.02 | 79%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 19%            | 0%                               | 100%               | 47.2%                                        | \$18,300                |
| BG 1, CT 2206    | 79%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 18%            | 0%                               | 100%               | 55.5%                                        | \$14,033                |
| BG 2, CT 2206    | 81%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 19%            | 2%                               | 98%                | 57.9%                                        | \$15,307                |
| BG 1, CT 2207    | 83%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 10%            | 0%                               | 100%               | 60.9%                                        | \$15,192                |
| BG 2, CT 2207    | 72%                         | 12%                       | 0%                               | 0%    | 0%                                        | 3%                    | 13%            | 2%                               | 98%                | 58.1%                                        | \$14,970                |
| BG 3, CT 2207    | 85%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 0%                               | 100%               | 64.6%                                        | \$13,734                |
| BG 1, CT 92      | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 1%                               | 99%                | 69.2%                                        | \$7,313                 |
| BG 2, CT 92      | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 2%                               | 98%                | 74.8%                                        | \$7,542                 |
| BG 1, CT 9585    | 91%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 2%                               | 98%                | 58.0%                                        | \$13,348                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 9585 | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 3%             | 0%                               | 100%               | 68.5%                                        | \$13,160                |
| BG 3, CT 9585 | 88%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 5%             | 1%                               | 99%                | 67.7%                                        | \$12,750                |
| BG 1, CT 9587 | 86%                         | 10%                       | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 48.9%                                        | \$19,688                |
| BG 2, CT 9587 | 91%                         | 0%                        | 0%                               | 0%    | 0%                                        | 8%                    | 0%             | 1%                               | 99%                | 53.1%                                        | \$16,632                |
| BG 3, CT 9587 | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 1%                               | 99%                | 18.3%                                        | \$21,159                |
| BG 1, CT 9588 | 88%                         | 3%                        | 0%                               | 0%    | 0%                                        | 10%                   | 0%             | 3%                               | 97%                | 30.5%                                        | \$21,192                |
| BG 2, CT 9588 | 95%                         | 1%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 44.9%                                        | \$16,353                |
| BG 3, CT 9588 | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 48.9%                                        | \$17,054                |
| BG 1, CT 9589 | 96%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 0%                               | 100%               | 85.1%                                        | \$4,476                 |
| BG 2, CT 9589 | 94%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 30.1%                                        | \$17,392                |
| BG 1, CT 9590 | 88%                         | 2%                        | 0%                               | 0%    | 0%                                        | 6%                    | 4%             | 0%                               | 100%               | 46.9%                                        | \$11,552                |
| BG 2, CT 9590 | 97%                         | 0%                        | 0%                               | 1%    | 0%                                        | 1%                    | 1%             | 0%                               | 100%               | 60.5%                                        | \$15,417                |
| BG 3, CT 9590 | 95%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 1%                               | 99%                | 28.0%                                        | \$20,966                |
| BG 1, CT 9592 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 59.6%                                        | \$12,898                |
| BG 2, CT 9592 | 93%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 4%                               | 96%                | 58.1%                                        | \$10,069                |
| BG 3, CT 9592 | 89%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 1%             | 0%                               | 100%               | 67.2%                                        | \$15,663                |
| BG 1, CT 9593 | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 4%                               | 96%                | 50.4%                                        | \$15,700                |
| BG 2, CT 9593 | 87%                         | 2%                        | 0%                               | 0%    | 0%                                        | 11%                   | 0%             | 0%                               | 100%               | 62.0%                                        | \$15,673                |
| BG 3, CT 9593 | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 0%                               | 100%               | 76.9%                                        | \$10,302                |
| BG 1, CT 9595 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 0%                               | 100%               | 52.8%                                        | \$14,821                |
| BG 2, CT 9595 | 92%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 51.7%                                        | \$17,738                |
| BG 3, CT 9595 | 91%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 2%                               | 98%                | 69.5%                                        | \$11,181                |
| BG 1, CT 9533 | 61%                         | 7%                        | 0%                               | 0%    | 0%                                        | 27%                   | 5%             | 1%                               | 99%                | 28.1%                                        | \$33,424                |
| BG 2, CT 9533 | 49%                         | 14%                       | 0%                               | 0%    | 0%                                        | 34%                   | 3%             | 0%                               | 100%               | 73.1%                                        | \$11,714                |
| BG 1, CT 9535 | 48%                         | 2%                        | 0%                               | 0%    | 0%                                        | 48%                   | 2%             | 0%                               | 100%               | 48.0%                                        | \$23,000                |
| BG 2, CT 9535 | 60%                         | 3%                        | 0%                               | 0%    | 0%                                        | 22%                   | 15%            | 0%                               | 100%               | 67.9%                                        | \$11,486                |
| BG 3, CT 9535 | 41%                         | 20%                       | 0%                               | 0%    | 0%                                        | 36%                   | 4%             | 0%                               | 100%               | 68.0%                                        | \$11,277                |
| BG 1, CT 9536 | 52%                         | 2%                        | 0%                               | 0%    | 0%                                        | 40%                   | 6%             | 0%                               | 100%               | 31.9%                                        | \$33,500                |
| BG 2, CT 9536 | 72%                         | 8%                        | 0%                               | 0%    | 0%                                        | 15%                   | 5%             | 0%                               | 100%               | 38.1%                                        | \$23,800                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 9536    | 49%                         | 16%                       | 0%                               | 0%    | 0%                                        | 33%                   | 2%             | 0%                               | 100%               | 53.3%                                        | \$13,534                |
| BG 1, CT 9537    | 41%                         | 16%                       | 0%                               | 0%    | 0%                                        | 25%                   | 17%            | 0%                               | 100%               | 79.2%                                        | \$13,393                |
| BG 2, CT 9537    | 67%                         | 7%                        | 0%                               | 0%    | 0%                                        | 21%                   | 6%             | 0%                               | 100%               | 39.9%                                        | \$18,750                |
| BG 3, CT 9537    | 75%                         | 8%                        | 0%                               | 0%    | 0%                                        | 11%                   | 6%             | 0%                               | 100%               | 31.8%                                        | \$20,313                |
| BG 1, CT 9538    | 62%                         | 5%                        | 0%                               | 0%    | 0%                                        | 31%                   | 2%             | 0%                               | 100%               | 63.0%                                        | \$6,300                 |
| BG 2, CT 9538    | 73%                         | 4%                        | 0%                               | 0%    | 0%                                        | 20%                   | 3%             | 0%                               | 100%               | 58.1%                                        | \$15,025                |
| BG 3, CT 9538    | 50%                         | 3%                        | 0%                               | 0%    | 0%                                        | 37%                   | 9%             | 0%                               | 100%               | 75.3%                                        | \$11,625                |
| BG 4, CT 9538    | 71%                         | 4%                        | 0%                               | 0%    | 0%                                        | 23%                   | 1%             | 0%                               | 100%               | 36.2%                                        | \$20,458                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 5101.01 | 58%                         | 6%                        | 1%                               | 0%    | 0%                                        | 3%                    | 32%            | 0%                               | 100%               | 8.5%                                         | \$53,378                |
| BG 2, CT 5101.01 | 68%                         | 2%                        | 0%                               | 0%    | 0%                                        | 14%                   | 17%            | 1%                               | 99%                | 12.6%                                        | \$34,788                |
| BG 3, CT 5101.01 | 59%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 31%            | 0%                               | 100%               | 23.8%                                        | \$54,375                |
| BG 4, CT 5101.01 | 56%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 33%            | 0%                               | 100%               | 18.7%                                        | \$53,622                |
| BG 1, CT 5101.02 | 65%                         | 8%                        | 0%                               | 0%    | 0%                                        | 6%                    | 21%            | 1%                               | 99%                | 62.7%                                        | \$15,614                |
| BG 2, CT 5101.02 | 52%                         | 28%                       | 0%                               | 0%    | 0%                                        | 4%                    | 16%            | 1%                               | 99%                | 42.3%                                        | \$18,875                |
| BG 1, CT 5102    | 17%                         | 13%                       | 0%                               | 0%    | 0%                                        | 9%                    | 61%            | 0%                               | 100%               | 35.7%                                        | \$19,410                |
| BG 2, CT 5102    | 57%                         | 4%                        | 0%                               | 0%    | 0%                                        | 15%                   | 23%            | 0%                               | 100%               | 58.8%                                        | \$14,774                |
| BG 3, CT 5102    | 42%                         | 24%                       | 0%                               | 0%    | 0%                                        | 6%                    | 29%            | 2%                               | 98%                | 58.1%                                        | \$13,278                |
| BG 4, CT 5102    | 75%                         | 4%                        | 0%                               | 0%    | 0%                                        | 4%                    | 18%            | 1%                               | 99%                | 14.1%                                        | \$63,250                |
| BG 1, CT 5103    | 47%                         | 17%                       | 0%                               | 0%    | 0%                                        | 5%                    | 31%            | 0%                               | 100%               | 54.0%                                        | \$17,552                |
| BG 2, CT 5103    | 47%                         | 15%                       | 0%                               | 0%    | 0%                                        | 2%                    | 35%            | 0%                               | 100%               | 39.8%                                        | \$19,281                |
| BG 1, CT 5104    | 54%                         | 5%                        | 0%                               | 0%    | 0%                                        | 1%                    | 41%            | 0%                               | 100%               | 47.5%                                        | \$17,788                |
| BG 2, CT 5104    | 64%                         | 1%                        | 2%                               | 0%    | 0%                                        | 0%                    | 33%            | 2%                               | 98%                | 58.6%                                        | \$12,083                |
| BG 3, CT 5104    | 56%                         | 5%                        | 1%                               | 0%    | 0%                                        | 4%                    | 35%            | 0%                               | 100%               | 78.9%                                        | \$12,455                |
| BG 1, CT 5105.02 | 68%                         | 8%                        | 0%                               | 1%    | 0%                                        | 3%                    | 21%            | 0%                               | 100%               | 38.3%                                        | \$25,303                |
| BG 2, CT 5105.02 | 67%                         | 8%                        | 0%                               | 0%    | 0%                                        | 13%                   | 13%            | 0%                               | 100%               | 51.0%                                        | \$24,219                |
| BG 3, CT 5105.02 | 78%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 17%            | 0%                               | 100%               | 26.7%                                        | \$27,121                |
| BG 1, CT 5105.03 | 80%                         | 1%                        | 0%                               | 0%    | 0%                                        | 8%                    | 11%            | 0%                               | 100%               | 34.9%                                        | \$38,281                |
| BG 2, CT 5105.03 | 63%                         | 9%                        | 0%                               | 0%    | 0%                                        | 12%                   | 16%            | 0%                               | 100%               | 34.9%                                        | \$35,295                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 5105.03 | 58%                         | 11%                       | 0%                               | 0%    | 0%                                        | 4%                    | 28%            | 0%                               | 100%               | 31.3%                                        | \$53,639                |
| BG 4, CT 5105.03 | 45%                         | 4%                        | 0%                               | 0%    | 0%                                        | 31%                   | 20%            | 0%                               | 100%               | 31.4%                                        | \$30,357                |
| BG 1, CT 5105.04 | 57%                         | 5%                        | 0%                               | 0%    | 0%                                        | 15%                   | 22%            | 2%                               | 98%                | 30.4%                                        | \$35,058                |
| BG 2, CT 5105.04 | 51%                         | 11%                       | 0%                               | 0%    | 0%                                        | 14%                   | 24%            | 0%                               | 100%               | 14.8%                                        | \$39,696                |
| BG 1, CT 5105.05 | 82%                         | 4%                        | 0%                               | 0%    | 0%                                        | 7%                    | 6%             | 1%                               | 99%                | 4.0%                                         | \$56,793                |
| BG 2, CT 5105.05 | 62%                         | 14%                       | 0%                               | 0%    | 0%                                        | 6%                    | 17%            | 0%                               | 100%               | 30.6%                                        | \$34,674                |
| BG 1, CT 5106.01 | 47%                         | 2%                        | 0%                               | 0%    | 0%                                        | 6%                    | 45%            | 0%                               | 100%               | 25.5%                                        | \$37,054                |
| BG 1, CT 5106.02 | 65%                         | 6%                        | 0%                               | 0%    | 0%                                        | 3%                    | 25%            | 0%                               | 100%               | 53.1%                                        | \$24,950                |
| BG 2, CT 5106.02 | 38%                         | 0%                        | 0%                               | 0%    | 0%                                        | 34%                   | 28%            | 0%                               | 100%               | 30.0%                                        | \$28,897                |
| BG 3, CT 5106.02 | 49%                         | 6%                        | 0%                               | 0%    | 0%                                        | 4%                    | 42%            | 0%                               | 100%               | 36.3%                                        | \$26,153                |
| BG 1, CT 5107.01 | 52%                         | 6%                        | 0%                               | 0%    | 0%                                        | 4%                    | 37%            | 0%                               | 100%               | 32.9%                                        | \$33,415                |
| BG 2, CT 5107.01 | 51%                         | 5%                        | 0%                               | 0%    | 0%                                        | 15%                   | 28%            | 0%                               | 100%               | 16.4%                                        | \$27,173                |
| BG 1, CT 5107.02 | 44%                         | 10%                       | 0%                               | 0%    | 0%                                        | 8%                    | 38%            | 0%                               | 100%               | 73.1%                                        | \$11,207                |
| BG 2, CT 5107.02 | 53%                         | 5%                        | 0%                               | 0%    | 0%                                        | 10%                   | 31%            | 0%                               | 100%               | 47.0%                                        | \$21,122                |
| BG 1, CT 1202    | 49%                         | 7%                        | 0%                               | 0%    | 0%                                        | 2%                    | 42%            | 0%                               | 100%               | 28.9%                                        | \$24,074                |
| BG 2, CT 1202    | 43%                         | 11%                       | 0%                               | 0%    | 0%                                        | 2%                    | 45%            | 2%                               | 98%                | 45.8%                                        | \$23,575                |
| BG 3, CT 1202    | 74%                         | 4%                        | 0%                               | 0%    | 0%                                        | 3%                    | 19%            | 0%                               | 100%               | 17.2%                                        | \$33,500                |
| BG 1, CT 1203    | 60%                         | 20%                       | 0%                               | 1%    | 0%                                        | 0%                    | 19%            | 0%                               | 100%               | 29.6%                                        | \$25,982                |
| BG 2, CT 1203    | 55%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 33%            | 1%                               | 99%                | 30.3%                                        | \$32,647                |
| BG 1, CT 1204    | 49%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 41%            | 3%                               | 97%                | 27.3%                                        | \$33,594                |
| BG 2, CT 1204    | 61%                         | 9%                        | 0%                               | 0%    | 0%                                        | 2%                    | 29%            | 2%                               | 98%                | 39.4%                                        | \$21,103                |
| BG 1, CT 1205    | 51%                         | 13%                       | 0%                               | 0%    | 0%                                        | 5%                    | 30%            | 4%                               | 96%                | 27.4%                                        | \$28,455                |
| BG 1, CT 1206    | 63%                         | 11%                       | 0%                               | 0%    | 0%                                        | 3%                    | 23%            | 0%                               | 100%               | 11.8%                                        | \$24,952                |
| BG 2, CT 1206    | 55%                         | 15%                       | 0%                               | 0%    | 0%                                        | 0%                    | 29%            | 0%                               | 100%               | 23.0%                                        | \$33,676                |
| BG 3, CT 1206    | 64%                         | 13%                       | 0%                               | 0%    | 0%                                        | 7%                    | 16%            | 0%                               | 100%               | 28.1%                                        | \$33,155                |
| BG 1, CT 1207    | 50%                         | 9%                        | 0%                               | 0%    | 0%                                        | 2%                    | 40%            | 3%                               | 97%                | 22.3%                                        | \$27,619                |
| BG 1, CT 1208    | 39%                         | 22%                       | 0%                               | 0%    | 0%                                        | 7%                    | 32%            | 1%                               | 99%                | 27.9%                                        | \$30,993                |
| BG 2, CT 1208    | 63%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 31%            | 5%                               | 95%                | 33.9%                                        | \$25,337                |
| BG 3, CT 1208    | 51%                         | 8%                        | 0%                               | 3%    | 0%                                        | 2%                    | 35%            | 4%                               | 96%                | 22.3%                                        | \$26,991                |



| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 1209    | 51%                         | 10%                       | 0%                               | 0%    | 0%                                        | 3%                    | 36%            | 0%                               | 100%               | 11.7%                                        | \$44,844                |
| BG 2, CT 1209    | 45%                         | 13%                       | 2%                               | 1%    | 0%                                        | 5%                    | 34%            | 3%                               | 97%                | 23.2%                                        | \$45,185                |
| BG 3, CT 1209    | 57%                         | 7%                        | 1%                               | 0%    | 0%                                        | 0%                    | 36%            | 0%                               | 100%               | 44.2%                                        | \$23,611                |
| BG 1, CT 1210.01 | 60%                         | 14%                       | 0%                               | 0%    | 0%                                        | 2%                    | 24%            | 1%                               | 99%                | 24.9%                                        | \$32,930                |
| BG 2, CT 1210.01 | 44%                         | 11%                       | 0%                               | 0%    | 0%                                        | 3%                    | 42%            | 1%                               | 99%                | 27.0%                                        | \$48,175                |
| BG 1, CT 1210.02 | 50%                         | 17%                       | 0%                               | 0%    | 0%                                        | 4%                    | 29%            | 0%                               | 100%               | 17.7%                                        | \$36,644                |
| BG 2, CT 1210.02 | 50%                         | 12%                       | 0%                               | 0%    | 0%                                        | 16%                   | 23%            | 0%                               | 100%               | 26.1%                                        | \$33,726                |
| BG 3, CT 1210.02 | 43%                         | 13%                       | 0%                               | 0%    | 0%                                        | 0%                    | 44%            | 0%                               | 100%               | 24.3%                                        | \$38,571                |
| BG 1, CT 1211    | 18%                         | 10%                       | 0%                               | 0%    | 0%                                        | 3%                    | 70%            | 1%                               | 99%                | 45.5%                                        | \$18,464                |
| BG 2, CT 1211    | 27%                         | 18%                       | 0%                               | 0%    | 0%                                        | 7%                    | 48%            | 1%                               | 99%                | 39.9%                                        | \$25,549                |
| BG 3, CT 1211    | 28%                         | 21%                       | 0%                               | 0%    | 0%                                        | 6%                    | 46%            | 0%                               | 100%               | 30.6%                                        | \$17,739                |
| BG 1, CT 1212    | 19%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 77%            | 0%                               | 100%               | 60.2%                                        | \$16,914                |
| BG 2, CT 1212    | 28%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 59%            | 5%                               | 95%                | 53.3%                                        | \$13,403                |
| BG 3, CT 1212    | 19%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 69%            | 0%                               | 100%               | 50.1%                                        | \$19,375                |
| BG 1, CT 1213    | 22%                         | 8%                        | 0%                               | 0%    | 0%                                        | 3%                    | 67%            | 0%                               | 100%               | 33.9%                                        | \$23,773                |
| BG 1, CT 1214    | 41%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 48%            | 1%                               | 99%                | 12.9%                                        | \$54,421                |
| BG 2, CT 1214    | 62%                         | 14%                       | 1%                               | 0%    | 0%                                        | 3%                    | 20%            | 2%                               | 98%                | 15.1%                                        | \$33,750                |
| BG 3, CT 1214    | 73%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 27%            | 3%                               | 97%                | 7.5%                                         | \$75,972                |
| BG 1, CT 1217.01 | 42%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 50%            | 0%                               | 100%               | 36.9%                                        | \$33,274                |
| BG 1, CT 1217.02 | 32%                         | 18%                       | 0%                               | 0%    | 0%                                        | 0%                    | 50%            | 0%                               | 100%               | 58.5%                                        | \$16,250                |
| BG 2, CT 1217.02 | 36%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 59%            | 0%                               | 100%               | 73.5%                                        | \$10,903                |
| BG 3, CT 1217.02 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 4, CT 1217.02 | 27%                         | 12%                       | 2%                               | 0%    | 0%                                        | 0%                    | 59%            | 1%                               | 99%                | 46.3%                                        | \$20,156                |
| BG 1, CT 1218.01 | 61%                         | 10%                       | 0%                               | 0%    | 0%                                        | 1%                    | 28%            | 0%                               | 100%               | 69.6%                                        | \$13,611                |
| BG 2, CT 1218.01 | 50%                         | 17%                       | 0%                               | 0%    | 0%                                        | 0%                    | 34%            | 0%                               | 100%               | 32.9%                                        | \$19,857                |
| BG 3, CT 1218.01 | 55%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 36%            | 0%                               | 100%               | 52.2%                                        | \$18,514                |
| BG 4, CT 1218.01 | 74%                         | 2%                        | 1%                               | 0%    | 0%                                        | 1%                    | 22%            | 1%                               | 99%                | 70.0%                                        | \$15,310                |
| BG 1, CT 1218.02 | 72%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 21%            | 1%                               | 99%                | 51.0%                                        | \$19,196                |
| BG 2, CT 1218.02 | 75%                         | 12%                       | 0%                               | 1%    | 0%                                        | 2%                    | 11%            | 0%                               | 100%               | 47.0%                                        | \$17,905                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 1218.02 | 72%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 22%            | 1%                               | 99%                | 15.6%                                        | \$35,500                |
| BG 1, CT 1219    | 74%                         | 9%                        | 1%                               | 0%    | 0%                                        | 0%                    | 17%            | 3%                               | 97%                | 30.6%                                        | \$25,057                |
| BG 2, CT 1219    | 68%                         | 16%                       | 0%                               | 0%    | 0%                                        | 2%                    | 14%            | 0%                               | 100%               | 28.0%                                        | \$32,788                |
| BG 1, CT 1220.01 | 58%                         | 13%                       | 0%                               | 0%    | 0%                                        | 5%                    | 25%            | 2%                               | 98%                | 43.3%                                        | \$16,360                |
| BG 2, CT 1220.01 | 69%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 27%            | 0%                               | 100%               | 50.8%                                        | \$18,500                |
| BG 3, CT 1220.01 | 59%                         | 6%                        | 0%                               | 0%    | 0%                                        | 3%                    | 32%            | 0%                               | 100%               | 32.3%                                        | \$31,346                |
| BG 1, CT 1220.02 | 78%                         | 7%                        | 2%                               | 0%    | 0%                                        | 0%                    | 13%            | 0%                               | 100%               | 20.6%                                        | \$33,229                |
| BG 2, CT 1220.02 | 62%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 35%            | 0%                               | 100%               | 23.5%                                        | \$45,132                |
| BG 1, CT 1221    | 60%                         | 8%                        | 0%                               | 0%    | 0%                                        | 1%                    | 30%            | 0%                               | 100%               | 64.0%                                        | \$13,273                |
| BG 2, CT 1221    | 46%                         | 22%                       | 0%                               | 0%    | 0%                                        | 0%                    | 32%            | 0%                               | 100%               | 69.8%                                        | \$17,426                |
| BG 1, CT 1222.01 | 51%                         | 4%                        | 11%                              | 0%    | 0%                                        | 0%                    | 33%            | 0%                               | 100%               | 51.2%                                        | \$18,500                |
| BG 2, CT 1222.01 | 70%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 22%            | 0%                               | 100%               | 67.7%                                        | \$13,828                |
| BG 3, CT 1222.01 | 71%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 21%            | 0%                               | 100%               | 67.1%                                        | \$14,434                |
| BG 1, CT 1222.02 | 56%                         | 13%                       | 1%                               | 0%    | 0%                                        | 1%                    | 30%            | 0%                               | 100%               | 51.3%                                        | \$18,218                |
| BG 1, CT 1224    | 47%                         | 24%                       | 0%                               | 0%    | 0%                                        | 3%                    | 26%            | 1%                               | 99%                | 59.5%                                        | \$16,368                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 601.02  | 75%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 18%            | 0%                               | 100%               | 5.3%                                         | \$61,094                |
| BG 2, CT 601.02  | 57%                         | 8%                        | 1%                               | 0%    | 0%                                        | 1%                    | 33%            | 0%                               | 100%               | 16.4%                                        | \$29,643                |
| BG 3, CT 601.02  | 90%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 2%             | 0%                               | 100%               | 18.1%                                        | \$33,750                |
| BG 4, CT 601.02  | 52%                         | 38%                       | 0%                               | 0%    | 0%                                        | 3%                    | 7%             | 4%                               | 96%                | 84.2%                                        | \$3,143                 |
| BG 1, CT 601.03  | 54%                         | 12%                       | 0%                               | 0%    | 0%                                        | 4%                    | 30%            | 0%                               | 100%               | 51.6%                                        | \$16,236                |
| BG 2, CT 601.03  | 57%                         | 7%                        | 0%                               | 0%    | 0%                                        | 9%                    | 28%            | 0%                               | 100%               | 14.1%                                        | \$31,020                |
| BG 1, CT 601.04  | 55%                         | 10%                       | 0%                               | 0%    | 0%                                        | 1%                    | 34%            | 0%                               | 100%               | 21.7%                                        | \$35,543                |
| BG 2, CT 601.04  | 65%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 27%            | 0%                               | 100%               | 25.8%                                        | \$27,220                |
| BG 1, CT 602.11  | 70%                         | 16%                       | 0%                               | 0%    | 0%                                        | 4%                    | 10%            | 0%                               | 100%               | 27.1%                                        | \$29,219                |
| BG 2, CT 602.11  | 73%                         | 7%                        | 0%                               | 0%    | 0%                                        | 5%                    | 14%            | 0%                               | 100%               | 54.2%                                        | \$14,702                |
| BG 3, CT 602.11  | 68%                         | 13%                       | 0%                               | 0%    | 0%                                        | 0%                    | 19%            | 0%                               | 100%               | 18.7%                                        | \$24,716                |
| BG 4, CT 602.11  | 51%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 45%            | 1%                               | 99%                | 47.9%                                        | \$24,881                |
| BG 1, CT 602.12  | 31%                         | 14%                       | 0%                               | 0%    | 0%                                        | 1%                    | 54%            | 0%                               | 100%               | 88.4%                                        | \$5,440                 |

| Block Group     | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                 | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 602.12 | 66%                         | 4%                        | 0%                               | 0%    | 0%                                        | 15%                   | 14%            | 0%                               | 100%               | 15.7%                                        | \$38,229                |
| BG 3, CT 602.12 | 72%                         | 10%                       | 3%                               | 0%    | 0%                                        | 1%                    | 14%            | 7%                               | 93%                | 8.0%                                         | \$45,694                |
| BG 4, CT 602.12 | 78%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 18%            | 1%                               | 99%                | 7.1%                                         | \$45,769                |
| BG 1, CT 602.13 | 73%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 19%            | 0%                               | 100%               | 11.1%                                        | \$43,176                |
| BG 2, CT 602.13 | 72%                         | 7%                        | 0%                               | 0%    | 0%                                        | 1%                    | 20%            | 2%                               | 98%                | 9.7%                                         | \$53,697                |
| BG 3, CT 602.13 | 72%                         | 4%                        | 0%                               | 1%    | 0%                                        | 3%                    | 21%            | 1%                               | 99%                | 10.9%                                        | \$67,578                |
| BG 1, CT 602.22 | 60%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 29%            | 1%                               | 99%                | 33.4%                                        | \$36,632                |
| BG 2, CT 602.22 | 54%                         | 13%                       | 0%                               | 0%    | 0%                                        | 2%                    | 32%            | 0%                               | 100%               | 22.7%                                        | \$26,984                |
| BG 3, CT 602.22 | 57%                         | 17%                       | 0%                               | 1%    | 0%                                        | 1%                    | 24%            | 3%                               | 97%                | 22.5%                                        | \$31,964                |
| BG 1, CT 602.23 | 43%                         | 15%                       | 0%                               | 0%    | 0%                                        | 0%                    | 43%            | 0%                               | 100%               | 50.4%                                        | \$13,789                |
| BG 2, CT 602.23 | 57%                         | 12%                       | 0%                               | 0%    | 0%                                        | 2%                    | 29%            | 0%                               | 100%               | 31.8%                                        | \$26,536                |
| BG 3, CT 602.23 | 66%                         | 7%                        | 0%                               | 0%    | 0%                                        | 3%                    | 25%            | 1%                               | 99%                | 23.1%                                        | \$27,361                |
| BG 1, CT 603.01 | 65%                         | 2%                        | 0%                               | 0%    | 0%                                        | 7%                    | 27%            | 0%                               | 100%               | 15.9%                                        | \$45,841                |
| BG 2, CT 603.01 | 54%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 38%            | 0%                               | 100%               | 26.6%                                        | \$32,214                |
| BG 1, CT 603.02 | 51%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 44%            | 0%                               | 100%               | 15.7%                                        | \$46,394                |
| BG 2, CT 603.02 | 71%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 25%            | 1%                               | 99%                | 19.7%                                        | \$35,227                |
| BG 3, CT 603.02 | 60%                         | 11%                       | 0%                               | 0%    | 0%                                        | 1%                    | 28%            | 0%                               | 100%               | 34.8%                                        | \$21,339                |
| BG 4, CT 603.02 | 60%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 35%            | 0%                               | 100%               | 26.7%                                        | \$32,593                |
| BG 1, CT 604.01 | 61%                         | 6%                        | 0%                               | 0%    | 0%                                        | 2%                    | 30%            | 0%                               | 100%               | 24.8%                                        | \$23,750                |
| BG 2, CT 604.01 | 73%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 27%            | 0%                               | 100%               | 50.3%                                        | \$15,580                |
| BG 1, CT 604.03 | 82%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 14%            | 2%                               | 98%                | 7.8%                                         | \$67,097                |
| BG 2, CT 604.03 | 59%                         | 10%                       | 0%                               | 0%    | 0%                                        | 3%                    | 28%            | 0%                               | 100%               | 32.8%                                        | \$33,710                |
| BG 1, CT 604.04 | 85%                         | 1%                        | 0%                               | 1%    | 0%                                        | 3%                    | 9%             | 0%                               | 100%               | 2.6%                                         | \$95,481                |
| BG 2, CT 604.04 | 74%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 18%            | 1%                               | 99%                | 31.2%                                        | \$30,417                |
| BG 3, CT 604.04 | 65%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 28%            | 3%                               | 97%                | 12.1%                                        | \$65,641                |
| BG 1, CT 605.01 | 57%                         | 11%                       | 0%                               | 0%    | 0%                                        | 3%                    | 29%            | 0%                               | 100%               | 41.8%                                        | \$24,402                |
| BG 2, CT 605.01 | 47%                         | 10%                       | 0%                               | 0%    | 0%                                        | 3%                    | 39%            | 0%                               | 100%               | 58.3%                                        | \$16,439                |
| BG 1, CT 605.02 | 55%                         | 3%                        | 0%                               | 0%    | 0%                                        | 1%                    | 40%            | 0%                               | 100%               | 45.8%                                        | \$21,705                |
| BG 2, CT 605.02 | 50%                         | 8%                        | 0%                               | 0%    | 0%                                        | 2%                    | 40%            | 0%                               | 100%               | 49.7%                                        | \$17,059                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 9569 | 74%                         | 11%                       | 0%                               | 0%    | 0%                                        | 10%                   | 5%             | 1%                               | 99%                | 57.3%                                        | \$14,458                |
| BG 2, CT 9569 | 97%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 1%                               | 99%                | 63.7%                                        | \$15,227                |
| BG 3, CT 9569 | 87%                         | 0%                        | 0%                               | 0%    | 0%                                        | 13%                   | 0%             | 2%                               | 98%                | 66.3%                                        | \$11,578                |
| BG 1, CT 9570 | 93%                         | 0%                        | 0%                               | 3%    | 0%                                        | 4%                    | 0%             | 0%                               | 100%               | 47.2%                                        | \$21,915                |
| BG 2, CT 9570 | 80%                         | 5%                        | 0%                               | 0%    | 0%                                        | 12%                   | 3%             | 0%                               | 100%               | 60.7%                                        | \$15,450                |
| BG 3, CT 9570 | 79%                         | 10%                       | 0%                               | 1%    | 0%                                        | 9%                    | 2%             | 0%                               | 100%               | 63.0%                                        | \$16,731                |
| BG 1, CT 9571 | 91%                         | 3%                        | 0%                               | 0%    | 0%                                        | 3%                    | 3%             | 0%                               | 100%               | 39.3%                                        | \$14,125                |
| BG 2, CT 9571 | 86%                         | 4%                        | 0%                               | 1%    | 0%                                        | 7%                    | 2%             | 0%                               | 100%               | 58.5%                                        | \$14,539                |
| BG 3, CT 9571 | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 3%             | 1%                               | 99%                | 56.0%                                        | \$13,594                |
| BG 1, CT 9572 | 77%                         | 1%                        | 0%                               | 1%    | 0%                                        | 18%                   | 3%             | 3%                               | 97%                | 44.6%                                        | \$16,604                |
| BG 2, CT 9572 | 95%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 1%                               | 99%                | 61.8%                                        | \$17,702                |
| BG 3, CT 9572 | 94%                         | 1%                        | 2%                               | 0%    | 0%                                        | 3%                    | 0%             | 1%                               | 99%                | 54.5%                                        | \$15,444                |
| BG 1, CT 9573 | 85%                         | 2%                        | 0%                               | 0%    | 0%                                        | 11%                   | 1%             | 1%                               | 99%                | 43.7%                                        | \$17,500                |
| BG 2, CT 9573 | 89%                         | 3%                        | 0%                               | 1%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 42.4%                                        | \$17,450                |
| BG 3, CT 9573 | 96%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 2%             | 0%                               | 100%               | 44.1%                                        | \$19,758                |
| BG 1, CT 9574 | 97%                         | 0%                        | 0%                               | 2%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 81.9%                                        | \$6,851                 |
| BG 2, CT 9574 | 86%                         | 6%                        | 0%                               | 1%    | 0%                                        | 0%                    | 8%             | 1%                               | 99%                | 39.9%                                        | \$16,339                |
| BG 1, CT 9575 | 93%                         | 1%                        | 0%                               | 0%    | 0%                                        | 6%                    | 0%             | 0%                               | 100%               | 53.5%                                        | \$11,378                |
| BG 2, CT 9575 | 83%                         | 8%                        | 0%                               | 0%    | 0%                                        | 6%                    | 3%             | 2%                               | 98%                | 78.5%                                        | \$6,687                 |
| BG 3, CT 9575 | 89%                         | 2%                        | 0%                               | 0%    | 0%                                        | 9%                    | 0%             | 0%                               | 100%               | 72.8%                                        | \$8,375                 |
| BG 1, CT 9576 | 91%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 1%                               | 99%                | 64.5%                                        | \$14,865                |
| BG 2, CT 9576 | 84%                         | 0%                        | 0%                               | 0%    | 0%                                        | 7%                    | 9%             | 0%                               | 100%               | 24.6%                                        | \$26,200                |
| BG 3, CT 9576 | 90%                         | 0%                        | 0%                               | 0%    | 0%                                        | 10%                   | 0%             | 0%                               | 100%               | 51.1%                                        | \$14,828                |
| BG 1, CT 5501 | 78%                         | 19%                       | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 1%                               | 99%                | 43.0%                                        | \$22,386                |
| BG 2, CT 5501 | 81%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 14%            | 0%                               | 100%               | 43.7%                                        | \$18,300                |
| BG 3, CT 5501 | 89%                         | 5%                        | 0%                               | 0%    | 0%                                        | 2%                    | 4%             | 2%                               | 98%                | 36.4%                                        | \$34,116                |
| BG 4, CT 5501 | 77%                         | 6%                        | 0%                               | 0%    | 0%                                        | 15%                   | 1%             | 5%                               | 95%                | 66.0%                                        | \$10,242                |
| BG 1, CT 5502 | 82%                         | 10%                       | 1%                               | 0%    | 0%                                        | 0%                    | 7%             | 1%                               | 99%                | 58.5%                                        | \$14,842                |
| BG 2, CT 5502 | 88%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 7%             | 4%                               | 96%                | 59.6%                                        | \$11,985                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 5502    | 89%                         | 6%                        | 0%                               | 0%    | 0%                                        | 1%                    | 4%             | 1%                               | 99%                | 70.1%                                        | \$12,432                |
| BG 1, CT 5503    | 91%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 4%             | 4%                               | 96%                | 44.7%                                        | \$13,664                |
| BG 2, CT 5503    | 86%                         | 4%                        | 0%                               | 0%    | 0%                                        | 5%                    | 5%             | 2%                               | 98%                | 59.8%                                        | \$15,924                |
| BG 3, CT 5503    | 90%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 4%             | 1%                               | 99%                | 40.5%                                        | \$21,219                |
| BG 1, CT 5504    | 75%                         | 8%                        | 0%                               | 0%    | 0%                                        | 4%                    | 12%            | 4%                               | 96%                | 77.8%                                        | \$11,500                |
| BG 2, CT 5504    | 83%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 5%             | 1%                               | 99%                | 50.8%                                        | \$10,667                |
| BG 3, CT 5504    | 91%                         | 8%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 7%                               | 93%                | 54.9%                                        | \$17,574                |
| BG 1, CT 5505    | 50%                         | 27%                       | 0%                               | 0%    | 0%                                        | 5%                    | 17%            | 0%                               | 100%               | 46.6%                                        | \$22,639                |
| BG 2, CT 5505    | 79%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 10%            | 0%                               | 100%               | 33.5%                                        | \$25,164                |
| BG 3, CT 5505    | 49%                         | 4%                        | 1%                               | 1%    | 0%                                        | 9%                    | 36%            | 0%                               | 100%               | 41.3%                                        | \$17,944                |
| BG 4, CT 5505    | 81%                         | 17%                       | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 41.8%                                        | \$22,011                |
| BG 1, CT 5506.01 | 87%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 8%             | 0%                               | 100%               | 48.9%                                        | \$16,563                |
| BG 2, CT 5506.01 | 77%                         | 6%                        | 0%                               | 0%    | 0%                                        | 3%                    | 14%            | 1%                               | 99%                | 53.4%                                        | \$15,731                |
| BG 3, CT 5506.01 | 87%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 6%             | 1%                               | 99%                | 54.1%                                        | \$17,327                |
| BG 1, CT 5506.02 | 69%                         | 21%                       | 0%                               | 0%    | 0%                                        | 3%                    | 7%             | 1%                               | 99%                | 44.2%                                        | \$23,953                |
| BG 2, CT 5506.02 | 77%                         | 11%                       | 0%                               | 0%    | 0%                                        | 0%                    | 12%            | 0%                               | 100%               | 55.0%                                        | \$16,760                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 5601    | 97%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 2%                               | 98%                | 50.1%                                        | \$12,946                |
| BG 2, CT 5601    | 89%                         | 10%                       | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 2%                               | 98%                | 53.6%                                        | \$13,397                |
| BG 3, CT 5601    | 99%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 64.1%                                        | \$13,949                |
| BG 1, CT 5602.01 | 91%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 3%                               | 97%                | 47.2%                                        | \$20,795                |
| BG 2, CT 5602.01 | 95%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 1%                               | 99%                | 26.6%                                        | \$30,771                |
| BG 1, CT 5602.04 | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 3%                               | 97%                | 49.5%                                        | \$12,857                |
| BG 2, CT 5602.04 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 61.8%                                        | \$12,000                |
| BG 3, CT 5602.04 | 97%                         | 2%                        | 0%                               | 1%    | 0%                                        | 0%                    | 0%             | 3%                               | 97%                | 53.7%                                        | \$16,192                |
| BG 1, CT 5603    | 93%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 6%                               | 94%                | 53.5%                                        | \$17,375                |
| BG 2, CT 5603    | 91%                         | 4%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 3%                               | 97%                | 62.9%                                        | \$13,938                |
| BG 3, CT 5603    | 94%                         | 3%                        | 0%                               | 2%    | 0%                                        | 1%                    | 0%             | 2%                               | 98%                | 56.7%                                        | \$19,620                |
| BG 1, CT 5604.01 | 95%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 1%             | 3%                               | 97%                | 30.9%                                        | \$39,063                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 5604.01 | 100%                        | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 74.5%                                        | \$10,964                |
| BG 1, CT 5604.02 | 81%                         | 10%                       | 1%                               | 0%    | 0%                                        | 0%                    | 8%             | 2%                               | 98%                | 34.6%                                        | \$17,857                |
| BG 2, CT 5604.02 | 97%                         | 1%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 0%                               | 100%               | 60.0%                                        | \$17,827                |
| BG 3, CT 5604.02 | 89%                         | 6%                        | 0%                               | 0%    | 0%                                        | 5%                    | 0%             | 2%                               | 98%                | 7.7%                                         | \$48,839                |
| BG 1, CT 5605    | 99%                         | 1%                        | 1%                               | 0%    | 0%                                        | 0%                    | 0%             | 6%                               | 94%                | 31.6%                                        | \$21,477                |
| BG 2, CT 5605    | 91%                         | 6%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 3%                               | 97%                | 41.3%                                        | \$15,750                |
| BG 3, CT 5605    | 96%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 0%                               | 100%               | 47.9%                                        | \$10,673                |
| BG 1, CT 5606    | 99%                         | 0%                        | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 5%                               | 95%                | 42.1%                                        | \$17,813                |
| BG 2, CT 5606    | 93%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 5%             | 0%                               | 100%               | 62.8%                                        | \$9,857                 |
| BG 3, CT 5606    | 91%                         | 5%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 6%                               | 94%                | 63.6%                                        | \$14,298                |
| BG 1, CT 5607.01 | 86%                         | 1%                        | 0%                               | 0%    | 0%                                        | 12%                   | 1%             | 6%                               | 94%                | 59.2%                                        | \$15,720                |
| BG 2, CT 5607.01 | 90%                         | 2%                        | 0%                               | 0%    | 0%                                        | 5%                    | 3%             | 4%                               | 96%                | 56.7%                                        | \$17,321                |
| BG 3, CT 5607.01 | 85%                         | 2%                        | 6%                               | 0%    | 0%                                        | 4%                    | 3%             | 1%                               | 99%                | 36.6%                                        | \$25,313                |
| BG 4, CT 5607.01 | 94%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 0%                               | 100%               | 27.6%                                        | \$18,250                |
| BG 1, CT 5607.02 | 91%                         | 4%                        | 2%                               | 0%    | 0%                                        | 2%                    | 1%             | 1%                               | 99%                | 48.3%                                        | \$17,651                |
| BG 2, CT 5607.02 | 84%                         | 8%                        | 0%                               | 0%    | 0%                                        | 2%                    | 6%             | 0%                               | 100%               | 45.7%                                        | \$20,877                |
| BG 3, CT 5607.02 | 97%                         | 3%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 3%                               | 97%                | 47.2%                                        | \$16,193                |
| BG 1, CT 5608.01 | 93%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 4%                               | 96%                | 62.3%                                        | \$13,542                |
| BG 2, CT 5608.01 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 52.3%                                        | \$11,083                |
| BG 1, CT 5608.02 | 96%                         | 4%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 72.3%                                        | \$12,232                |
| BG 2, CT 5608.02 | 98%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 2%                               | 98%                | 58.4%                                        | \$13,192                |
| BG 3, CT 5608.02 | 92%                         | 6%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 2%                               | 98%                | 65.1%                                        | \$13,667                |
| BG 1, CT 5609    | 96%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 6%                               | 94%                | 62.4%                                        | \$9,506                 |
| BG 2, CT 5609    | 89%                         | 7%                        | 0%                               | 0%    | 0%                                        | 4%                    | 0%             | 3%                               | 97%                | 65.9%                                        | \$11,838                |
| BG 3, CT 5609    | 86%                         | 4%                        | 0%                               | 0%    | 0%                                        | 9%                    | 1%             | 0%                               | 100%               | 46.3%                                        | \$15,776                |
| BG 0, CT 9900    | ND                          |                           |                                  |       |                                           |                       |                |                                  |                    |                                              |                         |
| BG 1, CT 9505    | 55%                         | 11%                       | 0%                               | 0%    | 0%                                        | 33%                   | 1%             | 2%                               | 98%                | 47.1%                                        | \$14,901                |
| BG 2, CT 9505    | 50%                         | 13%                       | 0%                               | 1%    | 0%                                        | 25%                   | 11%            | 4%                               | 96%                | 48.2%                                        | \$16,657                |
| BG 3, CT 9505    | 53%                         | 12%                       | 0%                               | 0%    | 0%                                        | 23%                   | 12%            | 1%                               | 99%                | 28.5%                                        | \$19,350                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 1, CT 9506    | 19%                         | 6%                        | 6%                               | 0%    | 0%                                        | 61%                   | 8%             | 0%                               | 100%               | 51.3%                                        | \$15,300                |
| BG 2, CT 9506    | 51%                         | 20%                       | 0%                               | 0%    | 0%                                        | 21%                   | 8%             | 9%                               | 91%                | 56.1%                                        | \$19,018                |
| BG 3, CT 9506    | 46%                         | 9%                        | 0%                               | 0%    | 0%                                        | 44%                   | 0%             | 6%                               | 94%                | 44.6%                                        | \$20,361                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 7201    | 79%                         | 7%                        | 0%                               | 1%    | 0%                                        | 9%                    | 5%             | 0%                               | 100%               | 59.3%                                        | \$17,614                |
| BG 2, CT 7201    | 81%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 13%            | 0%                               | 100%               | 47.2%                                        | \$19,023                |
| BG 3, CT 7201    | 44%                         | 7%                        | 0%                               | 0%    | 0%                                        | 31%                   | 17%            | 0%                               | 100%               | 74.4%                                        | \$9,404                 |
| BG 4, CT 7201    | 78%                         | 3%                        | 0%                               | 0%    | 0%                                        | 8%                    | 11%            | 0%                               | 100%               | 61.2%                                        | \$12,368                |
| BG 1, CT 7203    | 70%                         | 3%                        | 1%                               | 0%    | 0%                                        | 15%                   | 11%            | 0%                               | 100%               | 69.5%                                        | \$14,418                |
| BG 2, CT 7203    | 55%                         | 0%                        | 0%                               | 0%    | 0%                                        | 15%                   | 30%            | 2%                               | 98%                | 69.6%                                        | \$11,181                |
| BG 3, CT 7203    | 62%                         | 0%                        | 0%                               | 0%    | 0%                                        | 13%                   | 25%            | 0%                               | 100%               | 29.9%                                        | \$15,825                |
| BG 4, CT 7203    | 74%                         | 2%                        | 0%                               | 0%    | 0%                                        | 14%                   | 9%             | 0%                               | 100%               | 35.4%                                        | \$22,472                |
| BG 1, CT 7204    | 60%                         | 4%                        | 0%                               | 0%    | 0%                                        | 8%                    | 27%            | 0%                               | 100%               | 54.2%                                        | \$17,095                |
| BG 2, CT 7204    | 78%                         | 3%                        | 0%                               | 0%    | 0%                                        | 10%                   | 9%             | 0%                               | 100%               | 70.9%                                        | \$14,526                |
| BG 1, CT 7205.02 | 79%                         | 2%                        | 2%                               | 0%    | 0%                                        | 4%                    | 14%            | 0%                               | 100%               | 59.0%                                        | \$11,743                |
| BG 2, CT 7205.02 | 68%                         | 13%                       | 0%                               | 0%    | 0%                                        | 2%                    | 17%            | 0%                               | 100%               | 46.5%                                        | \$22,045                |
| BG 3, CT 7205.02 | 66%                         | 1%                        | 2%                               | 0%    | 0%                                        | 11%                   | 19%            | 0%                               | 100%               | 49.9%                                        | \$21,611                |
| BG 1, CT 7205.03 | 67%                         | 1%                        | 0%                               | 0%    | 0%                                        | 16%                   | 16%            | 1%                               | 99%                | 64.9%                                        | \$13,514                |
| BG 2, CT 7205.03 | 66%                         | 4%                        | 0%                               | 0%    | 0%                                        | 6%                    | 24%            | 1%                               | 99%                | 49.6%                                        | \$29,811                |
| BG 1, CT 7205.04 | 70%                         | 2%                        | 0%                               | 0%    | 0%                                        | 13%                   | 14%            | 4%                               | 96%                | 37.3%                                        | \$17,399                |
| BG 2, CT 7205.04 | 61%                         | 0%                        | 0%                               | 0%    | 0%                                        | 19%                   | 21%            | 0%                               | 100%               | 45.6%                                        | \$24,453                |
| BG 1, CT 9506    | 51%                         | 5%                        | 0%                               | 0%    | 0%                                        | 17%                   | 27%            | 0%                               | 100%               | 84.0%                                        | \$11,131                |
| BG 2, CT 9506    | 66%                         | 6%                        | 0%                               | 0%    | 0%                                        | 17%                   | 11%            | 0%                               | 100%               | 46.6%                                        | \$23,088                |
| BG 3, CT 9506    | 65%                         | 12%                       | 0%                               | 0%    | 0%                                        | 5%                    | 18%            | 1%                               | 99%                | 35.9%                                        | \$24,750                |
| BG 4, CT 9506    | 53%                         | 18%                       | 0%                               | 0%    | 0%                                        | 15%                   | 14%            | 0%                               | 100%               | 58.6%                                        | \$13,162                |
| BG 1, CT 9507    | 67%                         | 7%                        | 0%                               | 0%    | 0%                                        | 14%                   | 11%            | 0%                               | 100%               | 35.0%                                        | \$17,214                |
| BG 2, CT 9507    | 68%                         | 10%                       | 0%                               | 0%    | 0%                                        | 6%                    | 16%            | 0%                               | 100%               | 54.4%                                        | \$20,750                |
| BG 3, CT 9507    | 79%                         | 5%                        | 0%                               | 0%    | 0%                                        | 5%                    | 12%            | 0%                               | 100%               | 52.8%                                        | \$14,864                |
| BG 1, CT 9508    | 71%                         | 13%                       | 0%                               | 0%    | 0%                                        | 15%                   | 1%             | 0%                               | 100%               | 61.8%                                        | \$13,900                |

| Block Group      | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                  | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 2, CT 9508    | 61%                         | 9%                        | 0%                               | 0%    | 0%                                        | 7%                    | 23%            | 0%                               | 100%               | 44.9%                                        | \$18,512                |
| BG 3, CT 9508    | 60%                         | 13%                       | 0%                               | 0%    | 0%                                        | 12%                   | 15%            | 0%                               | 100%               | 46.3%                                        | \$15,357                |
| BG 1, CT 9509    | 65%                         | 11%                       | 0%                               | 0%    | 0%                                        | 11%                   | 13%            | 3%                               | 97%                | 47.3%                                        | \$16,150                |
| BG 2, CT 9509    | 72%                         | 2%                        | 0%                               | 0%    | 0%                                        | 11%                   | 14%            | 0%                               | 100%               | 51.2%                                        | \$19,125                |
| BG 3, CT 9509    | 66%                         | 7%                        | 0%                               | 0%    | 0%                                        | 6%                    | 21%            | 0%                               | 100%               | 58.8%                                        | \$15,606                |
| BG 1, CT 9510    | 79%                         | 14%                       | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 1%                               | 99%                | 41.0%                                        | \$16,974                |
| BG 2, CT 9510    | 67%                         | 11%                       | 0%                               | 0%    | 0%                                        | 14%                   | 8%             | 0%                               | 100%               | 43.2%                                        | \$19,402                |
| BG 1, CT 9511    | 71%                         | 8%                        | 1%                               | 0%    | 0%                                        | 13%                   | 7%             | 0%                               | 100%               | 56.3%                                        | \$20,036                |
| BG 2, CT 9511    | 59%                         | 13%                       | 0%                               | 0%    | 0%                                        | 6%                    | 22%            | 1%                               | 99%                | 70.9%                                        | \$8,639                 |
| BG 1, CT 9512    | 61%                         | 12%                       | 0%                               | 0%    | 0%                                        | 8%                    | 19%            | 0%                               | 100%               | 57.3%                                        | \$18,036                |
| BG 2, CT 9512    | 67%                         | 4%                        | 0%                               | 0%    | 0%                                        | 12%                   | 17%            | 1%                               | 99%                | 67.9%                                        | \$13,527                |
| BG 3, CT 9512    | 55%                         | 10%                       | 0%                               | 0%    | 0%                                        | 18%                   | 17%            | 0%                               | 100%               | 46.7%                                        | \$15,064                |
| BG 1, CT 9513    | 55%                         | 6%                        | 2%                               | 0%    | 0%                                        | 19%                   | 18%            | 0%                               | 100%               | 38.6%                                        | \$26,548                |
| BG 2, CT 9513    | 67%                         | 12%                       | 1%                               | 0%    | 0%                                        | 1%                    | 19%            | 0%                               | 100%               | 63.2%                                        | \$14,868                |
| BG 3, CT 9513    | 77%                         | 10%                       | 0%                               | 1%    | 0%                                        | 3%                    | 9%             | 1%                               | 99%                | 49.6%                                        | \$19,779                |
| BG 0, CT 9900    | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                 | ND                                           | ND                      |
| BG 1, CT 7501.01 | 97%                         | 0%                        | 0%                               | 0%    | 0%                                        | 3%                    | 0%             | 0%                               | 100%               | 60.6%                                        | \$10,461                |
| BG 2, CT 7501.01 | 89%                         | 4%                        | 0%                               | 0%    | 0%                                        | 6%                    | 1%             | 0%                               | 100%               | 84.1%                                        | \$8,654                 |
| BG 1, CT 7501.02 | 93%                         | 1%                        | 0%                               | 0%    | 0%                                        | 5%                    | 1%             | 1%                               | 99%                | 50.3%                                        | \$14,717                |
| BG 2, CT 7501.02 | 96%                         | 3%                        | 0%                               | 1%    | 0%                                        | 0%                    | 0%             | 0%                               | 100%               | 82.4%                                        | \$7,214                 |
| BG 1, CT 7502.01 | 96%                         | 1%                        | 0%                               | 1%    | 0%                                        | 2%                    | 1%             | 0%                               | 100%               | 64.4%                                        | \$11,324                |
| BG 2, CT 7502.01 | 87%                         | 1%                        | 7%                               | 0%    | 0%                                        | 2%                    | 4%             | 1%                               | 99%                | 46.9%                                        | \$23,198                |
| BG 1, CT 7502.02 | 88%                         | 2%                        | 0%                               | 0%    | 0%                                        | 3%                    | 7%             | 0%                               | 100%               | 71.4%                                        | \$11,759                |
| BG 2, CT 7502.02 | 92%                         | 1%                        | 0%                               | 0%    | 0%                                        | 1%                    | 6%             | 0%                               | 100%               | 64.6%                                        | \$11,339                |
| BG 3, CT 7502.02 | 94%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 2%                               | 98%                | 66.9%                                        | \$9,194                 |
| BG 1, CT 7503    | 93%                         | 3%                        | 0%                               | 0%    | 0%                                        | 4%                    | 1%             | 3%                               | 97%                | 47.2%                                        | \$19,743                |
| BG 2, CT 7503    | 93%                         | 1%                        | 0%                               | 0%    | 0%                                        | 2%                    | 4%             | 2%                               | 98%                | 37.6%                                        | \$17,708                |
| BG 1, CT 7504    | 86%                         | 8%                        | 0%                               | 0%    | 0%                                        | 3%                    | 3%             | 0%                               | 100%               | 81.4%                                        | \$7,841                 |
| BG 2, CT 7504    | 85%                         | 1%                        | 0%                               | 0%    | 0%                                        | 7%                    | 7%             | 0%                               | 100%               | 64.5%                                        | \$10,750                |



| Block Group       | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                    | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|-------------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|--------------------|----------------------------------------------|-------------------------|
|                   | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Not Hispanic or Latino           | Hispanic or Latino |                                              |                         |
| BG 3, CT 7504     | 88%                         | 3%                        | 0%                               | 0%    | 0%                                        | 2%                    | 8%             | 0%                               | 100%               | 70.0%                                        | \$14,038                |
| BG 4, CT 7504     | 91%                         | 0%                        | 4%                               | 0%    | 0%                                        | 0%                    | 5%             | 0%                               | 100%               | 51.5%                                        | \$22,750                |
| BG 5, CT 7504     | 94%                         | 4%                        | 0%                               | 0%    | 0%                                        | 2%                    | 0%             | 2%                               | 98%                | 48.5%                                        | \$23,125                |
| BG 1, CT 7505.01  | 92%                         | 2%                        | 0%                               | 0%    | 0%                                        | 1%                    | 4%             | 2%                               | 98%                | 57.2%                                        | \$18,913                |
| BG 2, CT 7505.01  | 94%                         | 5%                        | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 0%                               | 100%               | 27.3%                                        | \$22,256                |
| BG 3, CT 7505.01  | 93%                         | 0%                        | 0%                               | 0%    | 0%                                        | 6%                    | 1%             | 1%                               | 99%                | 57.8%                                        | \$16,076                |
| BG 1, CT 7505.02  | 96%                         | 0%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 1%                               | 99%                | 81.4%                                        | ND                      |
| BG 2, CT 7505.02  | 89%                         | 0%                        | 0%                               | 1%    | 0%                                        | 5%                    | 5%             | 1%                               | 99%                | 28.1%                                        | \$22,250                |
| BG 1, CT 7505.03  | 75%                         | 3%                        | 0%                               | 0%    | 0%                                        | 6%                    | 15%            | 1%                               | 99%                | 62.7%                                        | \$13,587                |
| BG 2, CT 7505.03  | 94%                         | 4%                        | 0%                               | 0%    | 0%                                        | 1%                    | 2%             | 0%                               | 100%               | 42.3%                                        | \$22,500                |
| BG 1, CT 7506.01  | 89%                         | 2%                        | 0%                               | 0%    | 0%                                        | 2%                    | 7%             | 5%                               | 95%                | 64.8%                                        | \$15,131                |
| BG 2, CT 7506.01  | 93%                         | 7%                        | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 1%                               | 99%                | 41.3%                                        | \$27,031                |
| BG 3, CT 7506.01  | 95%                         | 2%                        | 0%                               | 0%    | 0%                                        | 0%                    | 3%             | 2%                               | 98%                | 4.2%                                         | \$44,563                |
| BG 1, CT 7506.02  | 92%                         | 6%                        | 0%                               | 0%    | 0%                                        | 0%                    | 2%             | 2%                               | 98%                | 60.5%                                        | \$9,279                 |
| BG 2, CT 7506.02  | 81%                         | 1%                        | 0%                               | 0%    | 0%                                        | 11%                   | 6%             | 0%                               | 100%               | 86.6%                                        | \$9,722                 |
| Commonwealth-wide | 70%                         | 8%                        | 0%                               | 0%    | 0%                                        | 10%                   | 12%            | 1%                               | 99%                | 45.1%                                        | \$19,624                |

Source: U.S. Census Bureau 2013

BG = Block Group; CT = Census Tract; ND = no data

<sup>a</sup> Totals may not add to 100 percent, due to rounding.

**Table 7: Block Group Demographic Data, U.S. Virgin Islands, 2010**

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 9701 | 39%                         | 50%                       | 0%                               | 1%    | 0%                                        | 8%                    | 1%             | 21%                              | 79%                    | 12.8%                                        | \$51,250                |
| BG 2, CT 9701 | 68%                         | 24%                       | 0%                               | 1%    | 0%                                        | 4%                    | 2%             | 11%                              | 89%                    | 12.0%                                        | \$63,750                |
| BG 1, CT 9702 | 8%                          | 78%                       | 0%                               | 1%    | 0%                                        | 9%                    | 3%             | 40%                              | 60%                    | 39.8%                                        | \$21,600                |
| BG 2, CT 9702 | 20%                         | 71%                       | 1%                               | 1%    | 0%                                        | 6%                    | 1%             | 26%                              | 74%                    | 34.1%                                        | \$29,554                |
| BG 1, CT 9703 | 8%                          | 75%                       | 1%                               | 1%    | 0%                                        | 7%                    | 8%             | 35%                              | 65%                    | 50.7%                                        | \$20,424                |
| BG 2, CT 9703 | 18%                         | 66%                       | 1%                               | 2%    | 0%                                        | 9%                    | 4%             | 30%                              | 70%                    | 22.3%                                        | \$33,269                |
| BG 3, CT 9703 | 19%                         | 70%                       | 0%                               | 3%    | 0%                                        | 7%                    | 2%             | 23%                              | 77%                    | 17.4%                                        | \$50,069                |
| BG 1, CT 9704 | 16%                         | 69%                       | 0%                               | 2%    | 0%                                        | 9%                    | 4%             | 30%                              | 70%                    | 19.8%                                        | \$46,964                |
| BG 2, CT 9704 | 18%                         | 69%                       | 0%                               | 3%    | 0%                                        | 7%                    | 4%             | 17%                              | 83%                    | 13.4%                                        | \$50,956                |
| BG 3, CT 9704 | 10%                         | 76%                       | 0%                               | 1%    | 0%                                        | 10%                   | 3%             | 26%                              | 74%                    | 13.0%                                        | \$51,776                |
| BG 4, CT 9704 | 29%                         | 62%                       | 1%                               | 1%    | 0%                                        | 5%                    | 3%             | 17%                              | 83%                    | 13.5%                                        | \$54,750                |
| BG 1, CT 9705 | 8%                          | 80%                       | 1%                               | 1%    | 0%                                        | 8%                    | 2%             | 31%                              | 69%                    | 23.3%                                        | \$41,250                |
| BG 2, CT 9705 | 21%                         | 64%                       | 0%                               | 6%    | 0%                                        | 5%                    | 3%             | 24%                              | 76%                    | 14.9%                                        | \$50,156                |
| BG 3, CT 9705 | 15%                         | 74%                       | 1%                               | 0%    | 0%                                        | 8%                    | 2%             | 21%                              | 79%                    | 17.1%                                        | \$48,214                |
| BG 1, CT 9706 | 35%                         | 51%                       | 0%                               | 4%    | 0%                                        | 7%                    | 3%             | 19%                              | 81%                    | 12.6%                                        | \$57,500                |
| BG 2, CT 9706 | 4%                          | 88%                       | 0%                               | 1%    | 0%                                        | 4%                    | 3%             | 13%                              | 87%                    | 15.5%                                        | \$45,313                |
| BG 3, CT 9706 | 6%                          | 90%                       | 0%                               | 0%    | 0%                                        | 2%                    | 2%             | 11%                              | 89%                    | 13.4%                                        | \$38,125                |
| BG 4, CT 9706 | 32%                         | 56%                       | 1%                               | 1%    | 0%                                        | 6%                    | 3%             | 17%                              | 83%                    | 11.9%                                        | \$53,333                |
| BG 5, CT 9706 | 14%                         | 78%                       | 1%                               | 1%    | 0%                                        | 5%                    | 1%             | 14%                              | 86%                    | 10.2%                                        | \$60,179                |
| BG 1, CT 9707 | 47%                         | 48%                       | 0%                               | 0%    | 0%                                        | 3%                    | 1%             | 9%                               | 91%                    | 14.4%                                        | \$46,250                |
| BG 2, CT 9707 | 5%                          | 81%                       | 1%                               | 0%    | 0%                                        | 10%                   | 2%             | 24%                              | 76%                    | 19.4%                                        | \$36,875                |
| BG 3, CT 9707 | 5%                          | 82%                       | 0%                               | 0%    | 0%                                        | 12%                   | 1%             | 28%                              | 72%                    | 24.1%                                        | \$35,481                |
| BG 1, CT 9708 | 8%                          | 72%                       | 0%                               | 1%    | 0%                                        | 17%                   | 1%             | 33%                              | 67%                    | 26.3%                                        | \$33,182                |
| BG 2, CT 9708 | 6%                          | 71%                       | 1%                               | 1%    | 0%                                        | 18%                   | 4%             | 42%                              | 58%                    | 39.3%                                        | \$25,566                |
| BG 1, CT 9709 | 7%                          | 84%                       | 0%                               | 0%    | 0%                                        | 7%                    | 1%             | 17%                              | 83%                    | 48.5%                                        | \$18,802                |
| BG 1, CT 9710 | 54%                         | 33%                       | 1%                               | 2%    | 0%                                        | 7%                    | 4%             | 15%                              | 85%                    | 11.5%                                        | \$55,000                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 9710 | 8%                          | 85%                       | 0%                               | 1%    | 0%                                        | 4%                    | 1%             | 15%                              | 85%                    | 28.7%                                        | \$32,833                |
| BG 1, CT 9711 | 8%                          | 80%                       | 0%                               | 0%    | 0%                                        | 9%                    | 2%             | 25%                              | 75%                    | 32.7%                                        | \$32,917                |
| BG 2, CT 9711 | 10%                         | 80%                       | 0%                               | 0%    | 0%                                        | 7%                    | 3%             | 22%                              | 78%                    | 35.2%                                        | \$27,368                |
| BG 3, CT 9711 | 10%                         | 80%                       | 1%                               | 0%    | 0%                                        | 8%                    | 2%             | 28%                              | 72%                    | 51.5%                                        | \$20,076                |
| BG 4, CT 9711 | 13%                         | 75%                       | 0%                               | 1%    | 0%                                        | 6%                    | 4%             | 18%                              | 82%                    | 22.7%                                        | \$40,250                |
| BG 1, CT 9712 | 11%                         | 85%                       | 0%                               | 1%    | 0%                                        | 3%                    | 1%             | 15%                              | 85%                    | 17.8%                                        | \$39,141                |
| BG 2, CT 9712 | 13%                         | 78%                       | 1%                               | 0%    | 0%                                        | 7%                    | 2%             | 21%                              | 79%                    | 28.4%                                        | \$36,071                |
| BG 3, CT 9712 | 8%                          | 77%                       | 1%                               | 2%    | 0%                                        | 6%                    | 6%             | 24%                              | 76%                    | 24.6%                                        | \$37,216                |
| BG 4, CT 9712 | 6%                          | 81%                       | 0%                               | 1%    | 0%                                        | 10%                   | 2%             | 29%                              | 71%                    | 25.8%                                        | \$31,319                |
| BG 1, CT 9713 | 17%                         | 71%                       | 0%                               | 0%    | 0%                                        | 9%                    | 2%             | 26%                              | 74%                    | 16.1%                                        | \$45,313                |
| BG 2, CT 9713 | 5%                          | 87%                       | 1%                               | 1%    | 0%                                        | 5%                    | 2%             | 25%                              | 75%                    | 40.4%                                        | \$21,048                |
| BG 3, CT 9713 | 7%                          | 84%                       | 0%                               | 1%    | 0%                                        | 6%                    | 2%             | 29%                              | 71%                    | 21.3%                                        | \$31,250                |
| BG 1, CT 9714 | 3%                          | 87%                       | 0%                               | 0%    | 0%                                        | 8%                    | 2%             | 20%                              | 80%                    | 26.4%                                        | \$33,214                |
| BG 1, CT 9715 | 29%                         | 58%                       | 0%                               | 1%    | 0%                                        | 8%                    | 4%             | 25%                              | 75%                    | 12.6%                                        | \$65,625                |
| BG 2, CT 9715 | 13%                         | 75%                       | 1%                               | 0%    | 0%                                        | 7%                    | 4%             | 26%                              | 74%                    | 24.2%                                        | \$29,712                |
| BG 3, CT 9715 | 9%                          | 84%                       | 1%                               | 1%    | 0%                                        | 4%                    | 2%             | 17%                              | 83%                    | 20.7%                                        | \$41,938                |
| BG 0, CT 9900 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                     | ND                                           | ND                      |
| BG 1, CT 9501 | 69%                         | 27%                       | 0%                               | 1%    | 0%                                        | 1%                    | 3%             | 3%                               | 97%                    | 13.2%                                        | \$41,250                |
| BG 2, CT 9501 | 49%                         | 47%                       | 0%                               | 1%    | 0%                                        | 1%                    | 2%             | 5%                               | 95%                    | 18.5%                                        | \$37,361                |
| BG 3, CT 9501 | 34%                         | 62%                       | 1%                               | 1%    | 0%                                        | 1%                    | 1%             | 6%                               | 94%                    | 13.3%                                        | \$41,136                |
| BG 1, CT 9502 | 34%                         | 63%                       | 1%                               | 1%    | 0%                                        | 1%                    | 1%             | 8%                               | 92%                    | 12.2%                                        | \$42,438                |
| BG 2, CT 9502 | 28%                         | 65%                       | 0%                               | 0%    | 0%                                        | 6%                    | 1%             | 14%                              | 86%                    | 10.5%                                        | \$47,321                |
| BG 3, CT 9502 | 27%                         | 67%                       | 1%                               | 1%    | 0%                                        | 3%                    | 1%             | 24%                              | 76%                    | 20.0%                                        | \$37,375                |
| BG 4, CT 9502 | 46%                         | 48%                       | 1%                               | 1%    | 0%                                        | 2%                    | 2%             | 5%                               | 95%                    | 16.1%                                        | \$38,281                |
| BG 0, CT 9900 | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                     | ND                                           | ND                      |
| BG 1, CT 9601 | 21%                         | 76%                       | 0%                               | 1%    | 0%                                        | 1%                    | 1%             | 6%                               | 94%                    | 15.0%                                        | \$43,603                |
| BG 2, CT 9601 | 6%                          | 93%                       | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 9%                               | 91%                    | 18.4%                                        | \$33,214                |
| BG 3, CT 9601 | 14%                         | 83%                       | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 8%                               | 92%                    | 21.3%                                        | \$33,125                |
| BG 1, CT 9602 | 3%                          | 94%                       | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 8%                               | 92%                    | 19.8%                                        | \$38,295                |

| Block Group   | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|---------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|               | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 2, CT 9602 | 5%                          | 93%                       | 0%                               | 0%    | 0%                                        | 1%                    | 0%             | 6%                               | 94%                    | 13.9%                                        | \$38,188                |
| BG 3, CT 9602 | 6%                          | 92%                       | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 10%                              | 90%                    | 22.9%                                        | \$38,654                |
| BG 1, CT 9603 | 2%                          | 97%                       | 0%                               | 0%    | 0%                                        | 0%                    | 0%             | 3%                               | 97%                    | 25.3%                                        | \$31,987                |
| BG 2, CT 9603 | 4%                          | 93%                       | 0%                               | 0%    | 0%                                        | 2%                    | 1%             | 8%                               | 92%                    | 11.0%                                        | \$46,518                |
| BG 3, CT 9603 | 3%                          | 95%                       | 0%                               | 1%    | 0%                                        | 1%                    | 1%             | 8%                               | 92%                    | 13.4%                                        | \$41,188                |
| BG 1, CT 9604 | 39%                         | 55%                       | 1%                               | 2%    | 0%                                        | 2%                    | 1%             | 9%                               | 91%                    | 12.7%                                        | \$52,981                |
| BG 2, CT 9604 | 37%                         | 55%                       | 0%                               | 4%    | 0%                                        | 3%                    | 2%             | 13%                              | 87%                    | 13.3%                                        | \$48,958                |
| BG 3, CT 9604 | 23%                         | 71%                       | 0%                               | 3%    | 0%                                        | 1%                    | 2%             | 5%                               | 95%                    | 7.5%                                         | \$57,250                |
| BG 4, CT 9604 | 27%                         | 61%                       | 1%                               | 6%    | 0%                                        | 2%                    | 3%             | 9%                               | 91%                    | 8.4%                                         | \$55,750                |
| BG 1, CT 9605 | 10%                         | 86%                       | 0%                               | 1%    | 0%                                        | 1%                    | 2%             | 8%                               | 92%                    | 10.4%                                        | \$54,853                |
| BG 2, CT 9605 | 16%                         | 79%                       | 0%                               | 2%    | 0%                                        | 1%                    | 1%             | 6%                               | 94%                    | 6.3%                                         | \$60,417                |
| BG 3, CT 9605 | 63%                         | 28%                       | 1%                               | 3%    | 0%                                        | 2%                    | 3%             | 6%                               | 94%                    | 10.7%                                        | \$52,583                |
| BG 4, CT 9605 | 40%                         | 54%                       | 0%                               | 2%    | 0%                                        | 1%                    | 3%             | 7%                               | 93%                    | 9.3%                                         | \$61,083                |
| BG 5, CT 9605 | 58%                         | 36%                       | 1%                               | 2%    | 0%                                        | 2%                    | 3%             | 5%                               | 95%                    | 13.0%                                        | \$51,838                |
| BG 1, CT 9606 | 17%                         | 78%                       | 1%                               | 2%    | 0%                                        | 1%                    | 1%             | 10%                              | 90%                    | 15.0%                                        | \$44,167                |
| BG 2, CT 9606 | 15%                         | 72%                       | 1%                               | 8%    | 0%                                        | 2%                    | 1%             | 8%                               | 92%                    | 10.3%                                        | \$41,750                |
| BG 3, CT 9606 | 7%                          | 88%                       | 0%                               | 1%    | 0%                                        | 2%                    | 1%             | 22%                              | 78%                    | 26.0%                                        | \$26,118                |
| BG 1, CT 9607 | 3%                          | 94%                       | 1%                               | 0%    | 0%                                        | 1%                    | 0%             | 11%                              | 89%                    | 19.1%                                        | \$36,103                |
| BG 2, CT 9607 | 12%                         | 86%                       | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 7%                               | 93%                    | 17.6%                                        | \$36,938                |
| BG 3, CT 9607 | 45%                         | 50%                       | 0%                               | 2%    | 0%                                        | 2%                    | 2%             | 6%                               | 94%                    | 12.6%                                        | \$49,327                |
| BG 1, CT 9608 | 16%                         | 79%                       | 0%                               | 1%    | 0%                                        | 2%                    | 1%             | 11%                              | 89%                    | 20.6%                                        | \$37,214                |
| BG 2, CT 9608 | 11%                         | 80%                       | 1%                               | 5%    | 0%                                        | 1%                    | 3%             | 25%                              | 75%                    | 21.8%                                        | \$35,144                |
| BG 1, CT 9609 | 31%                         | 57%                       | 1%                               | 8%    | 0%                                        | 2%                    | 2%             | 7%                               | 93%                    | 9.5%                                         | \$59,167                |
| BG 2, CT 9609 | 4%                          | 94%                       | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 13%                              | 87%                    | 31.6%                                        | \$26,905                |
| BG 1, CT 9610 | 8%                          | 88%                       | 0%                               | 0%    | 0%                                        | 1%                    | 2%             | 16%                              | 84%                    | 17.9%                                        | \$38,906                |
| BG 2, CT 9610 | 5%                          | 92%                       | 1%                               | 0%    | 0%                                        | 2%                    | 1%             | 29%                              | 71%                    | 32.4%                                        | \$27,011                |
| BG 3, CT 9610 | 6%                          | 91%                       | 0%                               | 0%    | 0%                                        | 0%                    | 1%             | 14%                              | 86%                    | 25.2%                                        | \$31,200                |
| BG 4, CT 9610 | 28%                         | 56%                       | 0%                               | 8%    | 0%                                        | 3%                    | 5%             | 19%                              | 81%                    | 23.5%                                        | \$29,868                |
| BG 5, CT 9610 | 2%                          | 97%                       | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 22%                              | 78%                    | 36.6%                                        | \$23,482                |

| Block Group    | Race (Percent) <sup>a</sup> |                           |                                  |       |                                           |                       |                | Ethnicity (Percent) <sup>a</sup> |                        | Percent of Residents in Poverty <sup>a</sup> | Median Household Income |
|----------------|-----------------------------|---------------------------|----------------------------------|-------|-------------------------------------------|-----------------------|----------------|----------------------------------|------------------------|----------------------------------------------|-------------------------|
|                | White                       | Black or African American | American Indian or Alaska Native | Asian | Native Hawaiian or Other Pacific Islander | Some Other Race Alone | Multiple Races | Hispanic or Latino               | Not Hispanic or Latino |                                              |                         |
| BG 1, CT 9611  | 5%                          | 91%                       | 0%                               | 2%    | 0%                                        | 1%                    | 1%             | 10%                              | 90%                    | 28.7%                                        | \$28,892                |
| BG 2, CT 9611  | 7%                          | 88%                       | 1%                               | 2%    | 0%                                        | 1%                    | 1%             | 16%                              | 84%                    | 26.8%                                        | \$27,305                |
| BG 1, CT 9612  | 4%                          | 93%                       | 0%                               | 0%    | 0%                                        | 1%                    | 1%             | 11%                              | 89%                    | 30.6%                                        | \$26,895                |
| BG 2, CT 9612  | 8%                          | 86%                       | 0%                               | 1%    | 0%                                        | 1%                    | 2%             | 20%                              | 80%                    | 28.9%                                        | \$27,361                |
| BG 0, CT 9900  | ND                          | ND                        | ND                               | ND    | ND                                        | ND                    | ND             | ND                               | ND                     | ND                                           | ND                      |
| Territory-wide | 16%                         | 76%                       | 0%                               | 1%    | 0%                                        | 4%                    | 2%             | 17%                              | 83%                    | 22.5%                                        | \$37,254                |

Source: U.S. Census Bureau 2010

BG = Block Group; CT = Census Tract; ND = no data

<sup>a</sup> Totals may not add to 100%, due to rounding.

## REFERENCES

- U.S. Census Bureau. 2010. *Decennial Census*. Accessed June 23, 2015. Retrieved from:  
<http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml>
- \_\_\_\_\_. 2013. 2009-2013 American Community Survey 5-year Estimates. Accessed June 18, 2015. Retrieved from:  
<http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml>

## **APPENDIX F**

### **Climate Change Sources and Models**

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## **Introduction**

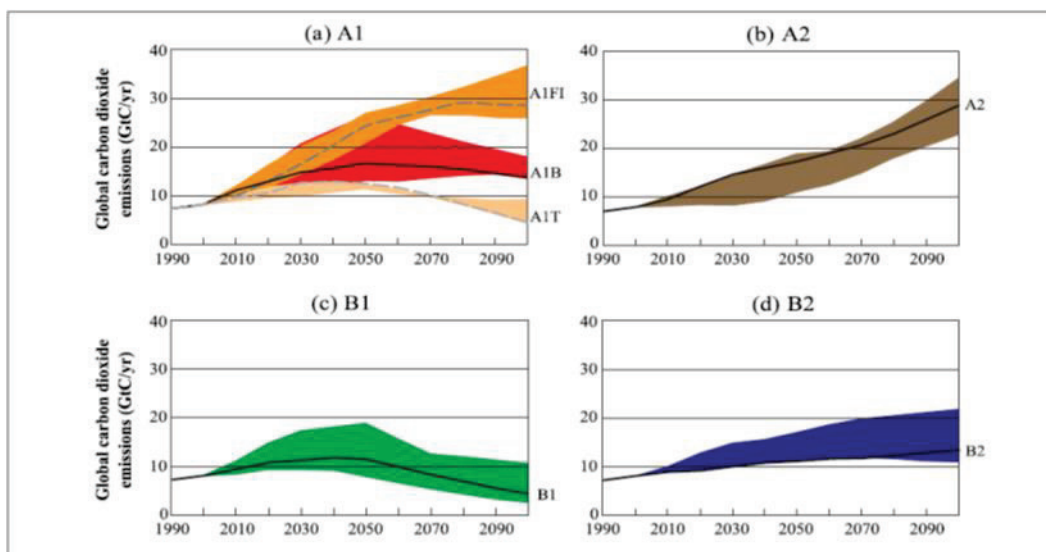
The following sections provide additional background information related to climate change sources and models to supplement what is provided in the climate change sections of the Final Programmatic Environmental Impact Statement.

### **Fifth Assessment Report, International Panel on Climate Change**

The Intergovernmental Panel on Climate Change (IPCC) released its Fifth Assessment Report in 2014. The report analyzes and evaluates global climate change projections and trends and provides regional climate trends and sector-specific climate risks. This assessment introduced new emission scenarios referred to as Representative Concentration Pathways (RCPs) used to evaluate future climate trends. The RCPs are “identified by approximate radiative forcing (cumulative measure of human emissions of greenhouse gases from all sources) in year 2100 relative to year 1750” (*IPCC 2013*). There are four RCPs: one mitigation scenario (RCP2.6), two stabilization scenarios (RCP4.5 and RCP6.0), and one high emission scenario (RCP8.0) (*IPCC 2013*).

### **Third National Climate Assessment, United States Global Change Research Program**

The United States Global Change Research Program (USGCRP) released the third National Climate Assessment in May 2014. The USGCRP is comprised of 13 federal departments and agencies participating in the USGCRP. Downscaled global circulation models were used to create regional models for eight regions covering the contiguous U.S., Alaska, Hawaii, and the Pacific Islands. These agencies conduct research and develop capabilities to support the national response to global change. The National Climate Assessment (NCA) uses RCP scenarios to evaluate climate effects on a national scale. However, regional climate effects presented in the NCA use emission scenarios from the Special Report on Emission Scenarios (SRES) which was first published in 2000 by the IPCC. These emission scenarios were used in the Third and Fourth Assessment Reports by IPCC. The SRES scenarios are based on population and economic growth and cultural responses, as well as technology development (*IPCC 2000*). The four scenarios for future conditions are defined as: high emission cases A1 and A2, and low emission cases B1 and B2. These scenarios are illustrated in Figure 1.



Source: IPCC 2000

Note: The graph illustrates the four families in the SRES. The A1 scenario is characterized by rapid economic growth, global population peaking by 2050 and declines after, introduction to new and more efficient technology, and three alternatives with predominant use of fossil fuel (A1F1), moderate use of fossil fuels (A1B), and predominant use of renewable energy (A1T). The A2 Scenario represents a heterogeneous world with continuously increasing global population and regional economic growth that is slower than other scenarios. The B1 scenario is characterized by global population peaking in 2050 and declines after, and economic structure with a service and information economy including reductions in material intensity and introduction to clean and resource efficient technology. The B2 scenario has an increasing population that is lower than the A2 and intermediate economic development (IPCC 2000). The ranges represent the long-term uncertainties associate with the literature available at the time of preparation of the report.

**Figure 1: Greenhouse Gas Emissions for SRES Storylines**

### **Regional Climate Trends and Scenarios for the U.S. National Climate Assessment: Part 7, Climate of Alaska, and Part 8, Climate of the Pacific Islands, National Oceanic and Atmospheric Administration.**

National Oceanic and Atmospheric Administration created regional climate trends and scenarios reports for each of the eight regions in the NCA, and one for the contiguous U.S. The eight regions in the NCA are Northeast, Southeast and the Caribbean, Midwest, Great Plains, Northwest, Southwest, Alaska, and Hawaii/Pacific Islands.

Climate change trends presented in this Final Programmatic Environmental Impact Statement were sourced from *Regional Climate Trends and Scenarios for the U.S. National Climate Assessment Part 7, Climate of Alaska* (Stewart et al. 2013), and *Part 8, Climate of the Pacific Islands* (Keener et al. 2013). The analysis used 15 coupled atmosphere–ocean general circulation models from the World Climate Research Program’s Coupled Model Intercomparison Project phase 3 (CMIP3) multi-model data set. These models have a grid resolution of approximately 100 to 200 miles (Stewart et al. 2013). Additionally downscaled CMIP3 models for temperature, precipitation, and growing season lengths at a 2-kilometer resolution for Alaska were used to simulate season temperature, precipitation and sea level pressure (Stewart et al. 2013). Three types of analysis were presented for input into the NCA, which include the following types:

- Multi model mean maps: models are regraded to a common grid with resolution of approximately 190 miles latitude and 60 to 110 miles longitude. Grid points are calculated as the mean of all variable means grid points. Multi mean analysis of future spatial patterns may provide the most robust estimate of future climate change;
- Spatially averaged products: grid points are averaged and represented as a single value; and
- Probability density function: This is used to compare and illustrate the differences between models by calculating spatially averaged values for each model simulation. The output is the frequency distribution of the averaged values (*Stewart et al. 2013*).

## References

- IPCC (Intergovernmental Panel on Climate Change). 2000. *Ch. 5: Emissions Scenarios*. In IPCC Special Report on Emissions Scenarios. Geneva, Switzerland: IPCC. Accessed: July 23, 2015. Retrieved from: <http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=0>
- \_\_\_\_\_. 2013. *Climate Change 2013: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Accessed: July 28, 2015. Retrieved from: <https://www.ipcc.ch/report/ar5/wg1/>
- Keener, V.W., K. Hamilton, S.K. Izuka, K.E. Kunkel, L.E. Stevens, and L. Sun. 2013. *Regional Climate Trends and Scenarios for the U.S. National Climate Assessment: Part 8. Climate of the Pacific Islands*. U.S. NOAA Technical Report NESDIS 142-8. National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service, Washington, D.C. Accessed: July 28, 2015. Retrieved from: [http://docs.lib.noaa.gov/noaa\\_documents/NESDIS/TR\\_NESDIS/TR\\_NESDIS\\_142-8.pdf](http://docs.lib.noaa.gov/noaa_documents/NESDIS/TR_NESDIS/TR_NESDIS_142-8.pdf) (updated November 2016)
- Stewart, Brook C., Kenneth E. Kunkel, Laura E. Stevens, Liqiang Sun, and John E. Walsh. 2013. *Regional Climate Trends and Scenarios for the U.S. National Climate Assessment: Part 7. Climate of Alaska*. U.S. NOAA Technical Report NESDIS 142-7. National Oceanic and Atmospheric Administration, National Environmental Satellite, Data, and Information Service, Washington, D.C. Accessed: July 23, 2015. Retrieved from: <https://data.globalchange.gov/file/91488eed-45ac-4f9e-a7e5-0494ff205719> (updated November 2016)

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## **APPENDIX G**

### **Hawaii Register of Historic Places**

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**Table 1: Hawaii Register of Historic Places**

| <b>Property Name</b>                                                   | <b>Island</b> | <b>Address/Property Area</b>                  | <b>Tax Map Key</b>                                                                                                    |
|------------------------------------------------------------------------|---------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 'Imiola Church                                                         | Hawaii        | NA                                            | 6-5-004:004                                                                                                           |
| (Kapoho Quad) King's Highway                                           | Hawaii        | NA                                            | 1-3-007:026                                                                                                           |
| (Keaau Ranch Quad) Burials                                             | Hawaii        | NA                                            | 2-1-013:001                                                                                                           |
| (Keahole Quad) Habitation Cluster                                      | Hawaii        | NA                                            | 7-3-043:003                                                                                                           |
| (Keahole Quad) Habitation Site                                         | Hawaii        | NA                                            | 7-4-008:003                                                                                                           |
| (Keahole Quad) House and Burials                                       | Hawaii        | NA                                            | 7-5-005:007                                                                                                           |
| (Keahole Quad) Shelter and Pen                                         | Hawaii        | NA                                            | 7-3-043:003                                                                                                           |
| (Keawanui Quad) Habitation and Burials                                 | Hawaii        | NA                                            | 5-8-001:012                                                                                                           |
| (Keawanui Quad) Habitation Complex                                     | Hawaii        | NA                                            | 5-7-001:021                                                                                                           |
| (Keawanui Quad) Possible Heiau                                         | Hawaii        | NA                                            | 5-8-001:013                                                                                                           |
| (Keawanui Quad) Vault Complex                                          | Hawaii        | NA                                            | 5-7-001:021                                                                                                           |
| (Manuka Quad) Habitation Complex                                       | Hawaii        | NA                                            | 9-1-001:007                                                                                                           |
| (Manuka Quad) Heiau and Trail                                          | Hawaii        | NA                                            | 9-1-001:003                                                                                                           |
| (Manuka Quad) Koa                                                      | Hawaii        | NA                                            | 9-1-001:003                                                                                                           |
| (Manuka Quad) Kuleana Complex                                          | Hawaii        | NA                                            | 9-1-001:003                                                                                                           |
| (Manuka Quad) Lava Tube Complex                                        | Hawaii        | NA                                            | 9-1-001:003                                                                                                           |
| (Manuka Quad) Platform and Mounds                                      | Hawaii        | NA                                            | 9-1-001:003                                                                                                           |
| (Manuka Quad) Platform and Shelters                                    | Hawaii        | NA                                            | 9-1-001:003                                                                                                           |
| (Manuka Quad) Shrine and Heiau                                         | Hawaii        | NA                                            | 9-1-01:003, :007                                                                                                      |
| (Milolii Quad) Burial Cave                                             | Hawaii        | NA                                            | 8-9-003:001                                                                                                           |
| 1790 Footprints                                                        | Hawaii        | NA                                            | 9-9-001:001, :002                                                                                                     |
| A.J. Williamson Residence                                              | Hawaii        | NA                                            | 2-6-006:011                                                                                                           |
| Ahole Holua Complex                                                    | Hawaii        | NA                                            | 8-9-006:003                                                                                                           |
| Ahu-a-'Umi Heiau                                                       | Hawaii        | NA                                            | 7-8-001:003                                                                                                           |
| Ainahou Ranch House                                                    | Hawaii        | NA                                            | 9-9-001:006                                                                                                           |
| Ainapo Trail (Menzies Trail)                                           | Hawaii        | NA                                            | 9-9-001:003                                                                                                           |
| Ala Loa (Puna District)                                                | Hawaii        | NA                                            | 1-2-009:003 (portion)                                                                                                 |
| Ala Loa Foot Trail (Southernmost Kohala & Northernmost Kona Districts) | Hawaii        | NA                                            | 6-8-001:032, :035 (portions); 6-8-022:032 (portion); 6-9-001:015 (portion); 6-9-007: (portion); 7-1-003:022 (portion) |
| Anna Ranch (a.k.a Lindsey Ranch and Waiauia Ranch)                     | Hawaii        | 65-1480 Kawaihae Rd., Kamuela                 | 6-5-006 & 003                                                                                                         |
| Asa and Lucy Thurston House Site (a.k.a. "Laniakea")                   | Hawaii        | Between Alahou and Lamaokaola Streets, Kailua | 7-5-004:035                                                                                                           |
| Bobcat Trail Habitation Cave                                           | Hawaii        | NA                                            | 7-1-004:006                                                                                                           |

| Property Name                                                                                          | Island | Address/Property Area          | Tax Map Key                                     |
|--------------------------------------------------------------------------------------------------------|--------|--------------------------------|-------------------------------------------------|
| Boundary Change                                                                                        | Hawaii | NA                             | 6-8-001:022, 015, 017 (portion)                 |
| Chee Ying Society Clubhouse (Delisted: 6/30/2007)                                                      | Hawaii | NA                             | 4-5-009:009                                     |
| Christ Church Episcopal                                                                                | Hawaii | NA                             | 8-1-005:008                                     |
| Crater Rim Drive                                                                                       | Hawaii | NA                             | 9-3                                             |
| Daifukuji Soto Zen Mission                                                                             | Hawaii | NA                             | 8-2-010:020                                     |
| District Courthouse and Police Station                                                                 | Hawaii | NA                             | 2-3-006:004                                     |
| East Hamakua Protestant Church                                                                         | Hawaii | NA                             | 4-4-006:001                                     |
| Elias Bond District                                                                                    | Hawaii | Kapaa                          | 5-3-005:004, :005, :017, :019, :020, :026, :027 |
| Francis Ii Brown Beach Residence                                                                       | Hawaii | NA                             | 7-1-003:003, :012, :013                         |
| Greenwell Store                                                                                        | Hawaii | NA                             | 8-1-004:050                                     |
| H. Tanimoto Residence (Honomu Theater)                                                                 | Hawaii | NA                             | 2-8-014:015-Residence (3) 2-8-014:107-Theater   |
| Hakalau Plantation Manager's House                                                                     | Hawaii | 29-2301 Old Mamalahoa Highway  | 2-9-002:039                                     |
| HALAULANI PLACE Multiple Property: Edward H. and Claire L. Moses Residence                             | Hawaii | 105 Halaulani Place            | 2-6-006:017 and :025                            |
| HALAULANI PLACE Multiple Property: Herbert Austin Truslow Residence a.k.a. Ellen G. Lyman Residence    | Hawaii | 52 Halaulani Place             | 2-6-006:007                                     |
| HALAULANI PLACE Multiple Property: James and Catherine Parker Residence                                | Hawaii | 72 Halaulani Place             | 2-6-006:027                                     |
| HALAULANI PLACE Multiple Property: Levi and Nettie Lyman Residence                                     | Hawaii | 40 Halaulani Place             | 2-6-006:008                                     |
| HALAULANI PLACE Multiple Property: Patrick and Ethel McGuinness Residence                              | Hawaii | 30 Halaulani Place             | 2-6-006:018                                     |
| HALAULANI PLACE Multiple Property: W. H. Hill Residence a.k.a. Vernon D. and Alice L. Shutte Residence | Hawaii | 91 Halaulani Place             | 2-6-006:016                                     |
| HALAULANI PLACE Multiple Property: Walter Irving and Jean Henderson Residence                          | Hawaii | 82 Halaulani Place             | 2-6-006:004                                     |
| Hale Halawai o Holualoa                                                                                | Hawaii | NA                             | 7-6-016:013                                     |
| Haleokane Heiau                                                                                        | Hawaii | NA                             | 7-4-008:003                                     |
| Hamakua Steel Bridges                                                                                  | Hawaii | Mamalahoa Hwy                  | 3-2; 3-3                                        |
| Hashimoto House                                                                                        | Hawaii | NA                             | 5-5-015:038                                     |
| Hawi Plantation Manager's Residence                                                                    | Hawaii | NA                             | 5-5-015:041                                     |
| Heiau in Kukuipahu                                                                                     | Hawaii | NA                             | 5-6-001:075                                     |
| Heichi and Hawaii Kawabata Family Home                                                                 | Hawaii | 64-810 Mamalahoa Hwy., Kamuela | 6-4-001:145                                     |
| Hilina Pali Road                                                                                       | Hawaii | NA                             | 9-3                                             |
| Hilo Masonic Lodge                                                                                     | Hawaii | NA                             | 2-3-005:007                                     |



| <b>Property Name</b>                                                                                                                                        | <b>Island</b> | <b>Address/Property Area</b>     | <b>Tax Map Key</b>                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------------|--------------------------------------|
| HISTORIC AND ARCHITECTURE RESOURCES OF HONOKAA TOWN MP Ferreira Building                                                                                    | Hawaii        | 45-3625 Mamane Street            | 4-5-007:007                          |
| Hoku Loa Church                                                                                                                                             | Hawaii        | 69-160 Puako Beach Drive         | 6-9-002:009                          |
| Holualoa 4 Archaeological District                                                                                                                          | Hawaii        | NA                               | 7-7-004                              |
| Holualoa Telephone Exchange Building                                                                                                                        | Hawaii        | 76-5973 Mamalahoa Highway        | 7-6-005:036                          |
| Honokaa Plantation Manager's Residence                                                                                                                      | Hawaii        | NA                               | 4-8-006:013                          |
| Honokohau Settlement/Kaloko-Honokohau National Historic Park (U.S. Government has acquired TMK 7-3-09:02 & 7-4-08:25 for park) (District w/ multiple sites) | Hawaii        | NA                               | 7-3-009:002; 7-4-008:003, :010, :025 |
| Hulihee Palace (Additional Documentation Accepted to Change Level of Significance)                                                                          | Hawaii        | NA                               | 7-5-007:020                          |
| James M. Hind Residence                                                                                                                                     | Hawaii        | NA                               | 5-5-015:035                          |
| Ka'elemakule-Magoon House Complex at Mahai'ula Bay                                                                                                          | Hawaii        | 72-3630 Queen Ka'ahumanu Highway | 7-2-005:003                          |
| Kahaluu Historic District (District w/multiple sites)                                                                                                       | Hawaii        | NA                               | 7-8-010:002, :004, :035              |
| Kahikolu Church                                                                                                                                             | Hawaii        | NA                               | 8-2-007:006                          |
| Kaiakakua Complex                                                                                                                                           | Hawaii        | NA                               | 9-1-001:003                          |
| Kalaoa Permanent House Site 10,205                                                                                                                          | Hawaii        | NA                               | 7-3-043:042 (portion)                |
| Kalapana Painted Church                                                                                                                                     | Hawaii        | NA                               | 1-2-006:081 (portion)                |
| Kamakahonu (Residence of King Kamehameha I)                                                                                                                 | Hawaii        | NA                               | 7-5-006:024, :032                    |
| Kamehameha Hall                                                                                                                                             | Hawaii        | NA                               | 2-1-021:043                          |
| Kamehameha III Birthplace (Kauikeaouli Stone)                                                                                                               | Hawaii        | NA                               | 7-8-012:017                          |
| Kapalaoa Archaeological District                                                                                                                            | Hawaii        | NA                               | 9-3-001:002 (portion)                |
| Kaulanamaluna Upland Complex                                                                                                                                | Hawaii        | NA                               | 8-9-006:002                          |
| Kealakekua Bay Historical District (District w/multiple sites)                                                                                              | Hawaii        | NA                               | 8-2, 8-3                             |
| Keauhou Holua Slide                                                                                                                                         | Hawaii        | NA                               | 7-8-010:030                          |
| Keauohana Ahupua'a Archaeological District (District with multiple sites)                                                                                   | Hawaii        | NA                               | 1-2-009:003 (portion)                |
| Keawaiki Complex                                                                                                                                            | Hawaii        | NA                               | 9-1-001:003                          |
| Keolonahihi Complex/Kamoa Point Complex (District w/multiple sites)                                                                                         | Hawaii        | NA                               | 7-7-004:012, :028, :031, :051, :052  |
| Kiholo-Puako Trail (Also in Quad 10)                                                                                                                        | Hawaii        | NA                               | 6, 7                                 |
| Ki'i Petroglyphs                                                                                                                                            | Hawaii        | NA                               | 9-5-006:001                          |
| Kilauea Crater                                                                                                                                              | Hawaii        | NA                               | 9-9-001:001                          |
| Kilauea Lodge                                                                                                                                               | Hawaii        | NA                               | 1-9-004:005 and :055                 |
| Kipuka Malua Complex                                                                                                                                        | Hawaii        | NA                               | 9-1-001:003, :006                    |

| Property Name                                                                   | Island | Address/Property Area          | Tax Map Key              |
|---------------------------------------------------------------------------------|--------|--------------------------------|--------------------------|
| Kohala District Courthouse                                                      | Hawaii | NA                             | 5-4-005:001              |
| Kohala Pilgrim Church (Delisted: 6/30/2007)                                     | Hawaii | NA                             | 5-5-015:025              |
| Kuamo'o Burials                                                                 | Hawaii | NA                             | 7-8-010:066              |
| Lanihau Papamu                                                                  | Hawaii | NA                             | 7-5-005:007              |
| Lapakahi Complex (District w/ multiple sites)                                   | Hawaii | NA                             | 5-7                      |
| Ludloff Residence                                                               | Hawaii | 1432 Wailuku Dr.               | 2-3-028:022              |
| MacKenzie Petroglyphs                                                           | Hawaii | NA                             | 1-3-007:026; 1-3-008:001 |
| Mahana Archaeological District                                                  | Hawaii | NA                             | 9-3-001:002 (portion)    |
| Makeanehu Complex                                                               | Hawaii | NA                             | 5-8-001:012              |
| Manuka Bay Holua Slide                                                          | Hawaii | NA                             | 9-1-001:003              |
| Manuka Bay Petroglyphs                                                          | Hawaii | NA                             | 9-1-001:003              |
| Masao Kubo Residence                                                            | Hawaii | 1411 Wailuku Dr.               | 2-3-028:044              |
| Matayoshi Hospital                                                              | Hawaii | 59 and 41 Hoku St., Hilo       | 2-2-019:040 & :041       |
| Mauna Kea Adze Quarry                                                           | Hawaii | NA                             | 4-4-015:001, :009, :010  |
| Mauna Loa Road                                                                  | Hawaii | NA                             | 9-3                      |
| Mauna Loa Trail                                                                 | Hawaii | NA                             | 9                        |
| Michael Victor Houses                                                           | Hawaii | NA                             | 2-3-014:002              |
| Moku'aikaua Church                                                              | Hawaii | NA                             | 7-5-007:018              |
| Mo'okini Heiau                                                                  | Hawaii | NA                             | 5-5-005:020              |
| Mountain View Theater                                                           | Hawaii | NA                             | 1-8-020:001              |
| Nanbu Hotel/Holy's Bakery                                                       | Hawaii | Akoni Pule Hwy., Kapaau        | 5-4-005:022              |
| North Honomalino Complex                                                        | Hawaii | NA                             | 8-9-003:001              |
| Okoe Bay Complex                                                                | Hawaii | NA                             | 8-9-003:001              |
| Old Laupahoehoe Jodo Mission                                                    | Hawaii | 46-1006 Laupahoehoe Point Road | 3-6-002:034              |
| Old Lindsey House                                                               | Hawaii | NA                             | 6-5-003:042              |
| Old Volcano House No. 42                                                        | Hawaii | NA                             | 9-9-001:023              |
| Old Waimea Elementary School Building/ Isaacs Art Center                        | Hawaii | NA                             | 6-5-007:003              |
| Opihikao Evangelical Church Residence                                           | Hawaii | NA                             | 1-3-004:018              |
| Paaupau Plantation House                                                        | Hawaii | NA                             | 4-4-006:022              |
| Palace Theatre                                                                  | Hawaii | NA                             | 2-3-007:021              |
| Pua'a 2 Agricultural Fields Archaeological District                             | Hawaii | NA                             | 7-5-014:023 (portion)    |
| Puakea Ranch                                                                    | Hawaii | 56-2864 Akoni Pule Highway     | 5-6-001:082              |
| Puako Petroglyph Archaeological District                                        | Hawaii | NA                             | 6-9-001:015              |
| Puako Petroglyph Boundary Change                                                | Hawaii | NA                             | 6-9-001:015              |
| PUBLIC SCHOOLS ON THE ISLAND OF<br>HAWAI'I Chiefess Kapiolani Elementary School | Hawaii | NA                             | 2-2-020:001              |

| <b>Property Name</b>                                                                    | <b>Island</b> | <b>Address/Property Area</b>     | <b>Tax Map Key</b>                |
|-----------------------------------------------------------------------------------------|---------------|----------------------------------|-----------------------------------|
| PUBLIC SCHOOLS ON THE ISLAND OF HAWAII Hilo High School                                 | Hawaii        | NA                               | 2-3-014:001 (portion)             |
| PUBLIC SCHOOLS ON THE ISLAND OF HAWAII Honokaa High & Elementary School                 | Hawaii        | NA                               | 4-5-003:020 (portion)             |
| PUBLIC SCHOOLS ON THE ISLAND OF HAWAII Ka'u High & Pahala Elementary School             | Hawaii        | NA                               | 9-6-005:008                       |
| PUBLIC SCHOOLS ON THE ISLAND OF HAWAII Kalaniana'ole Elementary & Intermediate School   | Hawaii        | NA                               | 2-7-022:002 and :003              |
| PUBLIC SCHOOLS ON THE ISLAND OF HAWAII Laupahoehoe High and Elementary School           | Hawaii        | NA                               | 3-5-004:026 and :050; 3-5-005:001 |
| PUBLIC SCHOOLS ON THE ISLAND OF HAWAII Naalehu School                                   | Hawaii        | NA                               | 9-5-009:006, :015                 |
| PUBLIC SCHOOLS ON THE ISLAND OF HAWAII Hilo Union Elementary School                     | Hawaii        | NA                               | 2-3-016:037 (portion)             |
| PUBLIC SCHOOLS ON THE ISLAND OF HAWAII Old Riverside School (Hilo District Office)      | Hawaii        | NA                               | 2-3-015:001                       |
| Puna-Ka'u Historic District, Hawaii Volcanoes National Park (District w/multiple sites) | Hawaii        | NA                               | 9                                 |
| Pu'uho'ou o Honaunau National Historical Park (District with multiple sites)            | Hawaii        | NA                               | 8-4-011:007                       |
| Pu'ukohola Heiau National Historic Park (District with multiple sites)                  | Hawaii        | NA                               | 6-2-002:009, :010, :016           |
| Rev. D. B. Lyman House                                                                  | Hawaii        | NA                               | 2-3-016:024                       |
| S. Hata Building                                                                        | Hawaii        | 318 Kamehameha Avenue, Hilo      | 2-3-008:016                       |
| Samuel and Asako Haraguchi Residence                                                    | Hawaii        | 90 Koula St.                     | 2-5-024:025 and :026              |
| South Manuka Bay Complex                                                                | Hawaii        | NA                               | 9-1-001:003                       |
| South Point Complex                                                                     | Hawaii        | NA                               | 9-3-001:001, :003, :007, :011     |
| St. Benedict's Catholic Church                                                          | Hawaii        | NA                               | 8-4-006:006                       |
| Thomas Guard House (a.k.a. Wylie House and Leonard House)                               | Hawaii        | 240 Kaiulani St., Hilo           | 2-3-015:020                       |
| Tomikawa Store                                                                          | Hawaii        | 76-5902 Mamalahoa Hwy., Holualoa | 7-6-008:020                       |
| Tong Wo Society Building                                                                | Hawaii        | NA                               | 5-3-008:020                       |
| Uchida Coffee Farm                                                                      | Hawaii        | NA                               | 8-2-015:013 (portion)             |
| Union Mill Managers Residence                                                           | Hawaii        | NA                               | 5-4-010:058, :059                 |
| United Community Church                                                                 | Hawaii        | NA                               | 2-2-020:002                       |
| United States Post Office and Office Building                                           | Hawaii        | NA                               | 2-3-005:003                       |

| Property Name                                                       | Island    | Address/Property Area  | Tax Map Key                               |
|---------------------------------------------------------------------|-----------|------------------------|-------------------------------------------|
| Volcano Block                                                       | Hawaii    | NA                     | 2-3-003:009                               |
| W. H. Shipman House                                                 | Hawaii    | NA                     | 2-3-015:004 and :005                      |
| Waiakea Mission Station or Haili Church                             | Hawaii    | NA                     | 2-3-012:009                               |
| Walter Irving Henderson House:                                      | Hawaii    | 75-5944 Alii Drive     | (3) 7-5-019:018                           |
| Wawalo'i Habitation                                                 | Hawaii    | NA                     | 7-3-043:003                               |
| Whitney Seismograph Vault No. 29                                    | Hawaii    | NA                     | 9-9-001:023                               |
| Wilkes Campsite                                                     | Hawaii    | NA                     | 9-9-001:003                               |
| Yamamoto Store                                                      | Hawaii    | NA                     | 2-9-003:018                               |
| Various                                                             | Kahoolawe | NA                     | 20-97-101 thru 20-97-676                  |
| Opaeka'a Road Bridge                                                | Kauai     | NA                     | 4-2-002:022                               |
| A. S. Wilcox Beach House                                            | Kauai     | NA                     | 5-5-001:002 (portion), 018, 019, 020, 021 |
| Ahuloulu Heiau Complex (Puukapele)                                  | Kauai     | NA                     | 1-2-001:003                               |
| Allan Sanborn Beach House                                           | Kauai     | 5174 Weke Rd., Hanalei | 5-5-002:049                               |
| Anahola Dune Burials                                                | Kauai     | NA                     | 4-8-007:001                               |
| Bishop National Bank of Hawaii (First Hawaiian Bank, Waimea Branch) | Kauai     | NA                     | 1-6-006:033                               |
| Burial Caves                                                        | Kauai     | NA                     | 1-9-001:020                               |
| Camp Slogett, Kokee                                                 | Kauai     | NA                     | 1-4-004:033                               |
| Charles Gay House                                                   | Kauai     | NA                     | 1-6-001:029                               |
| Civilian Conservation Corps Camp, Koke'e                            | Kauai     | NA                     | 1-4-001:013 (portion)                     |
| Cook Landing Site                                                   | Kauai     | NA                     | 1-6-006:001                               |
| Douglas Baldwin Beach House                                         | Kauai     | NA                     | 5-5-002:007                               |
| Grove Farm                                                          | Kauai     | NA                     | 3-6-001:002                               |
| Grove Farm Boundary Increase                                        | Kauai     | NA                     | 3-6-001:010                               |
| Grove Farm Company Locomotives                                      | Kauai     | NA                     | 3-3-002:015                               |
| Gulick-Rowell House                                                 | Kauai     | NA                     | 1-2-006:034                               |
| Haena Archaeological Complex                                        | Kauai     | NA                     | Multiple                                  |
| Hanalei Elementary School                                           | Kauai     | NA                     | 5-5-009:008                               |
| Hanalei Pier                                                        | Kauai     | Kuhio Hwy.             | 5-5-001:008                               |
| Hanapepe Complex 50                                                 | Kauai     | NA                     | 1-8-008:001,084                           |
| Hanapepe Salt Pans                                                  | Kauai     | NA                     | 1-8-008:043                               |
| HANAPEPE TOWN LOTS Multiple Property:<br>Hanapepe Lot No. 11B       | Kauai     | NA                     | 1-9-005:053                               |
| HANAPEPE TOWN LOTS Multiple Property:<br>Hanapepe Lot No.18         | Kauai     | NA                     | 1-9-004:008                               |
| HANAPEPE TOWN LOTS Multiple Property:<br>Hanapepe Lot No.49         | Kauai     | NA                     | 1-9-011:008                               |

| Property Name                                                                                   | Island | Address/Property Area | Tax Map Key                       |
|-------------------------------------------------------------------------------------------------|--------|-----------------------|-----------------------------------|
| HANAPEPE TOWN LOTS Multiple Property:<br>Obatake's, Lot No.21A                                  | Kauai  | NA                    | 1-9-005:041                       |
| Haraguchi Rice Mill                                                                             | Kauai  | NA                    | 5-4-003:007                       |
| Hauola Heiau                                                                                    | Kauai  | NA                    | 1-2-002:023                       |
| Hooneenuu Heiau                                                                                 | Kauai  | NA                    | 1-2-002:023                       |
| Kaipu Camp                                                                                      | Kauai  | NA                    | 3-6-001:017                       |
| Kamo'omaika'i Pond/Pu'u Poa Marsh                                                               | Kauai  | NA                    | 5-4-004:001                       |
| Kapaia Swinging (Pedestrian) Bridge                                                             | Kauai  | NA                    | 3-7-001                           |
| Kauai Belt Road                                                                                 | Kauai  | NA                    | Multiple                          |
| Kauai Museum (Albert Spencer Wilcox Building)                                                   | Kauai  | NA                    | 3-6-005:005                       |
| KAUAI PUBLIC SCHOOLS Multiple Property:<br>Anahola School Buildings                             | Kauai  | NA                    | 4-8-005:001                       |
| KAUAI PUBLIC SCHOOLS Multiple Property:<br>Kalaheo School Campus                                | Kauai  | NA                    | 2-3-002:005                       |
| KAUAI PUBLIC SCHOOLS Multiple Property:<br>Kapa'a School                                        | Kauai  | NA                    | 4-6-014:031                       |
| KAUAI PUBLIC SCHOOLS Multiple Property:<br>Waimea Elementary and Jr. High (Homemaking<br>Bldg.) | Kauai  | NA                    | 1-6-010:004                       |
| Kawamura Residence and Utility Shed                                                             | Kauai  | NA                    | 4-5-008:016                       |
| Kihe Heiau Complex                                                                              | Kauai  | NA                    | 4-9-009:001                       |
| Kikiaola (Kiki-a-ola, Menehune Ditch)                                                           | Kauai  | NA                    | 1-5-001:002 and 1-6-001:028, :045 |
| KILAUEA PLANTATION STONE BUILDINGS<br>Thematic Group: Head Bookkeeper's House                   | Kauai  | NA                    | 5-2-009:004                       |
| KILAUEA PLANTATION STONE BUILDINGS<br>Thematic Group: Head Luna's House                         | Kauai  | NA                    | 5-2-009:003                       |
| KILAUEA PLANTATION STONE BUILDINGS<br>Thematic Group: Kong Lung Store                           | Kauai  | NA                    | 5-2-08:29                         |
| KILAUEA PLANTATION STONE BUILDINGS<br>Thematic Group: Plantation Manager's House                | Kauai  | NA                    | 5-2-013:001                       |
| Kilauea Point Lighthouse                                                                        | Kauai  | NA                    | 5-2-004:017                       |
| Kilauea School                                                                                  | Kauai  | NA                    | 5-2-009:006                       |
| Kilohana (Gaylord P. Wilcox House)                                                              | Kauai  | NA                    | 3-4-005:001 (portion)             |
| Koloa Lava Tubes 3075                                                                           | Kauai  | NA                    | 2-6-004:038                       |
| Kukui Heiau                                                                                     | Kauai  | NA                    | 4-3-002:001, portion of :010      |
| Lawa'i Lava Tubes 3071                                                                          | Kauai  | NA                    | 2-6-003:003                       |
| Lawa'i Lava Tubes 3072                                                                          | Kauai  | NA                    | 2-6-003:003                       |
| Lewaula Heiau                                                                                   | Kauai  | NA                    | 1-5-001:001                       |

| Property Name                                                               | Island | Address/Property Area                   | Tax Map Key                     |
|-----------------------------------------------------------------------------|--------|-----------------------------------------|---------------------------------|
| Lihue Civic Center Historic District                                        | Kauai  | NA                                      | 3-6-005: 001,002,003            |
| Lihue Hongwanji Mission                                                     | Kauai  | NA                                      | 5-5-009:013                     |
| Lihue Post Office                                                           | Kauai  | NA                                      | 3-6-005:010                     |
| Mahamoku (a.k.a. Mabel Wilcox Hanalei Beach House)                          | Kauai  | 5344 Weke Rd., Hanalei 96814            | 5-5-003:010                     |
| Masuda Building                                                             | Kauai  | NA                                      | 1-6-007:030                     |
| Menhune Fishpond (Aleko Fishpond)                                           | Kauai  | NA                                      | 3-2-001:001                     |
| Na Pali Coast Archaeological District                                       | Kauai  | NA                                      | 5-9-001:001, 002, 022           |
| Na Pali Coast Archaeological District                                       | Kauai  | NA                                      | 1-4-001:007, 014, 020           |
| Old Sugar Mill of Koloa                                                     | Kauai  | NA                                      | 2-8-006:001                     |
| Puuopae Bridge                                                              | Kauai  | NA                                      | 4-4-002                         |
| Russian Fort Elizabeth                                                      | Kauai  | NA                                      | 1-7-005:003                     |
| Say Dock House                                                              | Kauai  | Kuhio Hwy.                              | 5-5-009:007                     |
| Seto Building                                                               | Kauai  | NA                                      | 4-5-011:031                     |
| Taro Terraces                                                               | Kauai  | NA                                      | 1-5-001:002                     |
| Wahiawa Petroglyphs                                                         | Kauai  | NA                                      | 2-2-001:007                     |
| Wailua Complex of Heiaus                                                    | Kauai  | NA                                      | 3-9-06:01; 4-1-02:03; 4-2-13:17 |
| Waimea Educational Center                                                   | Kauai  | NA                                      | 1-6-007:042                     |
| Waimea Valley Complex                                                       | Kauai  | NA                                      | 1-5-001:002,017                 |
| Wainiha Taro Terraces 152                                                   | Kauai  | NA                                      | 5-8-003:003                     |
| Wai'oli Mission District                                                    | Kauai  | NA                                      | 5-5-006:008,019                 |
| Weuweu-Kawai-iki Fishpond (Coco Palms)                                      | Kauai  | Corner of Kuamoo Road and Kuhio Highway | 4-1-003:007                     |
| Yamase Building                                                             | Kauai  | NA                                      | 1-6-007:032                     |
| 'Alae Petroglyphs                                                           | Maui   | NA                                      | 2-2-013:010                     |
| Alena Habitation Site                                                       | Maui   | NA                                      | 1-9-001:003                     |
| Asa Baldwin Residence                                                       | Maui   | 149 Cane Place, Paia                    | 3-8-002:004                     |
| Bank of Hawaii - Haiku Branch                                               | Maui   | NA                                      | 2-7-020:008                     |
| Cave of Seven Coffins                                                       | Maui   | NA                                      | 2-1-002:001                     |
| CHINESE SOCIETY HALLS Thematic Group: Chee Kung Tong (Site removed 8/29/98) | Maui   | NA                                      | 3-4-013:040                     |
| CHINESE SOCIETY HALLS Thematic Group: Ket Hing Society                      | Maui   | NA                                      | 2-2-003:036                     |
| CHINESE SOCIETY HALLS Thematic Group: Wo Hing Society Hall                  | Maui   | NA                                      | 4-5-001:045                     |
| Crater Historic District Haleakala National Park                            | Maui   | NA                                      | 1, 2                            |
| Frank Baldwin/ H.F. Rice Residence                                          | Maui   | NA                                      | 2-4-008:010                     |
| Fred C. Baldwin Memorial Home                                               | Maui   | 1813 Baldwin Avenue                     | 2-5-004:007                     |

| Property Name                                                              | Island | Address/Property Area | Tax Map Key                                       |
|----------------------------------------------------------------------------|--------|-----------------------|---------------------------------------------------|
| Gomes Residence                                                            | Maui   | NA                    | 2-4-018:063                                       |
| Haiku Fruit and Packing Company Manager's Residence                        | Maui   | 1061 Kokomo Road      | 2-7-021:007                                       |
| Ha'iku Mill                                                                | Maui   | NA                    | 2-7-003:006                                       |
| Hale Ho'ike'ike (Old Bailey House)                                         | Maui   | NA                    | 3-4-014:083                                       |
| Hale Pa'i                                                                  | Maui   | NA                    | 4-6-018:005                                       |
| Haleki'i-Pihana Heiau                                                      | Maui   | NA                    | 3-4-030:004                                       |
| Hale-o-Lono Heiau                                                          | Maui   | NA                    | 1-4-010:003                                       |
| Hamoia Complex                                                             | Maui   | NA                    | 1-4-007:002; 1-4-010:003                          |
| Hana Belt Road                                                             | Maui   | NA                    | 1, 2, 3                                           |
| Hana District Police Station and Courthouse                                | Maui   | NA                    | 1-4-013:036                                       |
| Hana Hongwanji Temple                                                      | Maui   | NA                    | 1-4-003:003                                       |
| Hana Store                                                                 | Maui   | NA                    | 1-4-013:001                                       |
| Hanamau'uloa Complex                                                       | Maui   | NA                    | 1-9-001:003                                       |
| Hardy House                                                                | Maui   | NA                    | 2-4-018:009                                       |
| Holy Ghost Catholic Church                                                 | Maui   | NA                    | 2-3-037:002                                       |
| Honokalani Village (Ka'eleku, Honokalani & Wakiu Ahupua'a) (Wai'anapanapa) | Maui   | NA                    | 1-3-003:026; 1-3-005:002, :009; 1-3-006:007, :009 |
| Honokowai Petroglyphs                                                      | Maui   | NA                    | 4-4-002:003                                       |
| Iao Theater                                                                | Maui   | NA                    | 3-4-012:022                                       |
| Ka'ahumanu Church                                                          | Maui   | NA                    | 3-4-014:002                                       |
| Kahikinui House                                                            | Maui   | NA                    | 1-9-001:003                                       |
| Kaiapuni Ko'a                                                              | Maui   | NA                    | 1-4-005:028                                       |
| Kaimupe'elua Heiau                                                         | Maui   | NA                    | 2-2-002:014                                       |
| Kalepolepo Fishpond                                                        | Maui   | NA                    | 3-9-001: submerged                                |
| Kaluakakalioa Cave                                                         | Maui   | NA                    | 1-9-001:003                                       |
| Kaluanui Heiau Complex                                                     | Maui   | NA                    | 1-4-007:002                                       |
| Kama'ole House Site                                                        | Maui   | NA                    | 3-9-004:001                                       |
| Kauhihale Complex                                                          | Maui   | NA                    | 2-9-012:002                                       |
| Ka'umi'umiua Heiau                                                         | Maui   | NA                    | 2-2-002:014                                       |
| Kealiakapu Complex-Kaunolu Village                                         | Maui   | NA                    | 4-9-002:001                                       |
| Keone'oio Archaeological District/La Perouse Archaeological District       | Maui   | NA                    | 2-1-004:006, :035, :073, :075, :110, :111, :114   |
| Kilolani Congregational Church                                             | Maui   | NA                    | 3-9-001:012                                       |
| Kipahulu Historic District                                                 | Maui   | NA                    | 00-04-2010                                        |
| Kipapa Archaeological District                                             | Maui   | NA                    | 1-9-001:003                                       |
| Kula Sanatorium                                                            | Maui   | 100 Keokea Pl., Kula  | 2-2-004:034                                       |
| Lahaina Historic District 60 Sites (Approximate)                           | Maui   | NA                    | 00-04-2100                                        |

| Property Name                                                            | Island  | Address/Property Area        | Tax Map Key                           |
|--------------------------------------------------------------------------|---------|------------------------------|---------------------------------------|
| Lo'alo'a Heiau                                                           | Maui    | NA                           | 1-7-002:012, :014                     |
| Luala'ilua Cave                                                          | Maui    | NA                           | 1-9-001:003                           |
| Luala'ilua Heiau                                                         | Maui    | NA                           | 1-9-001:003                           |
| Luala'ilua Terrace Complex                                               | Maui    | NA                           | 1-9-001:003                           |
| Lucy Kaiewe Searle Residence                                             | Maui    | 239 Front St., Lahaina       | 4-6-003:002                           |
| Maalaea General Store                                                    | Maui    | 232 Maalaea Harbor Road      | 3-6-008:002                           |
| Makawao Union Church                                                     | Maui    | NA                           | 2-5-004:011                           |
| Maui Jinsha Mission                                                      | Maui    | NA                           | 3-4-029:032                           |
| MAUI PUBLIC SCHOOLS Multiple Property: Henry Perrine Baldwin High School | Maui    | NA                           | 3-8-007:004                           |
| MAUI PUBLIC SCHOOLS Multiple Property: Keanae School                     | Maui    | NA                           | 1-1-008:020                           |
| MAUI PUBLIC SCHOOLS Multiple Property: Paia School                       | Maui    | NA                           | 2-5-005:004                           |
| MAUI PUBLIC SCHOOLS Multiple Property: Puunene School                    | Maui    | NA                           | 3-8-006:008                           |
| MAUI PUBLIC SCHOOLS Multiple Property: Wailuku School                    | Maui    | NA                           | 3-4-007:001                           |
| MAUI PUBLIC SCHOOLS Multiple Property: Kaupo School                      | Maui    | NA                           | 1-7-002:015                           |
| Moku'ula                                                                 | Maui    | NA                           | 4-6-007:001, :002, :035, :036         |
| Molohai Heiau                                                            | Maui    | NA                           | 2-2-002:014                           |
| Naniloa Drive Overpass Bridge                                            | Maui    | NA                           | 00-04-2067                            |
| Paia Mantokuji Soto Mission                                              | Maui    | 253-C Hana Highway           | 2-6-008:013                           |
| Papakea Heiau                                                            | Maui    | NA                           | 2-2-004:036                           |
| Papakea Petroglyphs                                                      | Maui    | NA                           | 1-9-001:003                           |
| Pi'ilanihale Heiau                                                       | Maui    | NA                           | 1-3-002:004, :039                     |
| Pioneer Mill Company Office                                              | Maui    | 380 Lahainaluna Rd., Lahaina | 4-6-026:057                           |
| Wahene Platform                                                          | Maui    | NA                           | 2-1-002:001                           |
| Waiale Bridge                                                            | Maui    | NA                           | 3-4-010:037                           |
| Waihe'e Church                                                           | Maui    | NA                           | 3-2-07:23                             |
| Waikapu Stone Church                                                     | Maui    | NA                           | 3-5-012:036                           |
| Wailuku Civic Center Historic District                                   | Maui    | NA                           | 3-4-007:008, 3-4-008:042, 3-4-014:001 |
| Wananalua Congregational Church                                          | Maui    | NA                           | 1-4-004:019                           |
| William K. Kaluakini Residence                                           | Maui    | 450 Front Street, Lahaina    | 4-6-006:005                           |
| 'Ili'ili'opae Heiau                                                      | Molokai | NA                           | 5-7-005:002                           |



| Property Name                                                                                        | Island  | Address/Property Area                                            | Tax Map Key                   |
|------------------------------------------------------------------------------------------------------|---------|------------------------------------------------------------------|-------------------------------|
| MOLOKA'I FISHPONDS Multiple Property Ualapu'e Fishpond (also part of Hokukano-'Ualapu'e NHL Complex) | Molokai | NA                                                               | 5-6-001:001                   |
| 'Ualapu'e Fishpond                                                                                   | Molokai | NA                                                               | 5-6-001:001                   |
| Ahahui Kalaniana'ole (Kalaniana'ole Hall)                                                            | Molokai | NA                                                               | 5-2-009:018 (portion)         |
| Ahina Heiau                                                                                          | Molokai | NA                                                               | 6-1-001:002                   |
| Ali'i Pond                                                                                           | Molokai | NA                                                               | 5-4-006:025                   |
| Anahaki Gulch Complex                                                                                | Molokai | NA                                                               | 5-2-005:019                   |
| Ananaluawahine Cave                                                                                  | Molokai | NA                                                               | 6-1-001:002                   |
| Archaeological Sites, Hawaiian Home Lands                                                            | Molokai | NA                                                               | 5-4-0030:03                   |
| California Packing Corporation's Plantation Manager's Residence                                      | Molokai | Southeast Corner of Kalae Highway and Farrington Avenue, Molokai | 5-2-012:006                   |
| Fishing Shrine                                                                                       | Molokai | NA                                                               | 5-1-002:030                   |
| Fishing Shrine at Kamaka'ipo Pt.                                                                     | Molokai | NA                                                               | 5-1-002:030                   |
| Fishing shrine at Keawa Ka Lani                                                                      | Molokai | NA                                                               | 5-1-002:030                   |
| Former site of fishing shrine                                                                        | Molokai | NA                                                               | 5-1-002:002                   |
| Habitation Area                                                                                      | Molokai | NA                                                               | 5-1-002:030                   |
| Habitation Area at Kaheu Gulch                                                                       | Molokai | NA                                                               | 5-1-002:030                   |
| Habitation Area at Kamaka'ipo Gulch                                                                  | Molokai | NA                                                               | 5-1-002:030                   |
| Habitation Area at Kamaka'ipo Lowlands                                                               | Molokai | NA                                                               | 5-1-002:030                   |
| Habitation Area Near Kamaka'ipo Gulch                                                                | Molokai | NA                                                               | 5-1-002:030                   |
| Habitation Site                                                                                      | Molokai | NA                                                               | 5-1-002:030                   |
| Habitation Site                                                                                      | Molokai | NA                                                               | 5-1-008 Easements 166 and 167 |
| Heiau at Kapukikani                                                                                  | Molokai | NA                                                               | 5-1-002:030                   |
| Hokukano-'Ualapu'e Complex (discontiguous properties)                                                | Molokai | NA                                                               | Multiple                      |
| Honouliwai Fishtrap                                                                                  | Molokai | NA                                                               | 5-8-002:068                   |
| Kahili Koa                                                                                           | Molokai | NA                                                               | 6-1-001:002                   |
| Kahokukano Heiau                                                                                     | Molokai | NA                                                               | 5-6-006:013                   |
| Kalauonakukui Heiau                                                                                  | Molokai | NA                                                               | 5-6-006:015                   |
| Kalaupapa Leprosy Settlement                                                                         | Molokai | NA                                                               | 6-1-001:001                   |
| Kalua'aha Church                                                                                     | Molokai | NA                                                               | 5-7-011:064                   |
| Kaluakapi'ioho Heiau                                                                                 | Molokai | NA                                                               | 5-6-006:013                   |
| Kalualohe Complex                                                                                    | Molokai | NA                                                               | 5-2-010:001                   |
| Kape'elua Complex                                                                                    | Molokai | NA                                                               | 5-2-023:007                   |
| Kaupikiawa Cave                                                                                      | Molokai | NA                                                               | 6-1-001:002                   |

| Property Name                                   | Island  | Address/Property Area | Tax Map Key                    |
|-------------------------------------------------|---------|-----------------------|--------------------------------|
| KAWELA SITES Kamehameha V Wall, T-20 and T-42-4 | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES Mound Site, Burial Site            | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES Puuhonua                           | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-10                               | Molokai | NA                    | 5-4-014:062                    |
| KAWELA SITES T-108                              | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-111-116 and T-182                | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES T-12                               | Molokai | NA                    | 5-4-014:071, :072              |
| KAWELA SITES T-124                              | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES T-125-126 and T-181                | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-13                               | Molokai | NA                    | 5-4-014:064, :065              |
| KAWELA SITES T-134                              | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-135-136                          | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES T-144                              | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-145                              | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-155-158                          | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES T-165-166                          | Molokai | NA                    | 5-4-003:028; 5-4-016:001, :002 |
| KAWELA SITES T-167                              | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-171                              | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-180                              | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES T-19                               | Molokai | NA                    | 5-4-014:082                    |
| KAWELA SITES T-22-4, T-90 A&B                   | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES T-28                               | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES T-5, T-122, T-178                  | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-57                               | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-6 Complex                        | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-70B                              | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-75                               | Molokai | NA                    | 5-4-016:024                    |
| KAWELA SITES T-76                               | Molokai | NA                    | 5-4-016:023, :024              |
| KAWELA SITES T-78                               | Molokai | NA                    | 5-4-003:028                    |
| KAWELA SITES T-79                               | Molokai | NA                    | 5-4-016:03                     |
| KAWELA SITES T-81, 100, 101, 105, 142           | Molokai | NA                    | 5-4-001:050                    |
| KAWELA SITES T-88                               | Molokai | NA                    | 5-4-003:001                    |
| KAWELA SITES T-92                               | Molokai | NA                    | 5-4-003:001                    |
| Keawakalae Ko'a                                 | Molokai | NA                    | 5-1-002:030                    |
| Keawanui Fishpond                               | Molokai | NA                    | 5-6-006:008                    |
| Kilohana School                                 | Molokai | NA                    | 5-6-002:008                    |
| Kipapa Fishpond                                 | Molokai | NA                    | 5-5-001:008                    |

| <b>Property Name</b>                                       | <b>Island</b> | <b>Address/Property Area</b> | <b>Tax Map Key</b>       |
|------------------------------------------------------------|---------------|------------------------------|--------------------------|
| Koloko'eli Fishpond                                        | Molokai       | NA                           | 5-4-002:014              |
| Kukui Heiau                                                | Molokai       | NA                           | 5-6-004:016, :057        |
| Luahine Maika (Bowling) Run                                | Molokai       | NA                           | 5-2-010:001              |
| MOLOKA'I FISHPONDS Multiple Property Fishpond              | Molokai       | NA                           | 5-6-009: submerged       |
| MOLOKA'I FISHPONDS Multiple Property Fishpond              | Molokai       | NA                           | 5-7-001: submerged       |
| MOLOKA'I FISHPONDS Multiple Property Fishpond              | Molokai       | NA                           | 5-7-003: submerged       |
| MOLOKA'I FISHPONDS Multiple Property Fishpond              | Molokai       | NA                           | 5-7-011: submerged       |
| MOLOKA'I FISHPONDS Multiple Property Fishpond              | Molokai       | NA                           | 7-7-007: submerged       |
| MOLOKA'I FISHPONDS Multiple Property Halemahana Fishpond   | Molokai       | NA                           | 5-6-003:035              |
| MOLOKA'I FISHPONDS Multiple Property Ipukaiole Fishpond    | Molokai       | NA                           | 5-7-004: submerged       |
| MOLOKA'I FISHPONDS Multiple Property Kahinapohaku Fishpond | Molokai       | NA                           | 5-8-001:002              |
| MOLOKA'I FISHPONDS Multiple Property Kainalu Fishpond      | Molokai       | NA                           | 5-7-004: submerged       |
| MOLOKA'I FISHPONDS Multiple Property Kalua'aha Fishpond    | Molokai       | NA                           | 5-7-010, -011: submerged |
| MOLOKA'I FISHPONDS Multiple Property Mahilika Fishpond     | Molokai       | NA                           | 5-7-010:031              |
| MOLOKA'I FISHPONDS Multiple Property Mikiawa Fishpond      | Molokai       | NA                           | 5-6-006:009              |
| MOLOKA'I FISHPONDS Multiple Property Panahana Fishpond     | Molokai       | NA                           | 5-7-007:022              |
| MOLOKA'I FISHPONDS Multiple Property Weheleauulu Fishpond  | Molokai       | NA                           | 5-6-009: submerged       |
| Moloka'i Public Library                                    | Molokai       | NA                           | 5-3-005:012              |
| Nanahoa Complex                                            | Molokai       | NA                           | 5-2-013:006              |
| Nihoa Complex                                              | Molokai       | NA                           | 5-2-013:009              |
| Pahiomu Fishpond                                           | Molokai       | NA                           | 5-5-001:010              |
| Pakui Heiau                                                | Molokai       | NA                           | 5-6-006:013              |
| Pu'u 'Olelo Heiau                                          | Molokai       | NA                           | 5-6-006:013              |
| R. W. Meyer Sugar                                          | Molokai       | NA                           | 5-2-016:045              |

| Property Name                                                                   | Island  | Address/Property Area            | Tax Map Key |
|---------------------------------------------------------------------------------|---------|----------------------------------|-------------|
| S.W. Molokai Archaeological District<br>(Discontiguous sites)                   | Molokai | NA                               | Multiple    |
| Sandalwood Pit                                                                  | Molokai | NA                               | 5-4-003:025 |
| St. Joseph Catholic Church                                                      | Molokai | NA                               | 5-6-008:005 |
| U.S. Coast Guard Molokai Light                                                  | Molokai | NA                               | 6-1-001:003 |
| Waiakea Fishpond (Molokai Fishponds Multiple<br>Property, also see Quads 04,05) | Molokai | NA                               | 5-2-011:020 |
| 2 Aalapapa Pl. (a.k.a. "Hilltop House", "Puuhonua"<br>or "Bird Lady's House")   | Oahu    | 2 Alapapa Pl., Lanikai           | 4-3-008:087 |
| 2022 University Ave.                                                            | Oahu    | 2022 University Av.              | 2-8-022:037 |
| 3029 Oahu Avenue                                                                | Oahu    | 3029 Oahu Av.                    | 2-9-032:053 |
| 3033 Oahu Avenue                                                                | Oahu    | 3033 Oahu Av.                    | 2-9-032:019 |
| 3162 Huelani Dr. (a.k.a. "Hale Huelani")                                        | Oahu    | 3162 Huelani Dr.                 | 2-9-034:014 |
| 931 14th Avenue, Kaimuki                                                        | Oahu    | 931 14th Avenue, Kaimuki         | 3-2-047:014 |
| A.T. Cooke and P.E. Spalding Residence                                          | Oahu    | 2447 Makiki Heights Dr.          | 2-5-008:002 |
| Ada Gartley Residence                                                           | Oahu    | 2208 Kamehameha Av., Manoa       | 2-9-002:014 |
| Adolph Egholm Residence #1                                                      | Oahu    | 3022 Kalakaua Av., Diamond Head  | 3-1-033:020 |
| Ala Wai Canal                                                                   | Oahu    | NA                               | 2-6-Various |
| Albert and Alice Berg Residence                                                 | Oahu    | 2386 Oahu Av., Manoa             | 2-9-005:023 |
| Albert E. Coxhead Residence                                                     | Oahu    | 1932 Awapuhi Av., Manoa          | 2-9-016:013 |
| Albert R. "Sunny" Cunha House                                                   | Oahu    | 1305 Center St., Kaimuki         | 3-3-007:012 |
| Alex G. and Jessie T. Horn Residence                                            | Oahu    | 2320 Sonoma St., Manoa           | 2-9-008:051 |
| Alexander & Baldwin Building                                                    | Oahu    | 129 Merchant St.                 | 2-1-013:001 |
| Alfa Hatch Residence                                                            | Oahu    | 3255 Huelani Dr., Manoa          | 2-9-034:006 |
| Alfred Hocking Beach House a.k.a. Hale Pohaku                                   | Oahu    | 41-849 Laumilo Street, Waimanalo | 4-1-004:042 |
| Alfred Hocking House (a.k.a. Rose Chang Lee<br>House)                           | Oahu    | 1302 Nehoa St., Makiki           | 2-4-027:065 |
| Alfred Sturgis Residence                                                        | Oahu    | 118 Poloke Place, Tantalus       | 2-5-015:007 |
| Alice Jones/Abraham Lewis Residence                                             | Oahu    | 2211 Kamehameha Av., Manoa       | 2-9-001:025 |
| Alice K. Rodenhurst Residence                                                   | Oahu    | 928 14th Av., Kaimuki            | 3-2-047:036 |
| Ali'iolani Hale                                                                 | Oahu    | NA                               | 2-1-025:003 |
| Allan R. Johnson Residence                                                      | Oahu    | 2442 Sonoma St., Manoa           | 2-9-008:058 |
| Aloha Tower                                                                     | Oahu    | NA                               | 2-1-001:013 |
| Alvin Melim Residence                                                           | Oahu    | 3038 Oahu Avenue                 | 2-9-032:030 |
| Andrade Beach Retreat                                                           | Oahu    | 908 Mokulua Dr., Lanikai         | 4-3-007:043 |
| Anna Rice Cooke/Alice and Philip Spalding<br>Residence                          | Oahu    | 2411 Makiki Heights Dr.          | 2-5-008:001 |

| <b>Property Name</b>                                             | <b>Island</b> | <b>Address/Property Area</b>      | <b>Tax Map Key</b>                 |
|------------------------------------------------------------------|---------------|-----------------------------------|------------------------------------|
| Antonio Victorino Soares and Arcenia Fernandes Soares Residence  | Oahu          | 1407 Koko Head Av., Kaimuki       | 3-3-008:030                        |
| ART DECO PARKS Thematic: Ala Wai Park Clubhouse                  | Oahu          | NA                                | 2-7-036:005                        |
| ART DECO PARKS Thematic: Haleiwa Beach Park                      | Oahu          | Waialua                           | 6-2-001:002                        |
| ART DECO PARKS Thematic: Kawananakoa Playground                  | Oahu          | Nuuanu                            | 2-2-009:011 (portion), 2-2-009:012 |
| ART DECO PARKS Thematic: Mother Waldron Playground               | Oahu          | Kakaako                           | 2-1-051:005                        |
| ART-DECO PARKS Thematic: Ala Moana Beach Park                    | Oahu          | 1201 Ala Moana Blvd.              | 2-3-037:001                        |
| Arthur and Beatrice Greenwell House                              | Oahu          | 1919 Ualakaa St.                  | 2-5-001:005                        |
| Arthur Coyne House                                               | Oahu          | 2386 East Manoa Road              | 2-9-010:034                        |
| ARTILLERY DISTRICT OF HONOLULU: Battery Hasebrouck               | Oahu          | NA                                | 9-9-001:013                        |
| ARTILLERY DISTRICT OF HONOLULU: Battery Hawkins                  | Oahu          | NA                                | 9-9-001:013                        |
| ARTILLERY DISTRICT OF HONOLULU: Battery Hawkins Annex            | Oahu          | NA                                | 9-9-001:013                        |
| ARTILLERY DISTRICT OF HONOLULU: Battery Jackson                  | Oahu          | NA                                | 9-9-001:013                        |
| ARTILLERY DISTRICT OF HONOLULU: Battery Randolph                 | Oahu          | NA                                | 2-6-005:001                        |
| ARTILLERY DISTRICT OF HONOLULU: Battery Selfridge                | Oahu          | NA                                | 9-9-001:013                        |
| August and Emilia Rego Cottage A                                 | Oahu          | 1058A Green Street, Punchbowl     | 2-4-017:031-0002                   |
| August C. Spoehler Residence (a.k.a. Robertson Arnott Residence) | Oahu          | 2726 Ferdinand Av., Manoa         | 2-9-016:025                        |
| Austin Jones Residence                                           | Oahu          | 2230 Kamehameha Av., Manoa        | 2-9-002:013                        |
| Beach Midden Site                                                | Oahu          | NA                                | 9-1-074:036                        |
| Bellows Field Archaeological Area                                | Oahu          | NA                                | 4-1-015:001,015                    |
| Bishop Bank                                                      | Oahu          | 63 Merchant St.                   | 2-1-002:019                        |
| Bishop Museum Complex                                            | Oahu          | 1525 Bernice St., Kalihi          | 1-6-024:001 (portion)              |
| Board of Agriculture and Forestry Building                       | Oahu          | 1428 South King St., lower Makiki | 2-4-005:018                        |
| Burial Cave, Ka'a'awa                                            | Oahu          | Kaaawa                            | 5-1-005:001                        |
| Burial Platform                                                  | Oahu          | NA                                | 5-7-002:003                        |
| C. Brewer Building                                               | Oahu          | 827 Fort St. Mall                 | 2-1-013:003                        |

| <b>Property Name</b>                                                                       | <b>Island</b> | <b>Address/Property Area</b>       | <b>Tax Map Key</b>       |
|--------------------------------------------------------------------------------------------|---------------|------------------------------------|--------------------------|
| C. L. Crutchfield Residence                                                                | Oahu          | 4823 Matsonia Dr., Welhelmina Rise | 3-3-026:009              |
| C. W. Dickey House                                                                         | Oahu          | 3030 Kalakaua Av., Diamond Head    | 3-1-033:018              |
| C.W. Case Deering Residence                                                                | Oahu          | 4191 Round Top Dr.                 | 2-5-016:030              |
| Carl and Francis Bayer Residence                                                           | Oahu          | 5329 Kalanianaʻole Hwy., Aina Hina | 3-6-003:012              |
| Castle Memorial Hall                                                                       | Oahu          | NA                                 | 2-8-016:001              |
| Catherine H. Richards/William and Emma Goodale Residence                                   | Oahu          | 247 Dowsett Av., Nuuanu            | 2-2-045:004 & 005        |
| Catherine MacIntosh Brown Residence                                                        | Oahu          | 2115 Brown Way                     | 2-9-011:009              |
| Central Intermediate School                                                                | Oahu          | 1302 Queen Emma St., Downtown      | 2-1-009:001              |
| Central Union Church                                                                       | Oahu          | 1660 South Beretania St.           | 2-8-011:002              |
| Charles and Edith Cooke Residence                                                          | Oahu          | 2869 Manoa Road                    | 2-9-019:004              |
| Charles and Mae Boettcher Residence                                                        | Oahu          | 248 North Kalaheo, Kailua          | 4-3-016:004              |
| Charles Martin House                                                                       | Oahu          | 3528 Campbell Av., Kapahulu        | 3-1-015:053              |
| Charles Montague Cooke, Jr. Residence Boundary Revision, Add                               | Oahu          | NA                                 | 2-9-019:043              |
| Charles Montague Cooke, Jr., Residence                                                     | Oahu          | 2859 Manoa Rd.                     | 2-9-019:035              |
| Charlotte Erickson Meyer/William C. Furer Residence                                        | Oahu          | 1909 Aleo Place, Manoa             | 2-9-008:036              |
| CHINATOWN HISTORIC DISTRICT                                                                | Oahu          | NA                                 | 1-7-002,003,004          |
| Church of the Crossroads                                                                   | Oahu          | 1212 University Av., Moiliili      | 2-8-006:017              |
| CINCPAC FLT Headquarters, Commander in Chief, Pacific Fleet, Pearl Harbor, Makalapa Crater | Oahu          | NA                                 | 9-9-002:004 (portion)    |
| Clarence Cooke Guest Beach House                                                           | Oahu          | 1548 Mokulua Drive, Lanikai        | 4-3-003:091              |
| Clarence Cooke Residence                                                                   | Oahu          | 3860 Old Pali Rd., Nuuanu          | 1-9-005:004              |
| Clarence H. Dyer Residence (a.k.a Doak and Majorie Cox Residence)                          | Oahu          | 1929 Kakela Dr., Manoa             | 2-8-019:029              |
| Clinton Briggs Ripley Homestead                                                            | Oahu          | 52-54-56-58 Robinson Ln., Nuuanu   | 1-8-003:002, 003,004,005 |
| COLLEGE HILLS TRACT Thematic: Antonio Perry Residence                                      | Oahu          | 2111 Brown Way, Manoa              | 2-9-011:015              |
| COLLEGE HILLS TRACT Thematic: Arthur L. Andrews Residence                                  | Oahu          | 2346 Liloa Rise, Manoa             | 2-9-006:011              |
| COLLEGE HILLS TRACT Thematic: Carrie A. Thompson House                                     | Oahu          | 2139 McKinley St., Manoa           | 2-8-020:011              |
| COLLEGE HILLS TRACT Thematic: Charles and Emma Hottel/Ebert and Sybil Botts Residence      | Oahu          | 2056 Lanihuli Dr., Manoa           | 2-9-001:041              |

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| COLLEGE HILLS TRACT Thematic: Charles and Vena Reed Residence     | Oahu          | 2225 Kamehameha Av., Manoa              | 2-9-001:010        |
| COLLEGE HILLS TRACT Thematic: Charles H. Hitchcock House          | Oahu          | 2376 Oahu Av., Manoa                    | 2-9-005:024        |
| COLLEGE HILLS TRACT Thematic: Frank C. Atherton House             | Oahu          | 2234 Kamehameha Av., Manoa              | 2-9-002:012        |
| COLLEGE HILLS TRACT Thematic: Freddie Steere Residence            | Oahu          | 2330 Beckwith St., Manoa                | 2-9-007:006        |
| COLLEGE HILLS TRACT Thematic: George and Emily Winant Residence   | Oahu          | 2361 East Manoa Rd., Manoa              | 2-9-007:021        |
| COLLEGE HILLS TRACT Thematic: Glazier Residence                   | Oahu          | 2121 Lanihuli Dr., Manoa                | 2-8-020:014        |
| COLLEGE HILLS TRACT Thematic: Henry and Henrietta Bredhoff House  | Oahu          | 2542 Malama Pl., Manoa                  | 2-9-012:024        |
| COLLEGE HILLS TRACT Thematic: Ida Macdonald Residence             | Oahu          | 2243 Mohala Way, Manoa                  | 2-9-006:023        |
| COLLEGE HILLS TRACT Thematic: J.D. and Laura Marques Residence    | Oahu          | 2141 Mohala Way /2312 Liloa Rise, Manoa | 2-9-006:014        |
| COLLEGE HILLS TRACT Thematic: Jane Pell Residence                 | Oahu          | 2311 Liloa Rise, Manoa                  | 2-9-005:035        |
| COLLEGE HILLS TRACT Thematic: Leo and Marguerite Miller Residence | Oahu          | 2318 Beckwith St., Manoa                | 2-9-007:008        |
| COLLEGE HILLS TRACT Thematic: Mark Potter Residence               | Oahu          | 2208 Hyde St., Manoa                    | 2-8-022:020        |
| COLLEGE HILLS TRACT Thematic: Mary Abel Residence                 | Oahu          | 2107 Lanihuli Dr., Manoa                | 2-8-020:012        |
| COLLEGE HILLS TRACT Thematic: Ray Morris Residence                | Oahu          | 2207 Mohala Way, Manoa                  | 2-9-006:020        |
| COLLEGE HILLS TRACT Thematic: Walter and Emma Snyder Residence    | Oahu          | 2418 Oahu Av., Manoa                    | 2-9-011:010        |
| COLLEGE HILLS TRACT Thematic: Mildred Yoder Residence             | Oahu          | 2239 Mohala Way, Manoa                  | 2-9-006:022        |
| Cornelia W. Good Residence                                        | Oahu          | 2334 Ferdinand Av., Manoa               | 2-9-008:021(1)     |
| Cyrus and Amy Loo Residence                                       | Oahu          | 2727 Kolonahe Place, Tantalus           | 2-5-023:044        |
| D. Worthington / H. Hewitt Residence                              | Oahu          | 158 and 164 Poloke Pl.                  | 2-2-015:004        |
| David and Martha Thrum House                                      | Oahu          | 2119 Kaola Way                          | 2-8-020:040        |
| Dillingham Transportation Building                                | Oahu          | 733 Bishop St.                          | 2-1-014:003        |
| Donald Hayselden Residence                                        | Oahu          | 2344 Sonoma St., Manoa                  | 2-9-008:046        |

| Property Name                                                          | Island | Address/Property Area                     | Tax Map Key    |
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| Dr. A. Clifford Braly House                                            | Oahu   | 2608 Ferdinand Avenue, Manoa              | 2-9-009:016    |
| Dr. Archibald Sinclair Residence                                       | Oahu   | 2725 Terrace Dr./2726 Hillside Av., Manoa | 2-9-015:023    |
| Dr. Edward Lau Residence                                               | Oahu   | 17 Kepola Place, Nuuanu                   | 2-2-005:026    |
| Dr. Gardner and Esther Black Residence                                 | Oahu   | 4817 Aukai Avenue                         | 3-5-007:026    |
| Dr. Henry Bicknell Residence                                           | Oahu   | 2336 Liloa Rise, Manoa                    | 2-9-006:012    |
| Dr. Vasco E. M. and Olga Marion Osorio Investment Property             | Oahu   | 3136 Huelani Drive, Manoa                 | 2-9-033:017    |
| Earl and Lillian McGhee Residence                                      | Oahu   | 2627 East Manoa Rd.                       | 2-9-014:037    |
| East-West Center Complex                                               | Oahu   | NA                                        | 2-8-023:005    |
| Ed Sheehan Residence                                                   | Oahu   | 239 Kulamanu Place                        | 3-1-040:061    |
| Edgar & Lucy Henriques House                                           | Oahu   | 20 Old Pali Pl., Nuuanu                   | 1-9-009:016    |
| Edric Cook Residence                                                   | Oahu   | NA                                        | 4-3-025:035    |
| Edward B. Loomis Residence                                             | Oahu   | 2442 Sonoma St., Manoa                    | 2-9-008:039    |
| Edward J. Greaney / Zodac Brown Residence                              | Oahu   | 3115 Noela Drive, Diamond Head            | 3-1-027:007001 |
| Edwin and Emma Stone Residence                                         | Oahu   | 2505 E Manoa Rd                           | 2-9-011:022    |
| Edwin and Maude Benner Residence                                       | Oahu   | 2533 Malama Place, Manoa                  | 2-9-012:004    |
| Edwin H. Bryan Residence                                               | Oahu   | 2721 Ferdinand Av., Manoa                 | 2-9-016:015    |
| Elizabeth W. Leong Residence                                           | Oahu   | 2721 Kolonahe Pl. Lower Tantalus          | 2-5-023:045    |
| Elma Schadt House (a.k.a. "The Coral House")                           | Oahu   | 49-705 Kamehameha Hwy.                    | 4-9-008:012    |
| Emerald Building                                                       | Oahu   | 1146-48-50 Bishop St., Downtown           | 2-1-010:041    |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3023 Kalakaua Avenue  | Oahu   | NA                                        | 3-1-033:051    |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 2311 Ferdinand Avenue | Oahu   | NA                                        | 2-9-008:016    |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 2826 Coconut Avenue   | Oahu   | NA                                        | 3-1-033:046    |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 2830 Coconut Avenue   | Oahu   | NA                                        | 3-1-033:045    |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 2958 Pali Highway     | Oahu   | NA                                        | 1-8-011:007    |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3023A Kalakaua Avenue | Oahu   | NA                                        | 3-1-033:013    |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3023B Kalakaua Avenue | Oahu   | NA                                        | 3-1-033:008    |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3027 Kalakaua Avenue  | Oahu   | NA                                        | 3-1-033:050    |



| Property Name                                                               | Island | Address/Property Area        | Tax Map Key                                                                                                                  |
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| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3029 Felix Street          | Oahu   | NA                           | 3-3-053:025                                                                                                                  |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3033 Kalakaua Avenue       | Oahu   | NA                           | 3-1-033:014                                                                                                                  |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3033B Kalakaua Avenue      | Oahu   | NA                           | 3-1-033:007                                                                                                                  |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3050 Kiele Avenue          | Oahu   | NA                           | 3-1-033:028                                                                                                                  |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 3581 Woodlawn Drive        | Oahu   | NA                           | 2-9-048:007                                                                                                                  |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 4109 Black Point Road      | Oahu   | NA                           | 3-5-001:026                                                                                                                  |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 4354 Kahala Avenue         | Oahu   | NA                           | 3-5-013:008                                                                                                                  |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 4584 Kahala Avenue         | Oahu   | NA                           | 3-5-004:012                                                                                                                  |
| ENGLISH TUDOR / FRENCH NORMAN COTTAGES Thematic: 4850 Kahala Avenue         | Oahu   | NA                           | 3-5-007:001                                                                                                                  |
| Ephraim V. and Rose Sayers Residence                                        | Oahu   | 2211 Mohala Way, Manoa       | 2-9-006:021                                                                                                                  |
| Eric Fennel Residence                                                       | Oahu   | 2310 Ferdinand Av., Manoa    | 2-9-008:023                                                                                                                  |
| Ernest R. Cameron House, American Association of University Women Residence | Oahu   | 1802 Keeaumoku St.           | 2-4-025-002                                                                                                                  |
| Ernest Shelton Van Tassel House (Nutridge)                                  | Oahu   | 3280 Round Top Dr., Tantalus | 2-5-019:004                                                                                                                  |
| Ewa Villages                                                                | Oahu   | NA                           | 9-1-017:078, :101, 102, :126; 9-1-095, :096, :097                                                                            |
| Eyman-Judson Residence                                                      | Oahu   | 3114 Paty Dr., Manoa         | 2-9-039:001                                                                                                                  |
| Falls of Clyde                                                              | Oahu   | NA                           | 2-1-001:060                                                                                                                  |
| Farrington High School                                                      | Oahu   | NA                           | 1-6-021:005 (portion)                                                                                                        |
| Filipino Federation of America/Equi Frili Brium Church                      | Oahu   | 1534 Kalaeepaa Drive, Kalihi | 1-4-021:052                                                                                                                  |
| FIRE STATIONS OF OAHU Thematic Group                                        | Oahu   | NA                           | 2-1-009:026/3-2-036:007 (portion)/ 1-3-005:022 (portion)/2-4-029:029 (portion)/2-1-031:018/1-5-005:014/6-6-013:003 (portion) |
| FIRE STATIONS OF OAHU Thematic Group: Kaimuki Fire Station                  | Oahu   | NA                           | 3-2-036:007 (portion)                                                                                                        |
| FIRE STATIONS OF OAHU Thematic Group: Kalihi Fire Station                   | Oahu   | NA                           | 1-3-005:022 (portion)                                                                                                        |

| <b>Property Name</b>                                              | <b>Island</b> | <b>Address/Property Area</b>    | <b>Tax Map Key</b>               |
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| FIRE STATIONS OF OAHU Thematic Group:<br>Makiki Fire Station      | Oahu          | NA                              | 2-4-029:029 (portion)            |
| FIRE STATIONS OF OAHU Thematic Group: Old<br>Kakaako Fire Station | Oahu          | NA                              | 2-1-031:018                      |
| FIRE STATIONS OF OAHU Thematic Group:<br>Palama Fire Station      | Oahu          | NA                              | 1-5-005:014                      |
| FIRE STATIONS OF OAHU Thematic Group:<br>Waialua Fire Station     | Oahu          | NA                              | 6-6-013:003 (portion)            |
| FIRE STATIONS OF OAHU Thematic Group:<br>Kakaako Fire Station     | Oahu          | NA                              | 2-1-031:018                      |
| Flora Lidgate Residence                                           | Oahu          | 2494 East Manoa Rd.             | 2-9-010:001                      |
| Fort Kamehameha Housing                                           | Oahu          | NA                              | 9-9-001:013,014                  |
| Fort Ruger Historical District                                    | Oahu          | NA                              | 3-1-042:009,020                  |
| Fort Ruger Market                                                 | Oahu          | 3585 Alohea Avenue              | 3-1-010:159                      |
| Fort Shafter, Palm Circle, 100 Area                               | Oahu          | NA                              | 1-1-008:005                      |
| Forty Niner Restaurant                                            | Oahu          | 98-110 Honomanu Street, Aiea    | 9-8-019:042                      |
| Foster Botanic Garden                                             | Oahu          | Vineyard                        | 1-7-007:001,002, 1-7-008:001,002 |
| Francis and Janetta Peterson Residence                            | Oahu          | 3034 Manoa Rd.                  | 2-9-032:012                      |
| Frank and Juliette Lee Residence                                  | Oahu          | 914 12th Av., Kaimuki           | 3-2-019:029                      |
| Frank and Kathryn Plum Residence (a.k.a. Rosof<br>Residence)      | Oahu          | 3044 Kalakaua Av., Diamond Head | 3-1-033:017                      |
| Frank and Mary Bechert Residence                                  | Oahu          | 2872 Manoa Road                 | 2-9-017:004                      |
| Frank Souza House                                                 | Oahu          | 1839 Lusitana Street            | 2-2-007:078                      |
| Fred Harrison Rental Property                                     | Oahu          | 3050 Kalakaua Avenue            | 3-1-033:054                      |
| Frederick G. Krauss Residence                                     | Oahu          | 2437 Parker Pl., Manoa          | 2-9-012:029, 070                 |
| Friend Building                                                   | Oahu          | NA                              | 2-1-002:032                      |
| Friendship Garden                                                 | Oahu          | 44-226 Kokokahi Place           | 4-4-031:076                      |
| George D. Oakley Residence                                        | Oahu          | 2110 Kakela Pl., Manoa          | 2-8-019:046                      |
| George Fred Wright Residence                                      | Oahu          | 3137 Oahu Av., Manoa            | 2-9-032:027 (portion)            |
| George Miller House (a.k.a. known as Carlson House)               | Oahu          | 747 Ocean View Dr., Kaimuki     | 3-2-055:030                      |
| George P. Castle Mountain Residence                               | Oahu          | 2998 Pacific Heights Rd.        | 2-2-031:017                      |
| George Robert Ewart Residence                                     | Oahu          | 2350 and 2370 Nuuanu Av.        | 1-8-005:031,032                  |
| George Yanagihara Residence                                       | Oahu          | 941-A 8th Av., Kaimuki          | 3-2-017:010                      |
| Georges de S. Canavaro House                                      | Oahu          | 2731 Rooke Av., Nuuanu          | 1-8-026:005                      |
| Gerald A. Dolan Residence                                         | Oahu          | 44-431 Kaneohe Bay Dr.          | 4-4-006:009,015                  |
| Gobindrum Watumull House                                          | Oahu          | 3015 Kiele Avenue, Diamond Head | 3-1-033:025                      |
| Grace Cooke Residence                                             | Oahu          | 2365 Oahu Av., Manoa            | 2-9-005:056                      |
| H. Alexander Walker Residence                                     | Oahu          | 2616 Pali Highway               | 1-8-008:001                      |

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| H. Allen Cook Residence                             | Oahu          | 1915 Komaia Dr., Manoa                                       | 2-9-017:018        |
| Hale Hani Court                                     | Oahu          | 1526, 1526A, 1526B, 1534, 1534A<br>Wilhelmina Rise           | 3-3-032:019        |
| Hanawao Heiau                                       | Oahu          | NA                                                           | 5-2-002:001        |
| Harold and Estella Everett Residence                | Oahu          | 3209 Oahu Avenue                                             | 2-9-035:035        |
| Harold Eichelberger Family Beach House              | Oahu          | 1556 Mokulua Drive, Lanikai                                  | 4-3-003:067        |
| Harold L. Castle Beach Residence                    | Oahu          | 55 Kailuana Place, Kailua                                    | 4-3-022:014-0001   |
| Harold T. Kay Residence                             | Oahu          | 1612 Alewa Dr., Alewa Heights                                | 1-8-029:001        |
| Haumalu (a.k.a. Martha and Frank Gerbode Residence) | Oahu          | 3065 Diamond Head Rd. and 2831<br>Coconut Av.                | 3-1-036:009        |
| Hawaii Shingon Mission                              | Oahu          | 915 Sheridan St.                                             | 2-3-018:004        |
| Hawaii State Library                                | Oahu          | NA                                                           | 2-1-025:001        |
| Hawaiian Canoe Malia                                | Oahu          | 2015 Kapiolani Blvd.                                         | 2-7-036:005        |
| Hawaiian Electric Company                           | Oahu          | NA                                                           | 2-1-016:001        |
| Hawaiian Electric Company                           | Oahu          | 45-3625 Mamane Street                                        | 2-1-016:001        |
| Hawaiian Electric Company                           | Oahu          | NA                                                           | 2-1-016:001        |
| Hawaiian Trail and Mountain Club                    | Oahu          | 41-023 Puuone St., Waimanalo                                 | 4-1-005:090        |
| He'eia Fishpond                                     | Oahu          | NA                                                           | 4-6-005:001        |
| Heinrich Kreye Residence                            | Oahu          | 2714 Aolani Pl., Manoa                                       | 2-9-014:004        |
| Helene Morgan Residence                             | Oahu          | 3040 Diamond Head Road                                       | 3-1-034:026        |
| Henry and Florence Davis Residence                  | Oahu          | 2765 Pacific Heights Road                                    | 2-2-023:025        |
| Henry Ho Court                                      | Oahu          | 1252, 1252A, 1256, 1256A Ekaha<br>Avenue, Honolulu, HI 96816 | 3-3-002:024        |
| Herbert Austin Residence                            | Oahu          | 3060 Oahu Av., Manoa                                         | 2-9-032:028        |
| Hermann and Johanna Rohrig Residence                | Oahu          | 2146 Kamehameha Avenue, Manoa                                | 2-9-006:015        |
| Hibiscus Place                                      | Oahu          | 2954 and 2956 Hibiscus Pl.,<br>Diamond Head                  | 3-1-034:047        |
| Hickam Air Force Base                               | Oahu          | NA                                                           | 9-9 Various        |
| Ho Fow and Mary Chong Residence                     | Oahu          | 1420 Lunalilo Street                                         | 2-4-022:021        |
| Honolulu Academy of Arts                            | Oahu          | NA                                                           | 2-4-014:021        |
| Honolulu Hale                                       | Oahu          | NA                                                           | 2-1-033:007        |
| Honolulu Hale Annex                                 | Oahu          | NA                                                           | 2-1-033:010        |
| Honolulu Hale/Grounds                               | Oahu          | NA                                                           | 2-1-033:007        |
| Honolulu Plantation Manager's Residence             | Oahu          | 98-563 Kaimu Loop, Aiea                                      | 9-8-030:050        |
| Honolulu Star-Bulletin Building                     | Oahu          | 121/125 Merchant Street                                      | 2-1-013:008        |
| Honouliuli Bridge                                   | Oahu          | Farrington Highway and Honouliuli<br>Stream                  | None               |

| <b>Property Name</b>                                                                   | <b>Island</b> | <b>Address/Property Area</b>                          | <b>Tax Map Key</b>             |
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| Honouliuli Internment Camp                                                             | Oahu          | Honouliuli Gulch, Vicinity of Waipahu                 | 9-2-001:001                    |
| Houvener Residence                                                                     | Oahu          | 1975 Judd Hillside Road                               | 2-5-004:016                    |
| Howard and Betty Liljestrand Residence                                                 | Oahu          | 3300 Tantalus Dr.                                     | 2-5-011:008                    |
| Hugh G. Peterson, Jr. Residence                                                        | Oahu          | 2345 Makiki Heights Dr.                               | 2-5-008:004                    |
| Huilua Fishpond                                                                        | Oahu          | NA                                                    | 5-2-005:021                    |
| Hung Lum Chun Residence                                                                | Oahu          | 1321 Alewa Drive                                      | 1-8-032:001                    |
| Iolani Barracks                                                                        | Oahu          | NA                                                    | 2-1-025:002                    |
| Iolani Barracks                                                                        | Oahu          | NA                                                    | 2-1-025:002                    |
| Iolani Palace Bandstand                                                                | Oahu          | NA                                                    | 2-1-025:002                    |
| Iolani Palace/Grounds (includes Old Archives Building and Old Mausoleum)               | Oahu          | NA                                                    | 2-1-025:002                    |
| Irvine Paris Residence                                                                 | Oahu          | 2475 Makiki Heights Dr.                               | 2-5-009:015                    |
| Irwin Memorial Park                                                                    | Oahu          | NA                                                    | 2-1-013:007                    |
| J. Lindsay and Margaret Grimshaw Residence                                             | Oahu          | 2747 Puuhonua St.                                     | 2-9-016:034                    |
| J. P. Mendonca Residence                                                               | Oahu          | 1942 Judd Hillside Rd., Manoa                         | 2-5-004:009                    |
| James A. Lyle Residence (a.k.a. Kenneth and Mae Seto Residence)                        | Oahu          | 2371 Oahu Av., Manoa                                  | 2-9-005:019                    |
| James and Asta Hughes Residence                                                        | Oahu          | 2722 Sonoma St., Manoa                                | 2-9-016:026                    |
| James and Virginia Machado Residences (a.k.a. Machado Homestead and "The Fair Ladies") | Oahu          | 1775 Lusitana,/207 Concordia/209 Concordia, Punchbowl | 2-2-007:037-0001, -0002, -0003 |
| James Cockburn Residence                                                               | Oahu          | 2440 Ferdinand Av., Manoa                             | 2-9-008:029                    |
| James David Mulvehill Residence                                                        | Oahu          | 3148 Alika Drive, Nuuanu Dowsett                      | 2-2-045:028                    |
| James Haynes Residence                                                                 | Oahu          | 3026 Kalakaua Avenue                                  | 2-5-014:011                    |
| James L. Coke Residence                                                                | Oahu          | 3649 Nuuanu Pali Dr., Nuuanu                          | 2-2-051:010                    |
| James Mann Residence                                                                   | Oahu          | 125 Kalaiopua Place                                   | 2-5-014:011                    |
| James R. and Louise Judd Residence                                                     | Oahu          | 2490 Makiki Heights Drive                             | 2-4-035:002                    |
| Jean Charlot Residence                                                                 | Oahu          | 4956 Kahala Av.                                       | 3-5-008:029                    |
| Jean Vaughan Gilbert Residence                                                         | Oahu          | 2366 Lipoa Rise, Manoa                                | 2-9-006:009                    |
| John & Kate Kelly Residence                                                            | Oahu          | 4117 Black Point Rd., Kahala                          | 3-1-041:010                    |
| John A. Davis Residence                                                                | Oahu          | 2119 Armstrong/2251 Mohala Way, Manoa                 | 2-9-006:024                    |
| John and Alice Hind Residence                                                          | Oahu          | 2561 Manoa Road                                       | 2-9-010:033                    |
| John and Eleanor Freitas Residence                                                     | Oahu          | 1947 Judd Hillside, Manoa                             | 2-5-004:007                    |
| John and Jane Millen Residence                                                         | Oahu          | 3797 Diamond Head Circle, Kapahulu                    | 3-1-020:019                    |
| John and Julia Stone Residence                                                         | Oahu          | 2746 Kahawai Street                                   | 2-9-014:063                    |
| John and Ruth Steffee Residence                                                        | Oahu          | 1955 Makiki St                                        | 2-5-001:043                    |

| Property Name                                                                 | Island | Address/Property Area                  | Tax Map Key                                                                                              |
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| John Francis Gray Stokes Residence (a.k.a. Young Residence)                   | Oahu   | 2618 Ferdinand Av., Manoa              | 2-9-009:015                                                                                              |
| John Guild Residence                                                          | Oahu   | 2001 Vancouver Dr., lower Manoa        | 2-8-016:028                                                                                              |
| John T. Waterhouse Residence/Borthwick Residence                              | Oahu   | 420 Wyllie St., Nuuanu                 | 1-8-006:007                                                                                              |
| Johnny Noble Residence                                                        | Oahu   | 2625 Doris Pl., Manoa                  | 2-9-014:043                                                                                              |
| Jones, Isabella Residence                                                     | Oahu   | 71 Dowsett Av.                         | 2-2-044:024                                                                                              |
| Joseph and Jean Skorpen Residence                                             | Oahu   | 3968 Lurline Dr., Wilhelmina Rise      | 3-3-027:008                                                                                              |
| Joseph E. and Luiza Gouveia Residence                                         | Oahu   | 2134 Metcalf Street                    | 2-8-017:042                                                                                              |
| Joseph Pratt Residence                                                        | Oahu   | 2911 Pacific Heights Rd.               | 2-2-030:033                                                                                              |
| Joseph W. Podmore Building (Bon Bon Cafe)                                     | Oahu   | 202 and 206 Merchant St.,<br>Downtown  | 2-1-016:004                                                                                              |
| Juliet Montague Guard Residence (a.k.a. “Armstrong Manor”)                    | Oahu   | 2426 Armstrong St., Manoa              | 2-9-012:014                                                                                              |
| Ka'ena Complex                                                                | Oahu   | NA                                     | 6-9-002:006,009; 8-1-001:006,016                                                                         |
| Kahalu'u Fishpond (Kahouna Fishpond)                                          | Oahu   | NA                                     | 4-7-011:001                                                                                              |
| Kahalu'u Taro Loi                                                             | Oahu   | NA                                     | 4-7-051:004                                                                                              |
| Kahuku Habitation Area                                                        | Oahu   | Kahuku                                 | 5-6-003:010                                                                                              |
| Kahuku Plantation Supervisor's House                                          | Oahu   | NA                                     | 5-6-010:158                                                                                              |
| Kaimuki Reservoir, Kaimuki Scout Bowl                                         | Oahu   | East corner of Crater Road,<br>Kaimuki | 3-2-035:012 (portion)                                                                                    |
| Kaka'ako Pumping Station                                                      | Oahu   | 653 Ala Moana Blvd., Kakaako           | 2-1-015:043,044                                                                                          |
| Kalou Fishpond                                                                | Oahu   | NA                                     | 5-8-001:015,055                                                                                          |
| Kamaunu Residence                                                             | Oahu   | 89-425 Pohakunui Av.                   | 8-9-006:039                                                                                              |
| Kamehameha Statue                                                             | Oahu   | NA                                     | 2-1-025:003                                                                                              |
| Kamehameha Statue                                                             | Oahu   | NA                                     | 2-1-025:003                                                                                              |
| Kamehameha V Post Office                                                      | Oahu   | 44 Merchant St.                        | 2-1-002:012                                                                                              |
| Kaneohe Naval Air Station                                                     | Oahu   | NA                                     | 4-4-008:001; 4-4-Various                                                                                 |
| Kane'ohe Ranch Building                                                       | Oahu   | NA                                     | 4-5-035:003                                                                                              |
| Kaniakapupu (aka Kamehameha III Summer Palace)                                | Oahu   | NA                                     | 2-2-054:001                                                                                              |
| Kapapa Island Complex                                                         | Oahu   | NA                                     | 4-4-008:004                                                                                              |
| Kapiolani Park                                                                | Oahu   | NA                                     | 3-1-030:001, 002, 003, 004; 3-1-031:003, 004,<br>005, 006, 007; 3-1-043:All except 004, 005,<br>011, 012 |
| Kapuaiwa Building                                                             | Oahu   | NA                                     | 2-1-025:003                                                                                              |
| Kaumakapili Church                                                            | Oahu   | 766 N. King St.                        | 1-7-031:049                                                                                              |
| Kawa'ewa'e Heiau                                                              | Oahu   | NA                                     | 4-5-033:001                                                                                              |
| Kawaiahao Church and Grounds (includes Lunalilo's Tomb and Adobe Schoolhouse) | Oahu   | 957 Punchbowl St.                      | 2-1-032:017                                                                                              |

| <b>Property Name</b>                                                                              | <b>Island</b> | <b>Address/Property Area</b>     | <b>Tax Map Key</b>                               |
|---------------------------------------------------------------------------------------------------|---------------|----------------------------------|--------------------------------------------------|
| Kawailoa Ryusenji Temple (Temple Demolished, Foundation Steps and Prayer Tree Remain)             | Oahu          | NA                               | 6-1-005:001                                      |
| KAWAIOLOA TRAINING SCHOOL FOR GIRLS (Industrial School): Hookipa Cottage                          | Oahu          | NA                               | 4-2-006:002                                      |
| KAWAIOLOA TRAINING SCHOOL FOR GIRLS (Industrial School): Maluhia Cottage                          | Oahu          | NA                               | 4-2-006:002                                      |
| KAWAIOLOA TRAINING SCHOOL FOR GIRLS (Industrial School): Gymnasium                                | Oahu          | NA                               | 4-2-006:002                                      |
| KAWAIOLOA TRAINING SCHOOL FOR GIRLS (Industrial School): Hilltop Cottage                          | Oahu          | NA                               | 4-2-006:002                                      |
| KAWAIOLOA TRAINING SCHOOL FOR GIRLS (Industrial School): Manoa Cottage                            | Oahu          | NA                               | 4-2-006:002                                      |
| Kea'au Talus Sites                                                                                | Oahu          | NA                               | 8-3-001:012                                      |
| Keaiwa Heiau                                                                                      | Oahu          | NA                               | 9-9-011:001,002, 003,004,005,006                 |
| Kealii O Ka Malu Church                                                                           | Oahu          | NA                               | 6-6-008:017                                      |
| Kenneth and Frances Day Residence (a.k.a. Richard Gosling Residence and Joseph Ferraro Residence) | Oahu          | 2703 Terrace Dr., Manoa          | 2-9-015:039                                      |
| Kin and Lau Shee Lum Residence                                                                    | Oahu          | 840 15th Avenue, Kaimuki         | 3-2-051:025                                      |
| Kipapa School Building B                                                                          | Oahu          | NA                               | 9-5-021:002 (portion)                            |
| Koa (Rabbit Island)                                                                               | Oahu          | NA                               | 4-1-014:009                                      |
| KUALOA AHUPUAA HISTORIC DISTRICT                                                                  | Oahu          | NA                               | 4-9-004:001, 4-9-005:001, portion of 4-9-006:001 |
| Kukaniloko Birthing Place Boundary Revision                                                       | Oahu          | NA                               | 7-1-001:004                                      |
| Kukuipilau Heiau                                                                                  | Oahu          | NA                               | 4-2-006:002                                      |
| Kupopolo Heiau                                                                                    | Oahu          | NA                               | 6-1-005:016                                      |
| Kyoto Gardens of Honolulu Memorial Park                                                           | Oahu          | 22 Craigsides Pl., Nuuanu        | 2-2-020:001                                      |
| La Pietra                                                                                         | Oahu          | 2933 Poni Moi Rd.                | 3-1-029:038                                      |
| Lanikai Monument                                                                                  | Oahu          | NA                               | 4-3-009:001                                      |
| Leleahina Heiau                                                                                   | Oahu          | NA                               | 4-6-014:005                                      |
| Lemon Wond Holt Residence                                                                         | Oahu          | 3704 Anuhea St., Wilhelmina Rise | 3-3-016:066                                      |
| Leong and Mildred (Chang) Young Residence                                                         | Oahu          | 847 Paahana Street               | 3-2-020:050                                      |
| Leong-Yap Residence                                                                               | Oahu          | 934 8th Av., Kaimuki             | 3-2-017:044                                      |
| Leroy Bush Residence                                                                              | Oahu          | 3107 Oahu Av., Manoa             | 2-9-032:024                                      |
| Lihiwai (George R. Carter House)                                                                  | Oahu          | 51 Kepola Pl., Nuuanu            | 2-2-050: 012,036,042,043                         |
| Lihiwai Boundary Increase                                                                         | Oahu          | NA                               | 2-2-050:057                                      |
| Linekona School                                                                                   | Oahu          | 1111 Victoria St.                | 2-4-002:020                                      |
| Louis and Marjorie Booth Stephens Residence                                                       | Oahu          | 3239 Pali Hwy., Nuuanu           | 2-2-045:040                                      |

| Property Name                                                                          | Island | Address/Property Area                | Tax Map Key                              |
|----------------------------------------------------------------------------------------|--------|--------------------------------------|------------------------------------------|
| Louis Butler Residence (a.k.a. Alice Hoogs Residence and Elisabeth Gladding Residence) | Oahu   | 2027 Lanihuli                        | 2-8-019:013                              |
| Lyndon Roberts Residence                                                               | Oahu   | 4382 Kahala Av.                      | 3-5-013:004                              |
| Mabel Smyth Memorial Building                                                          | Oahu   | 510 Punchbowl St., Downtown          | 2-1-035:001                              |
| Makani'olu Shelter                                                                     | Oahu   | NA                                   | 3-8-004:001                              |
| Makiki Christian Church                                                                | Oahu   | 829 Pensacola St., lower Makiki      | 2-3-011:002                              |
| Malcolm and Janet MacIntyre Residence                                                  | Oahu   | 2375 University Av., Manoa           | 2-9-003:002                              |
| Manoa Chinese Cemetery                                                                 | Oahu   | NA                                   | 2-9-043:001                              |
| Marconi Wireless Telegraph Station                                                     | Oahu   | 58-1095 Kamehameha Hwy., Kahuku      | 5-6-003:032                              |
| Mark Robinson Beach House                                                              | Oahu   | 33 Pilipu Pl., Kailua                | 4-3-018:045                              |
| Marshall and Ruth Goodsill Residence                                                   | Oahu   | 4258 Puu Panini Pl., Diamond Head    | 3-2-061:007                              |
| Martha K. Dowsett Residence                                                            | Oahu   | 3320 Kaohinani Dr.                   | 2-2-050:004                              |
| Mary Lyman Residence                                                                   | Oahu   | 1108 Kaumailuna Pl., Alewa Heights   | 1-8-033:066                              |
| May and George Jennings Residence                                                      | Oahu   | 1176 Alewa Dr., Alewa Heights        | 1-8-033:007                              |
| May/Spalding Residence                                                                 | Oahu   | 2231 Mohala Way                      | 2-9-006:008                              |
| McKinley High School                                                                   | Oahu   | NA                                   | 2-3-009:001 (portion)                    |
| Melchers Building                                                                      | Oahu   | 51 Merchant St.                      | 2-1-020:020                              |
| MERCHANT STREET DISTRICT Judd Building                                                 | Oahu   | 843 Fort St. Mall                    | 2-1-013:004                              |
| Mervin and Marian Williams Residence                                                   | Oahu   | 1519 Oneele Pl., Makiki              | 2-5-001:021                              |
| Mildred M. Yodor House                                                                 | Oahu   | 1619 Makiki St. and 1614 Anapuni St. | 2-4-023:008, 069                         |
| Miles and Kathy Anderson Residence                                                     | Oahu   | 1320 Aalapapa St., Lanikai           | 4-3-004:064                              |
| Milton I Residence                                                                     | Oahu   | 4339 Papu Circle                     | 3-1-044:051                              |
| Minnie Churchill Residence                                                             | Oahu   | 2424 East Manoa Road                 | 2-9-010:009                              |
| Mission Houses                                                                         | Oahu   | NA                                   | 2-1-032:002                              |
| Mission Memorial Building (Honolulu Hale Annex)                                        | Oahu   | NA                                   | 2-1-033:007                              |
| Moana Hotel                                                                            | Oahu   | 2365 Kalakaua Av.                    | 2-6-001:012                              |
| Moanalua Community Church                                                              | Oahu   | NA                                   | 1-1-010:034                              |
| Moliili Japanese Cemetery                                                              | Oahu   | 2642 Kapiolani Boulevard             | 2-7-018:024                              |
| Mokapu Burial Area                                                                     | Oahu   | Mokapu                               | 4-4-008:001                              |
| Moli'i Fishpond                                                                        | Oahu   | NA                                   | 4-9-003:001,002, 012,013,014,015,016,018 |
| Mrs. Helen Bruns House                                                                 | Oahu   | 2621 Anuenue Street                  | 2-9-014:070                              |
| Mrs. Josephine Ketchum Residence                                                       | Oahu   | 3004 Kiele, Diamond Head             | 3-1-033:035                              |
| Nioiula Heiau                                                                          | Oahu   | NA                                   | 8-8-001:001                              |
| Nu'uuanu Petroglyph Complex                                                            | Oahu   | NA                                   | 2-2-021:007, 2-2-020:014                 |

| <b>Property Name</b>                                                                | <b>Island</b> | <b>Address/Property Area</b>    | <b>Tax Map Key</b>           |
|-------------------------------------------------------------------------------------|---------------|---------------------------------|------------------------------|
| Oahu Railway & Land Company Right-of-Way (National)                                 | Oahu          | ROW                             | 8-9 & 9-1                    |
| Oahu Railway and Land Company Right-of-Way and Base Yard (State)                    | Oahu          | ROW and 91-1001 Renton Road     | 8-9, 9-1, and 9-1-69:001     |
| Okiokiolepe Pond                                                                    | Oahu          | NA                              | 9-1-001:001                  |
| Old Police Station (Walter Murray Gibson Building.)                                 | Oahu          | 842 Bethel St.                  | 2-1-002:057                  |
| Old U.S. Post Office, Custom House and Court House (Federal Building)               | Oahu          | 335 Merchant St.                | 2-1-025:004                  |
| Opana Radar Site                                                                    | Oahu          | NA                              | 5-7-002:002                  |
| OR&L Office & Document Storage Building and Station                                 | Oahu          | 333 N. King St., Iwilei         | 1-5-007:002                  |
| Otto and Laura Bierbach Residence                                                   | Oahu          | 2346 Oahu Av., Manoa            | 2-9-005:027                  |
| Our Lady of Peace Cathedral                                                         | Oahu          | NA                              | 2-1-001:014                  |
| Owen and Ellen Williams Residence                                                   | Oahu          | 3206 Ahinahina Pl., Palolo      | 3-3-045:029                  |
| Pahonu Turtle Pond                                                                  | Oahu          | NA                              | 4-1-002:007                  |
| Pahukini Heiau                                                                      | Oahu          | NA                              | 4-2-015:003                  |
| Paul and Catherine Withington Residence                                             | Oahu          | 3150 Huelani Place              | 2-9-033:005-0004             |
| Paul and Eleanor Burgher Residence                                                  | Oahu          | 3304 Kaohinani Drive, Nuuanu    | 2-2-050:005                  |
| Paul and Martha Wysard Residence                                                    | Oahu          | 2541 Malama Place               | 2-9-012:003                  |
| Paul Merle Scott Residence                                                          | Oahu          | 3104 Oahu Av., Manoa            | 2-9-032:040                  |
| Pearl Harbor Naval Base                                                             | Oahu          | NA                              | 9-1, 9-4, 9-6, 9-7, 9-8, 9-9 |
| Percy Pond Residence (a.k.a. William Clark Residence and Duncan Dempster Residence) | Oahu          | 2026 McKinley, Manoa            | 2-8-019:019                  |
| Pohaku ka Luahine                                                                   | Oahu          | NA                              | 1-1-013:001                  |
| Pohaku Lanai                                                                        | Oahu          | NA                              | 6-6-007:007                  |
| Pohakunui Heiau                                                                     | Oahu          | NA                              | 4-1-027:022                  |
| Pueo Heiau                                                                          | Oahu          | Waimanalo                       | 4-1-008:005                  |
| Punahou School Campus                                                               | Oahu          | NA                              | 2-8-018:001                  |
| Punchbowl Crater and National Memorial Cemetery of the Pacific                      | Oahu          | 2177 Puowaina Dr.               | 2-2-005:001, 002             |
| Pu'u o Mahuka Heiau                                                                 | Oahu          | NA                              | 5-9-005:068                  |
| Queen Emma Square                                                                   | Oahu          | NA                              | 2-1-018:004                  |
| Queen Emma's Summer Home (Hanaiakamalama)                                           | Oahu          | 2913 Pali Hwy.                  | 2-2-034:027                  |
| R. N. Linn Residence                                                                | Oahu          | 2013 Kakela Dr., Manoa          | 2-8-019:036                  |
| Railway Rolling Stock                                                               | Oahu          | NA                              | 9-1-069:001                  |
| Residence at 1519 Oliver Street                                                     | Oahu          | 1519 Oliver St., Moiliili       | 2-8-013:082                  |
| Richard J. Boyen Beach Cottage                                                      | Oahu          | 123 Kaiolena Drive, Lanikai     | 4-3-006:032                  |
| Richard M. Botley Residence                                                         | Oahu          | 3040 Hibiscus Pl., Diamond Head | 3-1-034:012                  |



| <b>Property Name</b>                                    | <b>Island</b> | <b>Address/Property Area</b>                                                      | <b>Tax Map Key</b>   |
|---------------------------------------------------------|---------------|-----------------------------------------------------------------------------------|----------------------|
| Richardson Theater                                      | Oahu          | NA                                                                                | 1-1-008:005          |
| Riley Allen Residence                                   | Oahu          | 3275 Pacific Heights Rd.                                                          | 2-2-029:014          |
| Robert L. and Geraldine Mullen Residence                | Oahu          | 4604 Aukai Avenue                                                                 | 3-5-031:014          |
| Robert L. Lukens Residence                              | Oahu          | 3524 Woodlawn Dr., Manoa                                                          | 2-2-047:012          |
| Robert M. Purvis Residence                              | Oahu          | 3346 Kaohinani Dr., Nuuanu                                                        | 2-2-050:002          |
| Robert McCorrison Beach House                           | Oahu          | 1056 Mokolua Dr., Kailua                                                          | 4-3-006:058          |
| Ronald and Miriam Deissaroth Residence                  | Oahu          | 671 Old Mokapu Road                                                               | 4-4-025:004          |
| Roosevelt High School                                   | Oahu          | NA                                                                                | 2-4-032:002          |
| Royal Brewery                                           | Oahu          | 545 Queen Street                                                                  | 2-1-031:021          |
| Royal Mausoleum                                         | Oahu          | NA                                                                                | 2-2-021:012          |
| Royal Saloon                                            | Oahu          | 2 Merchant St.                                                                    | 2-1-002:035          |
| S.W. Lee and Mavis W. Awana Residence                   | Oahu          | 377 Diamond Head Circle                                                           | 3-1-020:021          |
| Sacred Heart Church                                     | Oahu          | 1701 Wilder Av., Makiki                                                           | 2-8-012:068          |
| Saint Peter's Church                                    | Oahu          | 1317 Queen Emma St., Downtown                                                     | 2-1-018:002          |
| Sam and Mary Cooke Residence                            | Oahu          | 2829 Manoa Road                                                                   | 2-9-019:025          |
| Samuel and Laura Walker Residence                       | Oahu          | 3030 Puiwa Ln., Nuuanu                                                            | 2-2-044:026          |
| SCHOFIELD BARRACKS HISTORICAL DISTRICT                  | Oahu          | NA                                                                                | 7-7, Various         |
| Schofield Barracks Stockade                             | Oahu          | NA                                                                                | 7-7, Various         |
| Shields/Moore Residence                                 | Oahu          | NA                                                                                | 2-9-014:031          |
| Sidney and Grace Carr Residence                         | Oahu          | 2727 Manoa Road                                                                   | 2-9-015:057          |
| Small Heiau                                             | Oahu          | NA                                                                                | 4-9-004, 4-9-005     |
| Springer Residence                                      | Oahu          | 2128 Armstrong Street                                                             | 2-9-011:017          |
| St. Andrews Cathedral                                   | Oahu          | NA                                                                                | 2-1-018:002          |
| St. Andrews Cathedral (includes Tenney Hall)            | Oahu          | NA                                                                                | 2-1-018:002          |
| Stangenwald Building                                    | Oahu          | 119 Merchant St.                                                                  | 2-1-013:005          |
| Stanley Ball Residence                                  | Oahu          | 2387 Beckwith St., Manoa                                                          | 2-9-006:029          |
| State Capitol/Grounds                                   | Oahu          | NA                                                                                | 2-1-024:001 and :008 |
| State Capitol/Grounds                                   | Oahu          | NA                                                                                | 2-1-024:001 and :008 |
| State Capitol/Grounds                                   | Oahu          | NA                                                                                | 2-1-024:All          |
| State Tax Office                                        | Oahu          | NA                                                                                | 2-1-026:022          |
| Stuart and Elisabeth Thompkins Residence                | Oahu          | 2339 Pikake Pl., Nuuanu                                                           | 1-8-005:014          |
| T. R. Foster Building                                   | Oahu          | 902 Nuuanu Av.                                                                    | 1-7-002:035          |
| Tahitienne Cooperative Apartments (Whole Building)      | Oahu          | 2999 Kalakaua Avenue                                                              | 3-1-032:001          |
| Tantalus Drive-Round Top Road                           | Oahu          | Begin 1.5 Mile Marker on Tantalus Dr. and end at 8.0 Mile Marker on Round Top Dr. | 2-4 & 2-5 various    |
| TANTALUS RESIDENCES Thematic: James A. Wilder Residence | Oahu          | 3935 Round Top Dr.                                                                | 2-5-017:011          |

| <b>Property Name</b>                                                    | <b>Island</b> | <b>Address/Property Area</b>                            | <b>Tax Map Key</b>      |
|-------------------------------------------------------------------------|---------------|---------------------------------------------------------|-------------------------|
| TANTALUS RESIDENCES Thematic: Vincent and Eleanor Fullard-Leo Residence | Oahu          | 4069 Round Top Dr.                                      | 2-5-016:024             |
| Tennent Art Foundation Gallery                                          | Oahu          | 203 Prospect. Punchbowl                                 | 2-2-003:075&076         |
| Territorial Office Building                                             | Oahu          | NA                                                      | 2-1-025:003             |
| The Hawai'i Theatre                                                     | Oahu          | 1130 Bethel St.                                         | 2-1-003:014             |
| Theodore and Rose Vierra Residence                                      | Oahu          | 2326 Sonoma St., Manoa                                  | 2-9-008:049             |
| Thomas Alexander Burningham Residence                                   | Oahu          | 2849 Pali Hwy., Nuuanu                                  | 2-2-034:040,041         |
| Thomas Petrie Residence                                                 | Oahu          | 1916 Manoa Road                                         | 2-5-001:002             |
| Thomas Square                                                           | Oahu          | NA                                                      | 2-4-001:001             |
| Thomas Victor King Residence                                            | Oahu          | 155 Dowsett Av., Nuuanu                                 | 2-2-046:056             |
| Tom/Yee Court                                                           | Oahu          | 3405, 3409A and 3409B Wela St;<br>3554 Trousseau Street | 3-1-010:045             |
| Trentino or Kahuku Plantation Manager's Beach Cottage                   | Oahu          | NA                                                      | 5-7-003:041             |
| Tsoong Nyee Society Cook House                                          | Oahu          | NA                                                      | 9-4-010:004 (portion)   |
| U.S. Coast Guard Diamond Head Lighthouse                                | Oahu          | NA                                                      | 3-1-042:003             |
| U.S. Coast Guard Makapuu Point Light                                    | Oahu          | NA                                                      | 3-9-011:001             |
| U.S. Immigration Office                                                 | Oahu          | 595 Ala Moana Blvd.                                     | 2-1-015:018, 019        |
| U.S.S. Bowfin                                                           | Oahu          | NA                                                      | 9-9-003:031             |
| U.S.S. Missouri Battleship                                              | Oahu          | NA                                                      | 9-9-003                 |
| UH Manoa Bachman Hall                                                   | Oahu          | 2444 Dole St.                                           | 2-8-023:003             |
| UH Manoa Hemenway Hall                                                  | Oahu          | 2034 Campus Rd.                                         | 2-8-023:003             |
| UH Manoa Music Complex                                                  | Oahu          | 2411 Dole St.                                           | 2-8-029:001             |
| UH Manoa Sinclair Library                                               | Oahu          | 2425 Campus Rd.                                         | 2-8-023:003             |
| Ukanipo Heiau                                                           | Oahu          | NA                                                      | 8-1-001:019             |
| Ulu Po Heiau                                                            | Oahu          | NA                                                      | 4-2-013:031             |
| Uluhaimalama (a.k.a. The Royal Flower Garden of Queen Liliuokalani      | Oahu          | 352 Auwaiolimu St., Pauoa Valley                        | 2-2-014:005 through 006 |
| UNIVERSITY OF HAWAII Thematic: Andrews Amphitheater                     | Oahu          | NA                                                      | 2-8-023:003             |
| UNIVERSITY OF HAWAII Thematic: Crawford Hall                            | Oahu          | NA                                                      | 2-8-023:003             |
| UNIVERSITY OF HAWAII Thematic: Dean Hall                                | Oahu          | NA                                                      | 2-8-023:003             |
| UNIVERSITY OF HAWAII Thematic: Founders Gate                            | Oahu          | NA                                                      | 2-8-023:003             |
| UNIVERSITY OF HAWAII Thematic: Gartley Hall                             | Oahu          | NA                                                      | 2-8-023:003             |
| UNIVERSITY OF HAWAII Thematic: George Hall                              | Oahu          | NA                                                      | 2-8-023:003             |
| UNIVERSITY OF HAWAII Thematic: Hawaii Hall                              | Oahu          | NA                                                      | 2-8-023:003             |

| Property Name                                                 | Island | Address/Property Area                          | Tax Map Key                  |
|---------------------------------------------------------------|--------|------------------------------------------------|------------------------------|
| UNIVERSITY OF HAWAII Thematic: Varney Circle                  | Oahu   | NA                                             | 2-8-023:003                  |
| UNIVERSITY OF HAWAII Thematic: Wist Hall                      | Oahu   | NA                                             | 2-8-016:001                  |
| Virgil Biggs Residence                                        | Oahu   | 3334-A Kaimuki Av.                             | 3-2-016:005                  |
| W. W. Goodale Moir Residence                                  | Oahu   | 3311 Kahawalu Dr., Nuuanu                      | 2-2-049:025                  |
| Waialua Agricultural Company Engine Number 6                  | Oahu   | NA                                             | 9-1-069:001                  |
| Waialua Courthouse                                            | Oahu   | NA                                             | 6-6-009:023                  |
| Waialua School (Hale'iwa Elementary School)                   | Oahu   | NA                                             | 6-6-013:012 (portion)        |
| Wai'anae District                                             | Oahu   | NA                                             | 8-5-002: 019,022,024,025     |
| Wai'anae Plantation Manager's House                           | Oahu   | NA                                             | 8-5-003:011                  |
| Waiawa Bridge                                                 | Oahu   | Kamehameha Highway Westbound and Waiawa Stream | None                         |
| Waikane Store                                                 | Oahu   | 48-377 Kamehameha Hwy.                         | 4-8-003:001 (portion)        |
| Waikane Taro Flats                                            | Oahu   | Waikane                                        | 4-8-006:001; 4-8-014:004,006 |
| Waikele Stream Bridge and Highway Overpass                    | Oahu   | Farrington Highway and Waikele Stream          | None                         |
| Waimanalo Taro Terraces                                       | Oahu   | NA                                             | 4-1-010:001                  |
| Waioli Tea Room                                               | Oahu   | 3016 Oahu Av., Manoa                           | 2-9-031:001                  |
| Wakamiya Inari Shrine                                         | Oahu   | 94-695 Waipahu St.                             | 9-4-010:004                  |
| War Memorial Natatorium                                       | Oahu   | NA                                             | 3-1-031:003                  |
| Washington Place                                              | Oahu   | NA                                             | 2-1-018:001                  |
| Washington Place/Grounds                                      | Oahu   | NA                                             | 2-1-018:001                  |
| Waterhouse Warehouse Bldg.                                    | Oahu   | 16 Merchant St.                                | 2-1-002:034                  |
| Watson and Louise Ballentyne Residence                        | Oahu   | 2838 Oahu Avenue                               | 2-9-019:011                  |
| Wet Taro System                                               | Oahu   | NA                                             | 8-5-006:001                  |
| Wheeler Field Wheeler AFB                                     | Oahu   | NA                                             | 7-7, Various                 |
| Willard and Mary Jane Wax Residence                           | Oahu   | 2453 Manoa Rd.                                 | 2-9-010:021                  |
| William and Edna Montgomery Residence                         | Oahu   | 3014 Kiele Avenue, Diamond Head                | 3-1-033:034                  |
| William Getz Residence                                        | Oahu   | 2756 Pacific Heights Road                      | 2-2-030:011                  |
| William H. Hoogs Residence                                    | Oahu   | 2329 Sonoma St., Manoa                         | 2-9-008:024                  |
| William L. & Mary T. Hopper Residence                         | Oahu   | 2069 California Av.                            | 7-5-027:010                  |
| William Ninde Chaffee House                                   | Oahu   | 2311 Armstrong St., Manoa                      | 2-9-005:002                  |
| William Schieber Residence                                    | Oahu   | 2056 Mohala Way, Manoa                         | 2-9-007:009                  |
| Yee/Kobayashi Store                                           | Oahu   | 849 Queen St., Kakaako                         | 2-1-049:008                  |
| YMCA                                                          | Oahu   | NA                                             | 2-1-017:001, :002            |
| Yokohama Specie Bank                                          | Oahu   | 908 Bethel St.                                 | 2-1-002:033                  |
| Yukihide and Aki Kohatsu Residence (a.k.a. "Taira Residence") | Oahu   | 1651 Young St., Pawaa                          | 2-8-001:029                  |
| YWCA                                                          | Oahu   | NA                                             | 2-1-017:009                  |

| <b>Property Name</b>                      | <b>Island</b> | <b>Address/Property Area</b> | <b>Tax Map Key</b> |
|-------------------------------------------|---------------|------------------------------|--------------------|
| 2927 Hibiscus Place Residence             | Oahu          | 2927 Hibiscus Place          | (1) 3-1-034:007    |
| Charles J. and Louisa Henderson Residence | Oahu          | 3965 Noela Place             | (1) 3-1-029:034    |
| Franklin Dexter House                     | Oahu          | 1916 Manoa Road              | (1) 3-2-022:023    |
| George R. Ward House                      | Oahu          | 2438 Ferdinand Avenue        | (1) 2-9-008:030    |
| Granville Abbott Jr. Residence            | Oahu          | 4774 Aukai Avenue            | (1) 3-5-034:014    |
| Henry and Eva Frandsen Residence          | Oahu          | 1921 Makiki Street           | (1) 2-5-001:013    |
| James T and Helene Farr Residence         | Oahu          | 2356 Makaanani Drive         | (1) 1-6-018:048    |
| JB Guard House                            | Oahu          | 305 A Portlock Ave           | (1) 3-9-003:004    |
| John Walker Beach House                   | Oahu          | 876 Mokulua Drive            | (1) 4-3-008:093    |
| Kalama Beach Clubhouse                    | Oahu          | 280 N Kalaheo Avenue         | (1) 4-3-016:006    |
| Malama Manor                              | Oahu          | 2501 Malama Place            | (1) 2-9-012:008    |

Source: State of Hawaii State Historic Preservation. 2016. *Hawai'i Register of Historic Places*. September 15. Accessed: December 2016. Retrieved from: <https://dlnr.hawaii.gov/shpd/files/2016/09/Historic-Sites-State-National-Register-Nomination-Sites-9-15-2016.xlsx>

NA = not applicable; not assessed

## **APPENDIX H**

### **Radio Frequency Emissions Comments Received — All Regions**

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**Albert M. Manville, II, Ph.D., C.W.B.**

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**Re: National Telecommunications Information Administration's (NTIA) First Responder Network (FirstNet) Draft Programmatic Environmental Impact Statement (DPEIS) for the Western United States**

Comments to be submitted in their entirety for the Administrative Record.

Submitted by Albert M. Manville, II, Ph.D., C.W.B.

Principal, *Wildlife and Habitat Conservation Solutions, LLC*<sup>1</sup>;  
Adjunct Professor, Krieger School of Arts and Sciences, Advanced Academic Programs, Johns Hopkins University, Washington DC campus; and  
former U.S. Fish and Wildlife Service agency lead on avian-structural impacts — including from collision and radiation impacts to migratory birds from communication towers

September 29, 2016

[FirstNet DPEIS W.U.S. Comments-AMM.docx]

## **Introduction**

I am pleased to provide comments regarding FirstNet's DPEIS for the Western United States. Please consider my comments regarding this DPEIS for the Western United States as representative of national and continental needs and concerns regarding both wildlife and the impacts from communication towers and their radiation. My comments and recommendations are focused on new wireless communication towers which FirstNet will contract to be built and make operational.

## **Overview of my Assessment**

1. Below I provide more details not discussed in Chapter 2 about migratory birds, their status and importance.
2. I recommend — based on DPEIS Chapter 9, Best Management Practices (BMPs) — even stronger selection criteria for new towers, purposely avoiding — as practical and feasible — tower siting and operation in heavily human developed areas and wildlife concentration areas, especially for migratory birds.
3. I make a strong evidentiary case— in reviewing DPEIS Chapter 2 — based on the most recent peer-reviewed scientific literature and professional contacts, that the effects on non-thermal radiation must be included in FirstNet's National Environmental Policy Act (NEPA) review, based on a 2014 agreement with the Department of Interior. Furthermore, I argue that, "*the potential effects of major concern are rare...*" (p. 2-12) is an inaccurate conclusion based on the preponderance of recent new evidence and cumulative database effects.
4. I will show that independent studies from radiation effects should be supported by FirstNet to develop consistent, standardized, agreed-upon radiation metrics, based on peer-reviewed monitoring and testing research protocols. While arguably we have, "*no consistent measures of exposure...*" (p. 2-12), FirstNet has an opportunity to lead in establishing them.
5. I will show that independent scientific research supported by FirstNet could help develop and set exposure guidelines for radio frequency radiation (RFR) effects on wildlife, especially migratory birds, as well as on humans. I assert that the statement, "[we have] *no scientifically agreed upon biological mechanism of harm...*" (p. 2-12) is an incorrect one based on the current scientific evidence, and further that the communications industry continues to spend enormous amounts of money fighting current biological conclusions and recommendations.

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## Qualifications

My expertise in wildlife, including migratory birds, and impacts from radiation is extensive. I earned a B.S. in zoology from Allegheny College, an M.S. in natural resources and wildlife management from the University of Wisconsin, Stevens Point, and a Ph.D. from Michigan State University in wildlife ecology and management. More recently, I was designated as a “Certified Wildlife Biologist” (C.W.B.) by The Wildlife Society. During my military service, I was trained by the U.S. Navy in the use of electronic gear, then trained and certified by the Departments of State and Defense as a Mandarin Chinese linguist prior to working for the National Security Agency during my Navy tour of duty. I worked as a Federal wildlife biologist for 17 years, retiring in June 2014 from my position as a Senior Wildlife Biologist with the Division of Migratory Bird Management, U.S. Fish and Wildlife Service (FWS or Service), Headquarters Office, Arlington, VA. I was the Service’s national lead on issues related to anthropogenic causes of bird injury and mortality, including from communication towers. In that capacity, I chaired the Communication Tower Working Group (looking at both avian-tower collisions and avian-radiation impacts), working closely with the Federal Communications Commission (FCC), Federal Aviation Administration, other Federal agencies, all the large tower and cell phone trade associations, several cell phone and tower companies, scientists, academicians, and consultants. I was the FWS project officer for the cutting edge tower lighting study at Michigan State Police communication towers (Gehring et al. 2009, Gehring et al. 2011), served as the project officer for a U.S. Coast Guard tall communication tower study, developed a cell tower research monitoring protocol for the U.S. Forest Service (Manville 2002), crafted a peer-reviewed cell tower radiation monitoring protocol, and represented FWS as lead reviewer on many communication tower projects from cell towers to tall, digital television towers. I have published more than 175 professional and popular papers, chapters (including my current chapter in *Problematic Wildlife: a Cross-Disciplinary Approach*; Springer Publishing, 2016), and book reviews. I was considered my agency’s lead, go-to person on communication tower impacts to migratory birds and continue to work in consulting and teaching capacities on these issues.

## Previous Agreement

On February 4, 2014, the Director of the Office of Environmental Policy and Compliance (OEPC), Department of Interior (DOI), sent a letter to the U.S. Commerce Department’s NTIA suggesting regulatory compliance by its FirstNet, a newly created federal entity, implementing development of emergency broadcast systems nationwide (USDOJ 2014). Included in those recommendations were inadequacies which FirstNet had acknowledged and was then proceeding to address. These included inadequacies for conserving migratory birds in Enclosure A of the OEPC letter which I authored while working for the Division of Migratory Bird Management, USFWS. In it, I provided recommendations for addressing bird injury, crippling loss, and death from communication tower collisions; and research needs for beginning to address impacts from non-ionizing electromagnetic radiation emitted from such towers.

The take-home message was clear. We had a federal agency (FirstNet) willing to recognize and begin addressing the impacts of radiation on migratory birds — a significant and important step forward. On February 27, 2014, I began communicating with FirstNet’s Director of Environmental Compliance regarding their PEIS, including beginning to address impacts from low-level, non-thermal non-ionizing radiation that FirstNet stated they then did not intend to categorically exclude. We met with FirstNet’s Director of Environmental Compliance and her staff on March 20, 2014, and proceeded to help FirstNet further develop their DPEIS.

FCC standards dealing with tower radiation are flawed and continue to be based solely on thermal heating, now more than 30 years out of date. FCC, to date, has been unwilling to update their radiation regulatory standards while, to their credit, they are updating tower lighting, height and guy-wire standards. Significantly lower radiation output does not equate to reduced risk (e.g., Panagopoulos and Margaritis (2008)).

I hope FirstNet officials will evaluate their current position based on the recommendations that follow.

### **Background**

Recapping, the electromagnetic radiation standards used by the FCC continue to be based on thermal heating, a criterion now more than 30 years out of date and inapplicable today — except when one is very close to a base station antenna where thermal radiation is at issue. For example, for health and safety reasons, the FCC requires that power to cell and other communication towers must be turned off during maintenance by tower workers.

The current electromagnetic radiation issues are primarily due to the lower levels of radiation output from microwave-powered communication devices such as cellular telephones and their cell towers, emergency broadcast antennas, Wi-Fi, so called “smart meters,” and other sources of point-to-point communications; levels typically lower than from microwave ovens. The FCC’s radiation standards are currently being legally challenged at cell towers in the U.S. Migratory birds are impacted by these tower structures and their broadcasting/receiving radiation, including by very low levels of non-thermal radiation.

### **Why Are Migratory Birds Important?**

Migratory birds — i.e., those that migrate across U.S., Canadian and/or Mexican borders, of which 1,027 species are currently protected in the United States (50 C.F.R. 10.13 list), are a public trust resource, meaning they belong to everyone. Most birds in the western United States are migratory as they are elsewhere in the U.S. Almost all North American continental birds are protected by the Migratory Bird Treaty Act (MBTA). The Act implements and regulates bilateral protocols with Canada, Mexico, Japan and Russia. It is a strict liability statute; proof of criminal intent in the injury or killing of birds is not required by enforcement authorities for cases to be made.

The statute and its regulations protect migratory birds, their parts, eggs, feathers and nests from un-permitted possession and “take” (i.e., un-permitted injury, crippling loss, or killing). Migratory bird nests are protected during the breeding season while eagle nests are protected year-round. Efforts are currently underway by FWS to develop a permit where un-permitted and “unintentional take” could be allowed under MBTA; that process began in 2001. A Federal permit is required to possess a migratory bird and its parts, but the MBTA currently provides no provision for the accidental or incidental “take” (causing injury, crippling loss, or death — including from tower collisions and from radiation) of a protected migratory bird, even when otherwise normal, legal business practices or personal activities are involved, such as the construction and operation of the FirstNet emergency broadcast system. The U.S. Congress noted the “take” of even one protected migratory bird to be a violation of the Statute, with fines and criminal penalties that can be extensive. Under the purview of the MBTA and Executive Order 13186 (the Migratory Bird EO), agencies such as FirstNet need to make every effort to “avoid and minimize take” of migratory birds. You already reference in Chapter 9 of this DPEIS the FWS 2013 voluntary communication tower guidelines which I updated, authored and provided to FCC (Manville 2013b), in addition to other BMPs such as the Avian Power Line Interaction Committee guidelines (APLIC 2006, 2012), both which I co-authored.

Bald and Golden Eagles are also protected by the Bald and Golden Eagle Protection Act (BGEPA), another strict liability statute. “Take” under BGEPA is more expansive than under MBTA, and includes pursuit, shooting, poisoning, capturing, killing, trapping, collecting, molesting and disturbing both species (50 C.F.R. 22.3). It is important to note that eagles do not simply need to be killed or injured to be in violation of the Eagle Act. “Disturbance take” could result in reduced survivorship of adults, juveniles and chicks, affecting their population viability, including from the construction and operation of FirstNet towers. These “takes” are potential criminal offenses.

#### *Status of Migratory Birds:*

Migratory birds are in trouble, including impacts from individual structures and the cumulative communication tower network continent-wide. There are growing numbers of Birds of Conservation Concern (BCCs; USFWS 2008) — species in decline but not yet ready for federal listing as threatened or endangered under the Endangered Species Act (ESA), although some are under listing review. Currently there are 273 species (out of 1,027 protected birds) and subspecies on the national BCC, Service Regional BCC and Bird Conservation Region BCC lists, providing an early warning of likely peril unless the population trends are reversed.

Additionally, there are 93 endangered and threatened bird species on the ESA List of Threatened and Endangered Species. Collectively, BCC and ESA-listed birds represent at least 366 bird species (36%) in decline — some seriously — with numbers of both listed and BCC species growing (Manville 2013a). The FWS is also tasked to maintain stable or increasing breeding populations of Bald and Golden Eagles under implementing regulations of BGEPA and compliance with NEPA — including for broadcast towers.

#### *Bird Collisions:*

Migratory birds have been documented killed in single night, mass mortality collision events (up to 10,000 in single night, single tower collision events) with communication towers, guy-support wires, and tower lights in the U. S. since 1948 — Aronoff 1949, summarized in Manville 2007 — including at unguyed, unlit, < 200-ft above-ground-level (AGL) cell towers.

During nighttime migrations, birds can be overwhelmed by inclement weather events, forcing bird fall-out, significant reductions in flight heights, and resultant attraction to lighted structures and confusion (Manville 2014, 2016a) — such as security lighting that may be placed at power sheds, attracting birds, causing them to collide with the towers. Currently an estimated 6.8 million birds/yr are killed in the U.S. and Canada (Longcore et al. 2012). The vast majority of these bird deaths are in the U.S. In another review, at least 13 species of BCCs were estimated to suffer annual mortality of 1-9% of their estimated total population based solely on communication tower collisions in the U.S. or Canada (Longcore et al. 2013). These include estimated annual mortality of > 2% for the Yellow Rail, Swainson’s Warbler, Pied-bill Grebe, Bay-breasted Warbler, Golden-winged Warbler, Worm-eating Warbler, Prairie Warbler, and Ovenbird.

Up to 350 species of birds have been documented killed at communication towers (Manville 2014, 2016a). Each time one of these birds is killed at an individual communication tower such as that planned by FirstNet, these “takings” add to the overall impacts to bird populations not unlike the phenomenon of the “death by a thousand cuts.” That, of course, is a important purpose of your DPEIS — investigate cumulative effects.

#### *Radiation:*

While there is a massive and growing global database — studies being published weekly — on effects of tower and other non-ionizing radiation on wildlife, laboratory animals and humans, and it is important to

note that the impacts from both thermal and non-thermal radiation have already been well documented (e.g., [www.saferemr.com](http://www.saferemr.com)). In fact, most scientists consider non-thermal effects as well established even though all of the implications are not yet fully understood. Thermal effects are generally pretty clear. It is also important to note that tests on laboratory animals referenced in a radiation memo I provided to FCC in early 2016, and updated for release to the public on July 14, 2016 (excerpted herein; Manville 2016b; <http://bit.ly/savewildlifeRFR>), such as those on chicken embryos, mice and rats are used as surrogates to predict harm to humans, protected migratory birds and other wildlife. For practical, ethical and legal reasons, wild migratory birds would not otherwise be subjected to laboratory studies on impacts from radiation. Furthermore, scientists generally do not want to perform harmful experiments on either humans or protected wildlife such as migratory birds. Studies on the negative effects of non-thermal radiation to wild birds in Europe, briefly summarized below, are clearly relevant as predictors of what will, is likely, or is happening to wild birds in North America. These issues therefore need to be examined in detail by FirstNet, not categorically excluded as currently done in FCC's flawed approach.

In the June 2016 *Scientific American Blog* (Portier and Leonard 2016), in response to the question, “do cell phones cause cancer?” The authors response was clear: “*probably, but it’s complicated. The degree of risk almost certainly depends on the length and strength of exposure — but we still don’t know how significant the actual danger is.*” These same issues pertain to impacts to wildlife from both thermal and non-thermal effects emitted from cell and broadcast communication towers and FM antennas. I submit that the radiation effects on wildlife need to be addressed by the FCC, the Environmental Protection Agency (EPA), FirstNet, the FWS and other governmental entities.

While radiation studies have been ongoing for decades, not until recently have the effects of low-level, non-thermal electromagnetic radiation on domestic and wild birds been made public. Laboratory studies by T. Litovitz (2000 pers. comm.) and DiCarlo et al. (2002) from the standard 915 MHz cell phone frequency on domestic chicken embryos showed that radiation from extremely low levels (0.0001 the level emitted by the average digital cell phone) caused heart attacks and deaths in some embryos; controls were unaffected (DiCarlo et al. 2002). You already referenced these studies in your DPEIS. However, the effects of microwave (and other) radiation from communication towers on nesting and roosting wild birds are yet unstudied in the U.S. In Europe, impacts have been well documented. Balmori (2005) found strong negative correlations between levels of tower-emitted microwave radiation and bird breeding, nesting, and roosting in the vicinity of electromagnetic fields in Spain. He documented nest and site abandonment, plumage deterioration, locomotion problems, and death in House Sparrows, White Storks, Rock Doves, Magpies, Collared Doves, and other species. While these species had historically been documented to roost and nest in these areas, Balmori (2005) did not observe these symptoms prior to construction of the cellular phone towers.

In a troubling discovery, Balmori (2005) documented “far-field,” low level radiation exposures affecting migratory birds out to 300 meters (nearly 1,000 ft) distance from cell towers in Europe. Twelve nests (40% of his study sample) were located within 200 m (nearly 660 ft) of the antennas and never successfully raised any chicks, while only 1 (3.3%), located further than 300 m, never had chicks. Strange behaviors were observed at White Stork nesting sites within 100 m (328 ft) of one or several cell tower antennas. Those birds that the main beam impacted directly (i.e., electric field intensity/EFI > 2 V/m) included young that died from unknown causes. Within 100 m, paired adults frequently fought over nest construction sticks and failed to advance the construction of the nests with sticks falling to the ground while nests were being constructed. Balmori (2005) reported that some nests were never completed and the Storks remained passively in front of cellsite antennas. The electric field intensity was higher on nests within 200 m ( $2.36 \pm 0.82$  V/m) than on nests further than 300 m ( $0.53 \pm 0.82$  V/m). However, the EMF levels, including for nests < 100 m from the antennas, were not intense enough to be classified as thermally active. Power densities need to be at least 10 mW/cm<sup>2</sup> to produce tissue heating of even 0.5 C (Bern-

hardt 1992). The radio frequencies used in Europe and here in the U.S. are similar to the 700 MHz frequency band FirstNet is planning to utilize.

Balmori and Hallberg (2007) and Everaert and Bauwens (2007) found similar strong negative correlations among male House Sparrows. In another review, Balmori (2009) reported health effects to birds which were continuously irradiated. They suffered long-term effects including reduced territorial defense posturing, deterioration of bird health, problems with reproduction, and reduction of useful territories due to habitat deterioration.

Beason and Semm (2002) demonstrated that microwave radiation used in cell phones produces non-thermal responses in several types of neurons of the nervous system of Zebra Finches. The brain neurons of anesthetized birds were tested with a 900 MHz carrier, modulated at 217 Hz. Stimulation resulted in changes in the amount of neural activity by more than half of the brain cells with most (76%) of the responding cells increasing their rates of firing by an average 3.5-fold as opposed to controls — a clearly definitive study showing non-thermal effects. The other responding cells exhibited a decrease in their rates of spontaneous activity suggesting potential effects to humans using hand-held cell phones affecting sleep (Borbely et al. 1999). The Beason and Semm (2002) theoretical model could also help explain why birds may be attracted to cell towers, an important theoretical premise that they previously hypothesized in regard to Bobolinks (Semm and Beason 1990).

Radiation effects can be characterized as “*near-field*” (near the source of radiation), “*far-field*” (some distance from the source) or “*intermediate*.” The growing evidence is clear; there are low-level, non-thermal effects (Manville 2016b: p.4; <http://bit.ly/savewildlifeRFR>). In a meta-review of studies through 2008, and based on laboratory research they conducted, Panagopoulos and Margaritis (2008) determined maximum radiation distances for both cell phones and for communication towers, based on the Global System for Mobile Telecommunications (GSM) and the Digital Cellular System (DCS). This maximum radiation distance corresponds to an intensity around 10 mW/cm<sup>2</sup> for both types of radiation in regards to the RF components — i.e., Bernhardt’s (1992) threshold for thermal heating effects. In the Panagopoulos and Margaritis (2008) study, a “near-field” thermal effect which they called an “*intensity window*” appeared at a distance of 20-30 cm for the cell phone antenna, corresponding to a distance of 20-30 meters (66 to 98 feet) from the base antenna. This could be considered a classic nonlinear effect and would also apply to far field exposures where effects from an “intensity window” are greater than expected. Since cell phone base station antennas are frequently located within residential areas where houses and workplaces are often situated at distances 20-30 m from such antennas, not to mention birds nesting and roosting close to these antennas (e.g., Balmori 2005), humans, migratory birds and other wildlife may be exposed up to 24 hours per day. As a recommended mitigation measure, FirstNet should avoid siting any new broadcast antennas in close proximity to human development and in areas prone to heavy migratory bird use — where there are practical and reasonable alternatives. The FWS’s 2013 guidelines (Manville 2013b), referenced within the DPEIS, provide some recommendations of where to locate antennas.

Complicating the issue is the fact that there currently are no standards for wildlife exposure, including by the licensing and regulatory rules and procedures of the FCC. Other than the letter to and “agreement” between DOI and FirstNet, neither DOI nor the FWS have any policy or quasi policy that currently addresses radiation effects on migratory birds — with the exception of the 2013 (Manville 2013: p.2) guideline number 5. recommending at least a 1-mile disturbance-free buffer between new cell towers and nesting Bald Eagles and Ferruginous Hawks. Arguably, “effects” need to be determined by the EPA, which has no funding for this, and regulated as part of a NEPA site review process, including both thermal and non-thermal effects.

There is an increasing body of published laboratory research that finds DNA damage at low intensity exposures — well below levels of thermal heating — which may be comparable to far field exposures from cell and broadcast antennas, including those being constructed or to be used by FirstNet. This body of

work would apply to all species, including migratory birds, since DNA is DNA, whether single-strand or double helix. The first study to find such effects was conducted by H. Lai and N.P. Singh in 1995 (Lai and Singh 1995). Their work has since been replicated (e.g., Lai and Singh 1996, as well as in hundreds of other more recent published studies), performed in at least 14 laboratories worldwide. The take-home message is clear: low level transmission of EMF from cell and other broadcast towers and other sources probably causes DNA damage. The laboratory research findings strongly infer this relationship. Since DNA is the primary building block and genetic “map” for the very growth, production, replication and survival of all living organisms, deleterious effects can be critical.

The entire thermal model and all FCC categorical exclusions for all of the electronic devices we see today, rests on the incorrect assumption that low-level, non-ionizing non-thermal radiation cannot cause DNA breaks because it is “*so low-power*” (B. Levitt and H. Lai, Comments Filed Jointly to FCC, ET Docket No. 13-84, 2013). The evidence strongly supports the opposite conclusion: low power produces negative effects. These issues need to be adequately addressed by the appropriate authorities including the FCC, EPA, FWS, and FirstNet. Currently they are not.

Based on their research and meta-analyses, Panagopoulos and Margaritis (2008) concluded that large decreases in reproductive capacity were being caused by GSM and DCS radiation fields. This included extensive DNA fragmentation on reproductive cells of experimental animals induced by these fields, exerting an intense biological action able to kill cells, damage DNA, and dramatically decrease the reproductive capacity of living organisms, including populations of wild birds and insects. They cautioned, however, that the physical parameters of these radiations, including intensity, carrier frequency, pulse repetition frequency, distance from the antenna, and similar factors provided inconsistency and lack of standardization making it difficult to correlate specific thermal and non-thermal effects to specific types of radiation. Their take-away message, however, was clear: bio-effects to migratory birds, other wildlife, insects, laboratory animals and humans continue to be documented from thermal and non-thermal exposures, as well as effects from intermediate exposures between the near-field and far-field levels. All migratory birds are potentially at risk, whether they be Bald Eagles, Golden Eagles, Birds of Conservation Concern (USFWS 2008), Federally and/or State-listed bird species, other birds in peril regionally or population-wide, or birds whose populations are stable. FirstNet must therefore address these issues in the DPEIS and your subsequent implementing instructions. Ignoring non-thermal effects based on flawed FCC standards would not be acceptable.

Cucurachi et al. (2013) reported on 113 studies from original peer-reviewed publications and relevant existing reviews. A limited number of ecological studies was identified, the majority of which were conducted in a laboratory setting on bird embryos or eggs, small rodents and plants. In 65% of the studies, ecological effects of RF-EMF (50% of the animal studies and about 75% of the plant studies) were found both at high as well as at low dosages. Lack of standardization and limited sampling made generalizing results from the organism to the ecosystem level very difficult. Cucurachi et al. (2013) concluded, however, that due to the number of variables, no clear dose–effect relationship could be found especially for non-thermal effects. However, effects from some of the studies reviewed were well documented, and certainly can serve as predictors for effects to wild, protected migratory birds and other wildlife in North America.

Engels et al. (2014) investigated “*electromagnetic noise*” emitted everywhere humans use electronic devices including from cell phones and their towers. While prior to their study on European Robins, no “*noise effect*” had been widely accepted as scientifically proven, the authors in this double-blind experiment were able to show that migratory birds are unable to use their magnetic compass in the presence of urban electromagnetic noise. The magnetic compass is integral to bird movement and migration. The findings clearly demonstrated a non-thermal effect on European Robins and clearly serves as a predictor for effects to other migratory birds including those in North America.

Levitt and Lai (2010) reported numerous biological effects from cell tower radiation documented at very low intensities comparable to what the population experiences within 60- 150 m (197- 492 ft) distance from a cell tower, including effects that occurred in studies of cell cultures and animals after exposures to low-intensity RFR. These reported effects were genetic, growth, and reproductive in nature; they documented increases in permeability of the blood–brain barrier; showed behavioral responses; illustrated molecular, cellular, and metabolic changes; and provided evidence of increases in cancer risk — all applicable to migratory birds, other wildlife and to far field exposures in general. They cited published, peer-reviewed examples of effects that included:

Dutta et al. (1989) who reported an increase in calcium efflux in human neuroblastoma cells after exposure to RFR at 0.005 W/kg. Calcium is an important component in normal cellular functions.

Fesenko et al. (1999) who reported a change in immunological functions in mice after exposure to RFR at a power density of 0.001 mW/cm<sup>2</sup>. These results can serve as predictors for impacts to wild animals.

Magras and Xenos (1997) who reported a decrease in reproductive function in mice exposed to RFR at power densities of 0.000168— 0.001053 mW/cm<sup>2</sup>. The results also serve as predictors for reproductive impacts to wildlife.

Forgacs et al. (2006) who reported an increase in serum testosterone levels in rats exposed to GSM-like RFR at specific absorption rates (SAR) of 0.018— 0.025 W/kg. The results also serve as predictors for reproductive impacts to wildlife.

Persson et al. (1997) who reported an increase in the permeability of the blood–brain barrier in mice exposed to RFR at 0.0004– 0.008 W/kg. The blood–brain barrier is a physiological mechanism that protects the brain from toxic substances, bacteria, and viruses. These findings have clear applicability to wildlife including migratory birds.

Phillips et al. (1998) who reported DNA damage in cells exposed to RFR at the SAR of 0.0024– 0.024 W/kg. DNA is integral to the very function and survival of all living organisms, including migratory birds.

Kesari and Behari (2009) also reported an increase in DNA strand breaks in brain cells of rats after exposure to RFR at the SAR of 0.0008 W/kg. The results also serve as predictors for impacts to DNA in wildlife. And,

Belyayev et al. (2009) who reported changes in DNA repair mechanisms after RFR exposure at a SAR of 0.0037 W/kg. DNA is integral to the maintenance and repair of cells and cellular function in all animals. All sources from above were cited in Levitt and Lai (2010).

In a 2-year study conducted by the National Toxicology Program (NTP) of the National Institutes of Health (May 2016), NTP (Wyde 2016) reported partial findings from their \$25 million study on cancer risk to laboratory rodents from cellphone radiation. The report summarizes a long-term exposure study to cell phone radiation, with statistically significant evidence of DNA damage from non-thermal exposure to cellphone radiation to laboratory mice and rats. Controlled studies on laboratory rats showed that cellphone radiation caused 2 types of tumors, glioma and schwannoma, the results which “*could have broad implications for public health.*” The report has been characterized as a “*game-changer*” as it proves that non-ionizing, radiofrequency radiation can cause cancer without heating tissue. The researchers controlled the temperature of the test animals to prevent heating effects so the cancers were caused by a non-thermal mechanism. The report on the mice component of the study will be released at a later date. Not



surprisingly, much of the media coverage contained considerable bias or “media spin” intended to create doubt about the study’s important findings regarding cancer risk from exposure to cellphone radiation (Moskowitz 2016). The implications are troubling for migratory birds and other wildlife.

## Summary Recommendations

Levitt and Lai (2010) concluded that the obvious mechanism of effects from RFR are thermal (i.e., tissue heating) — which is what FCC bases its current radiation standards on, even if they are more than 30 years out of date and rejected both by the Department of Interior and Department of Commerce (USDOJ 2014, Manville 2016a) as incomplete. However, for decades, there have been questions about non-thermal (i.e., not dependent on a change in temperature) effects, whether they exist, and what specifically causes the effects to surface. The sources cited above should help dispel that doubt or at the very least show that non-thermal effects do indeed occur, have been well documented, and can have significant deleterious effects on migratory birds and other wildlife.

Practically, as Levitt and Lai (2010) concluded, we do not actually need to know whether RFR effects are thermal or non-thermal to set exposure guidelines. Most of the biological-effects studies of RFR that have been conducted since the 1980s were under non-thermal conditions, including the most recent NTP (2016) studies. In studies using isolated cells, the ambient temperature during exposure was generally well controlled. In most animal studies, the RFR intensity used usually did not cause a significant increase in body temperature in the test animals. Most scientists consider non-thermal effects as well established, even though the implications are not fully understood.

Scientifically, Levitt and Lai (2010) concluded that there are three rationales for the existence of non-thermal effects:

1. Effects can occur at low intensities when a significant increase in temperature is not likely.
2. Heating does not produce the same effects as RFR exposure.
3. RFR with different modulations and characteristics produce different effects even though they may produce the same pattern of SAR distribution and tissue heating.

There is virtually no non-thermal research to indicate what is safe for either humans or wildlife, including migratory birds which are highly sensitive to perturbations in ways humans are not (see previous citations). Unfortunately, there also is very little far-field, distance-to-safety research for wildlife — most especially for migratory birds — as this has not been studied with that focus in mind. What little EMF/RF field research on wildlife that has been conducted, its focus has been on behavior, mortality and reproductive outcomes (e.g., B. Levitt and H. Lai, Comments Filed Jointly to FCC, ET Docket No. 13-84, 2013; Balmori 2005, 2009; Balmori and Hallberg 2007; Everaert and Bauwens 2007; Engels et al. 2014; Wasserman et al. 1984; and Semm and Beason 1990).

In summary, we need to better understand, tease out, and refine how to address these growing and poorly understood radiation impacts to migratory birds, bees, bats, and myriad other wildlife. Currently, other than to proceed using the precautionary approach and keep emissions as low as reasonably achievable, we are at loggerheads in advancing meaningful guidelines, policies and regulations that address non-thermal effects. The good news: there appears to be an awakening at least within a significant segment the scientific community to the realization that these issues must be addressed — for the health of humans, wildlife and our environment — and hopefully FirstNet will continue on the course of assessing how to minimize the impacts of radiation on wildlife and humans as had been agreed to in 2014.

### Suggested Next Steps for FirstNet

The following suggestions would help significantly advance the need to address effects/impacts from non-thermal radiation on migratory birds and other wildlife, and help in further reducing collision impacts and habitat fragmentation:

- We desperately need to conduct field research on thermal and non-thermal radiation impacts to wild migratory birds and other wildlife here in North America, similar to studies conducted in Europe. Specifically, the research focus should center on causality for “*near-field*,” “*far-field*” and “*intermediate*” effects, ideally based on some standard, agree-upon radiation metrics. FirstNet and leading independent radiation experts (ideally none affiliated with the communication industry) should work together to develop radiation metrics. The metrics need to be consistent with standards for intensity, carrier frequency, pulse repetition frequency, distance from the antenna, and similar factors. The research must be based on peer-reviewed monitoring and testing protocols (e.g., upgrades to the Manville 2002 peer-reviewed research protocol submitted to the U.S. Forest Service for studies on cell towers in Arizona, and key methodologies used in studies previously referenced in the Manville [2016b] memo, among others). The research needs to be conducted by credible, independent third party research entities with no vested interest in the outcomes, and the results need to be published in refereed scientific journals, made available to the public and the affected federal agencies.
- Studies need to be designed to better tease out and understand causality of thermal and non-thermal impacts from radiation on migratory birds. Results need to be carefully compared with findings from Europe and elsewhere on wild birds, and efforts need to be made to begin developing exposure guidelines for migratory birds and other wildlife based on dose-effect and other nonlinear relationships. We do not actually need to know whether RFR effects are thermal or non-thermal to develop and set exposure guidelines (Levitt and Lai 2013).
- To minimize deleterious radiation exposures, these guidelines should include use of avoidance measures such as those developed by the electric utility industry for bird collision and electrocution avoidance (APLIC 2006, 2012). In the case of Bald Eagles, the communication tower guidelines refined and updated by FWS (Manville 2013b) — and submitted to the FCC and industry — recommend one-mile disturbance free buffers during active nesting of Ferruginous Hawks and Bald Eagles, and 0.5-mile buffers around other active raptor nests, based on nest studies conducted by the Wyoming Ecological Services Field Office in that State; Guideline number 5. Impacts must address collision mortality, crippling loss, and injury; mortality, injury, population viability and survivorship based on impacts from radiation; as well as disturbance and habitat fragmentation. The updated 2013 Service Guidelines were intended to be inclusive.
- Agencies tasked with the protection, management, and research on migratory birds and other wildlife (e.g., FWS, U.S. Geological Survey, National Park Service, U.S. Forest Service, Bureau of Land Management, and USDA Wildlife Services, among others) need to develop radiation policies that avoid or minimize impacts to migratory birds and other trust wildlife species. This means supporting — and where applicable — conducting research, and developing policies that help minimize radiation impacts. FirstNet can work with these agencies in support of these efforts.
- As Levitt and Lai (2010) concluded, we do not actually need to know whether RFR effects are thermal or non-thermal to set exposure guidelines. Most scientists consider non-thermal effects as well established, even though the implications are not fully understood.

- Given the rapidly growing database of peer-reviewed, published scientific studies (e.g., <http://www.saferemr.com>, School of Public Health, University of California, Berkeley), it is time these issues be addressed both by FCC and NTIA.
- Without question, these are challenging and daunting issues. FirstNet can begin by taking “small bites out of this 800 pound gorilla” first by developing a siting review process for new towers based on bird- and human-friendly habitats — using the precautionary approach as the direction forward — much like what FWS did following release of its 2000 guidance through a site review process. Proper site location will help to minimize collision and radiation impacts, especially given the scientific information we have available (many sources referenced within these comments). Meanwhile, FirstNet needs to proceed as agreed to in 2014 with helping support independent field radiation research, including in the DPEIS review process, implementing instructions, and through funding and agency support. It is important for FirstNet to begin focusing on new tower siting and location — given the enormity of this endeavor. Implementing the BMPs recommended in this DPEIS and suggestions provided in these comments would be a good start.

Thank you for the opportunity to comment on this complicated but incredibly important issue. Hopefully reasoned minds will prevail, impacts of non-thermal radiation will be included as part of this review, and BMPs will result in a significant reduction of impacts to migratory birds, other wildlife and humans.

Respectfully submitted

Albert M. Manville, II, Ph.D., C.W.B.

#### LITERATURE CITED

Aronoff, A. 1949. The September migration tragedy. *Linnaean News-Letter* 3(1):2.

Avian Power Line Interaction Committee (APLIC). 2006. Suggested practices for avian protection on power lines: the state of the art in 2006. Edison Electric Institute, APLIC, and the California Energy Commission. Washington, DC, and Sacramento, CA. 207 pp.

Avian Power Line Interaction Committee (APLIC). 2012. Reducing avian collisions with power lines: the state of the art in 2012. Edison Electric Institute and APLIC, Washington, DC. 159 pp.

Balmori, A. 2005. Possible effects of electromagnetic fields from phone masts on a population of White Stork (*Ciconia ciconia*). *Electromagnetic Biology and Medicine* 24:109-119.

Balmori, A. 2009. Electromagnetic pollution from phone masts. Effects on wildlife pathophysiology. *Electromagnetic Fields (EMF) Special Issue*, 16 (2-3): 191-199.

Balmori, A., and O. Hallberg. 2007. The urban decline of the House Sparrow (*Passer domestics*): a possible link with electromagnetic radiation. *Electromagnetic Biology and Medicine* 26:141-151.

Beason, R.C., and P. Semm. 2002. Responses of neurons to amplitude modulated microwave stimulus. *Neuroscience Letters* 333 (2002):175-178. Carter, E. 2013. Birding in the United States: demographic and economic analyses. U.S. Fish and Wildlife Service Report 2011-1, 16 pp. Arlington, VA

Bernhardt, J.H. 1992. Non-ionizing radiation safety: radiofrequency radiation, electric and magnetic fields. *Phys. Med. Biol.* 37 (1992): 80–84.

Borbely, A.A., R. Huber, T. Graf, B. Fuchs, E. Gallmann, and P. Achermann. 1999. Pulsed high-frequency electromagnetic field affects human sleep and sleep electroencephalogram. *Neurosci. Lett.* 275 (1999): 207–210.

Cleveland, R.F., Jr. 2001. Human exposure to radiofrequency electromagnetic fields: FCC guidelines; global standards; evaluating compliance; Federal and local jurisdiction. Pages 116-128 *In* B.B. Levitt (ed.). *Cell Towers: Wireless Convenience” or Environmental Hazard?* Proceedings Cell Tower Forum, New Century Publishing.

Cucurachi, S., W.L.M. Tamis, M.G. Vijver, J.W.G.M. Peijnenburg, J.F.B. Bolte, and G.R. de Snoo. 2013. A review of ecological effects of radio frequency electromagnetic fields (RF-EMF). *Environment International* 51 (January 2013): 116-140. DiCarlo, A., N. White, F. Guo, P. Garrett, and T. Litovitz. 2002. Chronic electromagnetic field exposure decreases HSP70 levels and lowers cytoprotection. *Journal Cellular Biochemistry* 84: 447-454.

DiCarlo, A., N. White, F. Guo, P. Garrett, and T. Litovitz. 2002. Chronic electromagnetic field exposure decreases HSP70 levels and lowers cytoprotection. *Journal Cellular Biochemistry* 84: 447-454.

Engels, S., N-L. Schneider, N. Lefeldt, C.M. Hein, M. Zapka, A. Michalik, D. Elbers, A. Kittel, P.J. Hore, and H. Mouritsen. 2014. Anthropogenic electromagnetic noise disrupts magnetic compass orientation in a migratory bird. *Nature* 509 (May 15, 2014). doi:10.1038/nature13290.

Everaert, J. 2016. Electromagnetic radiation (EMR) in our environment. [www.livingplanet.be](http://www.livingplanet.be)

Everaert, J., and D. Bauwens. 2007. A possible effect of electromagnetic radiation from mobile phone base stations not he number of breeding House Sparrows (*Passer domesticus*). *Electromagnetic Biology and Medicine* 26:63-72.

Gehring, J., P. Kerlinger, and A.M. Manville, II. 2009. Communication towers, lights and birds: successful methods of reducing the frequency of avian collisions. *Ecological Applications* 19(2): 505-514.

Gehring, J., P. Kerlinger, and A.M. Manville, II. 2011. The role of tower height and guy wires on avian collisions with communication towers. *Journal of Wildlife Management* 75(4): 848-855.

Grigor’ev, I. 2003. Biological effects of mobile phone electromagnetic field on chick embryo (risk assessment using the mortality rate). *Radiats Biol Radioecol* 43(5):541-3.

ICNIRP. 1998. Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300GHz). *Health Phys.* 74: 494-522.

Lai, H., and N.P. Singh. 1995. Acute low-intensity microwave exposure increases DNA single-strand breaks in rat brain cells. *Bioelectromagnetics* 16 (1995): 207–210.

Lai, H., and N.P. Singh. 1996. Single and double-strand DNA breaks in rat brain cells after acute exposure to radiofrequency electromagnetic radiation. *Int. J. Radiat. Biol.* 69 (1996): 513–521.

Levitt, B.B. 1995. *Electromagnetic Fields: A Consumer’s Guide to the Issues and How to Protect Ourselves*. Harcourt Brace. ISBN 0-15-628100-7

Levitt, B.B., and H. Lai. 2010. Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays. *Environ. Rev.* 18 (2010): 369–395. doi:10.1139/A10-018.

Levitt, B.B., and H. Lai. 2013. Comments Filed Jointly to the Federal Communications Commission, ET Docket No. 13-84, 2013.

Longcore, T., C. Rich, P. Mineau, B. MacDonald, D.G. Bert, L.M. Sullivan, E. Mutrie, S.A. Gauthreaux, Jr., M.L. Avery, R.C. Crawford, A.M. Manville, II, E.R. Travis, and D. Drake. 2012. An estimate of avian mortality at communication towers in the United States and Canada. *PLoS ONE* 7(4) 17 pp, Open Access.

Longcore, T., C. Rich, P. Mineau, B. MacDonald, D.G. Bert, L.M. Sullivan, E. Mutrie, S.A. Gauthreaux, Jr., M.L. Avery, R.C. Crawford, A.M. Manville, II, E.R. Travis, and D. Drake. 2013. Avian mortality at communication towers in the United States and Canada: which species, how many, and where? *Biological Conservation* 158: 410-419.

Manville, A.M. II. 2001. Avian mortality at communication towers: steps to alleviate a growing problem. Pp. 75-86, 227-228. *In*: B.B. Levitt (ed.). *Proceedings of the “Cell Towers Forum” State of the Science/State of the Law*, December 2, 2000, Litchfield, CT. ISBN 1-884820-62-X.

Manville, A.M., II. 2002. Protocol for monitoring the impacts of cellular telecommunication towers on migratory birds within the Coconino, Prescott, and Kaibab National Forests, Arizona. Peer-reviewed research monitoring protocol requested by and prepared for the U.S. Forest Service. Division of Migratory Bird Management, USFWS, 9 pp. March 2002.

Manville, A.M., II. 2007. Comments of the U.S. Fish and Wildlife Service submitted electronically to the FCC on 47 CFR Parts 1 and 17, WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, “Effects of Communication Towers on Migratory Birds.” February 2, 2007. 32 pp.

Manville, A.M. II. 2009. Towers, turbines, power lines and buildings – steps being taken by the U.S. Fish and Wildlife Service to avoid or minimize take of migratory birds at these structures. Pp 262-272 *In* T.D. Rich, C. Arizmendi, D.W. Demarest, and C. Thompson (eds.). *Tundra to Tropics: Connecting Birds, Habitats and People*. *Proceedings 4<sup>th</sup> International Partners in Flight Conference*, McAllen, Texas.

Manville, A.M., II. 2013a. Anthropogenic-related bird mortality focusing on steps to address human-caused problems. Invited White Paper for the Anthropogenic Panel, 5<sup>th</sup> International Partners in Flight Conference, August 27, 2013, Snowbird, Utah. Division of Migratory Bird Management, USFWS, peer-reviewed white paper. 16 pp.

Manville, A.M., II. 2013b. U.S. Fish and Wildlife Service (USFWS) revised guidelines for communication tower design, siting, construction, operation, retrofitting, and decommissioning — Suggestions based on previous USFWS recommendations to FCC regarding WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, “Effects of Communication Towers on Migratory Birds,” Docket No. 08-61, FCC’s Antenna Structure Registration Program, and Service 2012 Wind Energy Guidelines. Division of Migratory Bird Management, Arlington, VA. 5 pp.

Manville, A.M., II. 2014. Status of U.S. Fish and Wildlife Service developments with communication towers with a focus on migratory birds: updates to Service staff involved with tower issues — a webinar. *Talking Points and Literature Citations*, Available to the Public. March 7, 13 pp.

Manville, A.M. II. 2015. Recommendations for additional research and funding to assess impacts of non-ionizing radiation to birds and other wildlife. Memorandum to Dr. J. McGlade, Science Advisor to United Nations Environment Program, Key Research Needs Affecting Wildlife Suggesting UNEP's Immediate Attention. March 5, 2 pp.

Manville, A.M., II. 2016a. Impacts to birds and bats due to collisions and electrocutions from some tall structures in the United States: wires, towers, turbines and solar arrays — state of the art in addressing the problems. Chap 20, pp 415-442, *In* F.M. Angelici (editor), *Problematic Wildlife: a Cross-Disciplinary Approach*, Springer International Publishing, Switzerland. DOI 10.1007/978-3-319-22246-2\_20

Manville, A.M., II. 2016b. A briefing memo: what we know, can infer, and don't yet know about impacts from thermal and non-thermal non-ionizing radiation to birds and other wildlife — for public release. Peer-reviewed briefing memo, July 14, 2016, 12 pp.

Moskowitz, J.M. 2016. National Toxicology Program finds cell phone radiation causes cancer. Electromagnetic Radiation Safety. J. Moskowitz, Dir., Center for Family and Community Health, School of Public Health, Univ. CA— Berkeley. [www.saferemr.com/2016/05/national-toxicology-program-finds-cell.html](http://www.saferemr.com/2016/05/national-toxicology-program-finds-cell.html)

Panagopoulos, D.J., and L.H. Margaritis. 2008. Mobile telephony radiation effects on living organisms. Chapter 3, pp. 107-149, *In* A.C. Harper and R.V. Buress (eds.), *Mobile Telephones*, Nova Science Publishers, Inc. ISBN: 978-1-60456-436-5.

Portier, C.J., and W.L. Leonard. 2016. Scientific American Blog. June 13.

Semm, P. and R.C. Beason. 1990. Responses to small magnetic variations by the trigeminal system of the bobolink, *Brain Res. Bull.* 25: 735–740.

Tanner, J.A. 1966. Effects of microwave radiation on birds. *Nature* 210, May 7, Letters to Nature, doi: 10.1038/210636a0

Tanner, J.A., C. Romero-Sierra, and S.J. Davie. 1967. Non-thermal effects of microwave radiant on birds. *Nature* 216. *Nature* 216, 1139 (Dec 16, 1967) doi:10.1038/2161139a0

United States Department of Interior. 2014. ER 14/0001-14/0004. Letter to Mr. Eli Veenendaal, Natl. Telecommunications and Information Administration, US Dept. Commerce. Signed by W.R. Taylor, Director Office of Environmental Policy and Compliance, Office of Secretary, DOI. February 7, 8 pp, in the public arena.

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. 85 pp. (<http://www.fws.gov/migratorybirds/>>).

Wasserman, F.E., C. Dowd, B.A. Schlenger, D. Byman, S.P. Battista, and T.H. Kunz. 1984. The effects of microwave radiation on avian dominance behavior. *Bioelectronmagnetics* 5(3): 331-339.

Wyde, M. 2016. National Toxicology Program finds cell phone radiation causes cancer. Summary Presentation at BioEM 2016 Meeting, Ghent, Belgium, by M. Wyde, Dir. NTP Studies of Cell Phone Radiation, NIEHS, June 8.

Xenos, T.D, and I.N. Magras. 2003. Low power density RF radiation effects on experimental animal embryos and fetuses *In*: P. Stavroulakis (Ed.), Biological Effects of Electromagnetic Fields, Springer, 579-602.

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## **U.S. Department of the Interior**

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# United States Department of the Interior

OFFICE OF THE SECRETARY  
Washington, D.C. 20240

OCT 11 2016

Ms. Amanda Pereira, NEPA Coordinator  
FirstNet  
12201 Sunrise Valley Drive, M/S 243  
Reston, VA 20192

Re: Comments on Draft Programmatic Environmental Impact Statement for the Central Region of the Nationwide Public Safety Broadband Network and Notice of Public Meetings, U.S. Department of Commerce, National Telecommunications and Information Administration, First Responder Network "FirstNet" Authority

Dear Ms. Pereira:

The Department of the Interior (Department) has reviewed the Draft Programmatic Environmental Impact Statement (DPEIS) for the Central Region of the Nationwide Public Safety Broadband Network (NPSBN), i.e., the Proposed Action.

The Proposed Action may impact listed species and migratory birds. Because the DPEIS does not include specific locations or impacts, it is not possible to assess those impacts at this time. The Department recommends that FirstNet consult with the U.S. Fish and Wildlife Service (USFWS) when planning specific clearing and construction projects. The Department offers the following comments from the USFWS Field Offices in Wyoming and Minnesota.

The Proposed Action includes the potential construction of new wireless communication towers and/or modification of existing towers. The placement and operation of towers can affect migratory birds directly through injury, crippling loss, and death from collisions with towers and their supporting guy-wire infrastructure, as well as indirectly through habitat destruction or degradation due to vegetation clearing and tower construction. Additionally, communication towers might have an impact on migratory birds due to non-ionizing electromagnetic radiation emitted by the tower. Please review the February 7, 2014, letter from the Department to Mr. Eli Veenendaal (National Telecommunications and Information Administration) for additional information regarding electromagnetic radiation impacts for the Proposed Action (Enclosure 1).

The DPEIS notes that "If proposed project sites are unable to avoid sensitive areas, best management practices (BMPs) and mitigation measures as defined through consultation with the appropriate resource agency, would be implemented." (Page 29, Executive Summary). The Department supports the DPEIS's BMPs to minimize potential impacts to migratory birds, including:

- *Engage in early consultation with appropriate agencies and stakeholders as necessary, including but not limited to USFWS, NMFS(National Marine Fisheries Service), and other relevant Federal or state agencies;*

- *Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) (APLIC and USFWS, 2005) for any aboveground lines or cables (e.g., use of diverters);*
- *Implement seasonal and spatial buffer zones around sensitive areas for deployment and maintenance activities, where possible, as recommended by USFWS and state wildlife and natural resources agencies;*
- *Implement the National Bald Eagle Management Guidelines (USFWS, 2007);*
- *Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practical;*
- *Avoid Important Bird Areas (IBAs) and other known important bird habitats to the maximum extent practicable;*
- *Follow guidelines outlined by USFWS for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS, 2013);*
- *Avoid activities within migratory bird flyways and in the immediate vicinity of bat roosts to the extent practicable.*

The Department emphasizes that USFWS Interim Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS 2013, <https://www.fws.gov/migratorybirds/pdf/management/usfwscommunicationtowerguidance.pdf>) recommend unguyed and unlit towers when practicable to reduce bird collisions, injuries, and mortalities. Recent Department of Transportation (DOT) Federal Aviation Administration (FAA) modifications to obstruction marking and lighting requirements include new configurations that feature flashing lights and which are likely to result in a significant decrease in bird fatalities. (see FAA Advisory Circular, December 4, 2015, [http://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_70\\_7460-1L\\_.pdf](http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_70_7460-1L_.pdf)).

With regards to the BMP to “avoid activities within migratory bird flyways” to the extent practicable, the USFWS believes that migrants concentrate along coastlines of major waterbodies such as the oceans and Great Lakes (Bowden et al. 2015), Rathbun et al. 2016, Diehl et al. 2003, Ewert et al. 2011, Peterson et al. 2015, Buler and Dawson 2012, France et al. 2012). The Department would prefer that communication towers be constructed (in order of USFWS preference):

1. More than three miles from any ocean or Great Lake shoreline.
2. If towers are closer than three miles to the shoreline, there should be: site-specific studies and self-standing (un-guyed) towers that are short enough to not require lighting.
3. If towers are closer than three miles to the shoreline and sufficiently tall to require lighting, there should be: site-specific studies; self-standing (un-guyed) towers with lighting that does not include steady-burning lights.

Major north/south river corridors are also major migration corridors and stopover sites. Setback distances from these rivers will depend, to some extent, upon habitat conditions and topography. However, these areas should be avoided to the greatest extent possible. FirstNet should generally follow both the USFWS (2013) Guidelines and those stated above for shorelines.

Under Executive Order (E.O.) 13186, the USFWS is encouraged to “restore and enhance the habitat of migratory birds, as practicable” and “prevent or abate the pollution or detrimental



alteration of the environment for the benefit of migratory birds, as practicable”. The USFWS therefore considers impacts to habitat for migratory birds when providing comments and recommendations under the National Environmental Policy Act (NEPA) environmental review process. The USFWS supports the following DPEIS’s BMPs to minimize vegetation and habitat disturbance and loss:

- *Follow all applicable Federal, state, and local requirements for vegetation removal, disturbance, and restoration;*
- *Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practicable;*
- *Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce vegetation loss;*
- *Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles before moving from one deployment site to another;*
- *Minimize land clearing and vegetation disturbance by using existing roads and unvegetated areas, when feasible, during deployment activities; and*
- *Minimize or avoid removal of forest vegetation whenever possible.*

In accordance with the goals of E.O. 13186 and the Endangered Species Act (ESA), the USFWS recommends that impacts to migratory birds and listed species be mitigated to the greatest extent practicable. The Department uses the NEPA definition of mitigation (<https://ceq.doe.gov/nepa/regs/ceq/1508.htm#1508.20>) which includes avoidance and minimization of impacts, restoring the affected environment, reducing impacts over time, and compensating for impacts by replacing or providing substitute resources or environments.

Additionally, the USFWS recommends conducting vegetation removal and tree clearing outside the breeding period for migratory birds. The USFWS Field Offices can provide state-specific date ranges when clearing should be avoided.

The DPEIS contained only minimal information regarding the location and habitat types expected to be affected within the project area even though vegetation clearing is likely in the development of the network. The USFWS therefore cannot thoroughly review the expected impacts to species listed under ESA (listed species) at this time. Without additional information, it is impossible to accurately assess the project’s potential effects.

The Department disagrees with the statements made in Table ES5-7 of the Executive Summary, and any supporting statements in the DPEIS, that for the broad categories shown the project, “May affect, not likely to adversely affect”. Until specific potential sites and activities are identified, USFWS believes that these conclusions are premature.

The Department recommends that FirstNet consult with USFWS field offices when planning specific clearing and construction projects. The USFWS also recommends visiting the USFWS’s Midwest Region’s Endangered Species Act Section 7 Technical Assistance website (<https://www.fws.gov/midwest/endangered/section7/s7>) regarding impacts in Minnesota, Iowa, Missouri, Wisconsin, Illinois, Indiana, Michigan, and Ohio. Guidance is available at this website to assist you in fulfilling the requirements for consultation under section 7 of the Endangered Species Act, including a step-by-step explanation of the section 7 process, species distribution

lists, species life history information and examples of typical letters. For impacts in Montana, North Dakota, South Dakota, Wyoming, Nebraska, Utah, Colorado, and Kansas, use the USFWS's Mountain-Prairie Region Ecological USFWSs website (<https://www.fws.gov/mountain-prairie/es/index.php>). If, after reviewing the technical assistance websites, it is determined that additional information from a biologist is necessary to assist in the consultation process, please contact the appropriate USFWS field office for the state affected.

The Cheyenne, WY Field Office and Bloomington, IN Field Office of the USFWS have included more detailed comments regarding the DPEIS and impacts of the Proposed Action on listed species and migratory birds in their states (Enclosure 2).

The Department appreciates the opportunity to participate in the environmental review of the Proposed Action. For issues regarding Minnesota, Iowa, Missouri, Wisconsin, Illinois, Indiana, Michigan, and Ohio, Service Field Office contact information can be found at: [https://www.fws.gov/midwest/es/fld\\_off.html](https://www.fws.gov/midwest/es/fld_off.html). For issues regarding Montana, North Dakota, South Dakota, Wyoming, Nebraska, Utah, Colorado, and Kansas, USFWS Field Office contact information can be found by selecting the "Field Offices" tab at <https://www.fws.gov/mountain-prairie/es/index.php>.

Sincerely,



Michaela E. Noble, Director  
Office of Environmental Policy  
and Compliance

Enclosure 1: Letter from Willie Taylor (Director, OEPC) to Eli Veenendaal (National Telecommunications and Information Administration, U.S. Department of Commerce)

Enclosure 2: Table containing Specific comments from Cheyenne, WY Field Office and Specific comments from Bloomington, IN Field Office

## Literature Cited

- Bowden, T. S., E. C. Olson, N. A. Rathbun, D. C. Nolfi, R. L. Horton, D. J. Larson, and J. C. Gosse. 2015. Great Lakes Avian Radar Technical Report Huron and Oceana Counties, Michigan Fall 2011. U.S. Department of Interior, Fish and Wildlife Service, Biological Biological Technical Publication FWS/BTP-2015
- Buler, J. J., and D. K. Dawson. 2012. Radar analysis of fall bird migration stopover sites in the Northeast U.S. Final Report. Cooperative Agreement USGS and University of Delaware.
- Diehl, R. H., R. P. Larkin, and J. E. Black. 2003. Radar observations of bird migration over the Great Lakes. *Auk* 120:278-290.
- Ewert, D. N., M. J. Hamas, R. J. Smith, M. E. Dallman, and S. W. Jorgensen. 2011. Distribution of migratory landbirds along the northern Lake Huron shoreline. *Wilson Journal of Ornithology* 123:536-547.
- France, K. E., M. Burger, T. G. Howard, M. D. Schlesinger, K. A. Perkins, M. MacNeil, D. Klein, and D. N. Ewert. 2012. Final report for Lake Ontario Migratory Bird Stopover Project. Prepared by The Nature Conservancy for the New York State Department of Environmental Conservation, in fulfillment of a grant from the New York Great Lakes Protection Fund (C303907).
- Peterson, A. C., Niemi, G. J. and Johnson, D. H. 2015, Patterns in diurnal airspace use by migratory landbirds along an ecological barrier. *Ecological Applications*, 25: 673–684. doi:10.1890/14-0277.1
- Rathbun N. A., T. S. Bowden, R. L. Horton, D. C. Nolfi, E. C. Olson, D. J. Larson, and J. C. Gosse. 2016. Great Lakes Avian Radar Technical Report; Niagara, Genesee, Wayne, and Jefferson Counties, New York; Spring 2013. U.S. Department of Interior, Fish and Wildlife Service, Biological Technical Publication FWS/BTP-3012-2016





## United States Department of the Interior

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

FEB - 7 2014



In Reply Refer To: (ER 14/0001) (ER 14/0004).

Mr. Eli Veenendaal  
National Telecommunications and Information  
Administration  
U.S. Department of Commerce  
1401 Constitution Avenue, N.W.  
Washington, D.C. 20230

Dear Mr. Veenendaal:

The Department of the Interior (Department) has reviewed the above referenced proposal and submits the following comments and attachment for consideration. Because the First Responder Network Authority (FirstNet) is a newly created entity, we commend the U.S. Department of Commerce for its timely proposals for NEPA implementing procedures.

The Department believes that some of the proposed procedures are not consistent with Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds, which specifically requires federal agencies to develop and use principles, standards, and practices that will lessen the amount of unintentional take reasonably attributed to agency actions. The Department, through the Fish and Wildlife Service (FWS), finds that the proposals lack provisions necessary to conserve migratory bird resources, including eagles. The proposals also do not reflect current information regarding the effects of communication towers to birds. Our comments are intended to further clarify specific issues and address provisions in the proposals.

The Department recommends revisions to the proposed procedures to better reflect the impacts to resources under our jurisdiction from communication towers. The placement and operation of communication towers, including un-guyed, unlit, monopole or lattice-designed structures, impact protected migratory birds in two significant ways. The first is by injury, crippling loss, and death from collisions with towers and their supporting guy-wire infrastructure, where present. The second significant issue associated with communication towers involves impacts from non-ionizing electromagnetic radiation emitted by them (See Attachment).

In addition to the 147 Birds of Conservation Concern (BCC) species, the FWS has listed an additional 92 species as endangered or threatened under the Endangered Species Act. Together with the bald and golden eagle, this represents 241 species of birds whose populations are in trouble or otherwise merit special protection, according to the varying criteria of these lists. The Department suggests that FirstNet consider preparing a programmatic environmental impact statement (see attachment) to determine and address cumulative impacts from authorizing FirstNet projects on those 241 species for which the incremental impact of tower mortality, when



added to other past, present, and reasonably foreseeable future actions, is most likely significant, given their overall imperiled status. Notwithstanding the proposed implementing procedures, a programmatic NEPA document might be the most effective and efficient method for establishing best management practices for individual projects, reducing the burden to individual applicants, and addressing cumulative impacts.

#### *Categorical Exclusions*

The Department has identified 13 of the proposed categorical exclusions (A-6, A-7, A-8, A-9, A-10, A-11, A-12, A-13, A-14 A-15, A-16, A-17, and A-19) as having the potential to significantly affect wildlife and the biological environment. Given this potential, we want to underscore the importance of our comments on FirstNet's procedural guidance under Environmental Review and Consultation Requirements for NEPA Reviews and its list of extraordinary circumstances in Appendix D.

#### *Environmental Review and Consultation Requirements for NEPA Reviews*

To ensure there are no potentially significant impacts on birds from projects that may otherwise be categorically excluded, the Department recommends including the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act to the list of requirements in this section.

#### *Extraordinary Circumstances*

To avoid potentially significant impacts on birds from projects that may otherwise be categorically excluded, the Department recommends including species covered under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act to the list of environmentally sensitive resources. Additionally, adding important resources to migratory birds such as sites in the Western Hemisphere Shorebird Reserve Network and Audubon Important Bird Areas to the paragraph on areas having special designation or recognition would help ensure their consideration when contemplating use of a categorical exclusion.

#### *Developing the Purpose and Need*

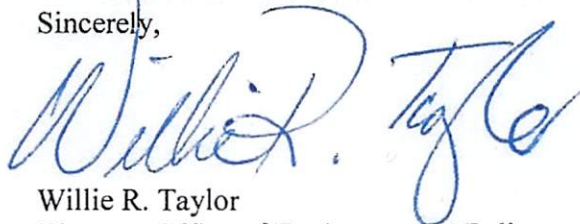
The Department recommends inclusion of language that would ensure consideration of all other authorities to which NEPA is supplemental as opposed to simply the FirstNet mission. As currently written, the procedures are limited to ensuring the purpose and need considers the FirstNet mission. If strictly applied, this approach would severely limit the range of reasonable alternatives, and likely preclude consideration of more environmentally benign locations or construction practices.

#### *Environmental Review Process, Apply NEPA Early in the Process, Where Action is by Non-Federal Entity*

The Department recommends that FirstNet be required to coordinate with federal agencies having jurisdiction by law or special expertise on construction and lighting of its network of towers.

Thank you for the opportunity to comment on the draft document. If you have any questions concerning the comments, please contact Diana Whittington, NEPA Migratory Bird lead, at (703) 358-2010. If you have any questions regarding Departmental NEPA procedures, contact Lisa Treichel, Office of Environmental Policy and Compliance at (202) 208-7116.

Sincerely,

A handwritten signature in blue ink, appearing to read "Willie R. Taylor". The signature is fluid and cursive, with the first name "Willie" being the most prominent part.

Willie R. Taylor  
Director, Office of Environmental Policy  
and Compliance

Enclosure

**Literature Cited**

- Longcore, T., C. Rich, P. Mineau, B. MacDonald, D.G. Bert, L.M. Sullivan, E. Mutrie, S.A. Gauthreaux, Jr., M.L. Avery, R.C. Crawford, A.M. Manville, II, E.R. Travis, and D. Drake. 2013. Avian mortality at communication towers in the United States and Canada: which species, how many, and where? *Biological Conservation* 158: 410-419.
- U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern, 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. 85 pages. <http://www.fws.gov/migratorybirds>.

## Enclosure A

### Background

The placement and operation of communication towers, including un-guyed, unlit, monopole or lattice-designed structures, impact protected migratory birds in two significant ways.

The first is by injury, crippling loss, and death from collisions with towers and their supporting guy-wire infrastructure, where present. Mass mortality events tend to occur during periods of peak spring and fall songbird migration when inclement weather events coincide with migration, and frequently where lights (either on the towers and/or on adjacent outbuildings) are also present. This situation has been well documented in the U.S. since 1948 in the published literature (Aronoff 1949, see Manville 2007a for a critique). The tallest communication towers tend to be the most problematic (Gehring *et al.* 2011). However, mid-range (~400-ft) towers as proposed by the First Responder Network Authority (FirstNet, a newly created entity under the Department of Commerce) can also significantly impact protected migratory birds, as can un-guyed and unlit lattice and monopole towers (Gehring *et al.* 2009, Manville 2007a, 2009, 2013a). Mass mortalities (more than several hundred birds per night) at unguyed, unlit monopole and lattice towers were documented in fall 2005 and 2011 in the Northeast and North Central U.S. (e.g., Manville 2007a). It has been argued that communication towers including “short” towers do not impact migratory birds, including at the population level (e.g., Arnold and Zink 2011), but recent findings have contradicted that assertion (Manville 2007a, 2013a, Longcore *et al.* 2012, 2013).

The second significant issue associated with communication towers involves impacts from non-ionizing electromagnetic radiation emitted by these structures. Radiation studies at cellular communication towers were begun circa 2000 in Europe and continue today on wild nesting birds. Study results have documented nest and site abandonment, plumage deterioration, locomotion problems, reduced survivorship, and death (e.g., Balmori 2005, Balmori and Hallberg 2007, and Everaert and Bauwens 2007). Nesting migratory birds and their offspring have apparently been affected by the radiation from cellular phone towers in the 900 and 1800 MHz frequency ranges – 915 MHz is the standard cellular phone frequency used in the United States. However, the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today. This is primarily due to the lower levels of radiation output from microwave-powered communication devices such as cellular telephones and other sources of point-to-point communications; levels typically lower than from microwave ovens. The problem, however, appears to focus on very low levels of non-ionizing electromagnetic radiation. For example, in laboratory studies, T. Litovitz (personal communication) and DiCarlo *et al.* (2002) raised concerns about impacts of low-level, non-thermal electromagnetic radiation from the standard 915 MHz cell phone frequency on domestic chicken embryos – with some lethal results (Manville 2009, 2013a). Radiation at extremely low levels (0.0001 the level emitted by the average digital cellular telephone) caused heart attacks and the deaths of some chicken embryos subjected to hypoxic conditions in the laboratory while controls subjected to hypoxia were unaffected (DiCarlo *et al.* 2002). To date, no independent, third-party field studies have been conducted in North America on impacts of tower electromagnetic radiation on migratory birds. With the European field and U.S. laboratory evidence already available,

independent, third-party peer-reviewed studies need to be conducted in the U.S. to begin examining the effects from radiation on migratory birds and other trust species.

## **Discussion**

### ***Collision Deaths and Categorical Exclusions***

Attempts to estimate bird-collision mortality at communication towers in the U.S. resulted in figures of 4-5 million bird deaths per year (Manville 2005, 2009). A meta-review of the published literature now suggests, based on statistically determined parameters, that mortality may be 6.8 million birds per year in Canada and the U.S.; the vast majority in the United States (Longcore *et al.* 2012). Up to 350 species of birds have been killed at communication towers (Manville 2007a, 2009). The Service's Division of Migratory Bird Management has updated its voluntary, 2000 communication tower guidelines to reflect some of the more recent research findings (Manville 2013b). However, the level of estimated mortality alone suggests at a minimum that FirstNet prepare an environmental assessment to estimate and assess the cumulative effects of tower mortality to protected migratory birds.

A second meta-review of the published mortality data from scientific studies conducted in the U.S. and Canada (Longcore *et al.* 2013) strongly correlates population effects to at least 13 species of Birds of Conservation Concern (BCC, USFWS 2008). These are mortalities to BCC species based solely on documented collisions with communication towers in the U.S. and Canada, ranging from estimated annual levels of mortality of 1 to 9% of their estimated total population. Among these where mortality at communication towers was estimated at over 2% annually are the Yellow Rail, Swainson's Warbler, Pied-billed Grebe, Bay-breasted Warbler, Golden-winged Warbler, Prairie Warbler, and Ovenbird. Longcore *et al.* (2013) emphasized that avian mortality associated with anthropogenic sources is almost always reported in the aggregate, *i.e.*, "number of birds killed," which cannot detect species-level effects necessary to make effective and meaningful conservation assessments, including determining cumulative effects. These new findings strongly suggest the need for at least an environmental assessment by FirstNet, or more likely, an environmental impact statement.

### ***Radiation Impacts and Categorical Exclusions***

There is a growing level of anecdotal evidence linking effects of non-thermal, non-ionizing electromagnetic radiation from communication towers on nesting and roosting wild birds and other wildlife in the U.S. Independent, third-party studies have yet to be conducted in the U.S. or Canada, although a peer-reviewed research protocol developed for the U.S. Forest Service by the Service's Division of Migratory Bird Management is available to study both collision and radiation impacts (Manville 2002).

As previously mentioned, Balmori (2005) found strong negative correlations between levels of tower-emitted microwave radiation and bird breeding, nesting, and roosting in the vicinity of electromagnetic fields in Spain. He documented nest and site abandonment, plumage deterioration, locomotion problems, reduced survivorship, and death in House Sparrows, White Storks, Rock Doves, Magpies, Collared Doves, and other species. Though these species had historically been documented to roost and nest in these areas, Balmori (2005) did not observe these symptoms prior to construction and operation of the cellular phone towers. Balmori and Hallberg (2007) and Everaert and Bauwens (2007) found similar strong negative correlations

among male House Sparrows. Under laboratory conditions, DiCarlo *et al.* (2002) raised troubling concerns about impacts of low-level, non-thermal electromagnetic radiation from the standard 915 MHz cell phone frequency on domestic chicken embryos – with some lethal results (Manville 2009). Given the findings of the studies mentioned above, field studies should be conducted in North America to validate potential impacts of communication tower radiation – both direct and indirect – to migratory birds and other trust wildlife species.

### Literature Cited

- Arnold, T. W., and R.M. Zink. 2011. Collision mortality has no discernable effect on population trends of North American birds. *Plos ONE* 6:e24708.
- Aronoff, A. 1949. The September migration tragedy. *Linnaean News-Letter* 3(1):2.
- Balmori, A. 2005. Possible effects of electromagnetic fields from phone masts on a population of White Stork (*Ciconia ciconia*). *Electromagnetic Biology and Medicine* 24:109-119.
- Balmori, A., and O. Hallberg. 2007. The urban decline of the House Sparrow (*Passer domesticus*): a possible link with electromagnetic radiation. *Electromagnetic Biology and Medicine* 26:141-151.
- DiCarlo, A., N. White, F. Guo, P. Garrett, and T. Litovitz. 2002. Chronic electromagnetic field exposure decreases HSP70 levels and lowers cytoprotection. *Journal Cellular Biochemistry* 84: 447-454.
- Everaert, J., and D. Bauwens. 2007. A possible effect of electromagnetic radiation from mobile phone base stations on the number of breeding House Sparrows (*Passer domesticus*). *Electromagnetic Biology and Medicine* 26:63-72.
- Gehring, J., P. Kerlinger, and A.M. Manville, II. 2009. Communication towers, lights, and birds: successful methods of reducing the frequency of avian collisions. *Ecological Applications* 19:505-514.
- Gehring, J., P. Kerlinger, and A.M. Manville, II. 2011. The role of tower height and guy wires on avian collisions with communication towers. *Journal of Wildlife Management* 75: 848-855.
- Longcore, T., C. Rich, P. Mineau, B. MacDonald, D.G. Bert, L.M. Sullivan, E. Mutrie, S.A. Gauthreaux, Jr., M.L. Avery, R.C. Crawford, A.M. Manville, II, E.R. Travis, and D. Drake. 2012. An estimate of avian mortality at communication towers in the United States and Canada. *PLoS ONE* 7(4) 17 pp, Open Access.
- Longcore, T., C. Rich, P. Mineau, B. MacDonald, D.G. Bert, L.M. Sullivan, E. Mutrie, S.A. Gauthreaux, Jr., M.L. Avery, R.C. Crawford, A.M. Manville, II, E.R. Travis, and D. Drake. 2013. Avian mortality at communication towers in the United States and Canada: which species, how many, and where? *Biological Conservation* 158: 410-419.
- Manville, A.M., II. 2002. Protocol for monitoring the impacts of cellular telecommunication towers on migratory birds within the Coconino, Prescott, and Kaibab National Forests, Arizona. Peer-reviewed research monitoring protocol requested by and prepared for the U.S. Forest Service. Division of Migratory Bird Management, USFWS. 9 pp, March 2002.
- Manville, A.M., II. 2005. Bird strikes and electrocutions at power lines, communication towers, and wind turbines: state of the art and state of the science – next steps toward mitigation. Pages 1051-1064 *In* C.J. Ralph and T.D. Rich (eds), *Bird Conservation Implementation in the Americas: Proceedings 3<sup>rd</sup> International Partners in Flight Conference*, U.S.D.A. Forest Service Gen. Technical Report PSW-GTR-191, Albany, CA.
- Manville, A.M., II. 2007a. Comments of the U.S. Fish and Wildlife Service submitted electronically to the FCC on 47 CFR Parts 1 and 17, WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, “Effects of Communication Towers on Migratory Birds.” February 2, 2007. 32 pp.
- Manville, A.M., II. 2007b. U.S. Fish and Wildlife concerns over potential radiation impacts from cellular communication towers on migratory birds and other wildlife – research opportunities. Invited Presentation to “Congressional Staff Briefing on the Environmental and Human Health Effects of Radiofrequency (RF) Radiation,” House Capitol 5, Washington, DC. 16 page PowerPoint presentation. May 10, 2007.

- Manville, A.M. II. 2009. Towers, turbines, power lines and buildings – steps being taken by the U.S. Fish and Wildlife Service to avoid or minimize take of migratory birds at these structures. Pages 262-272 in T.D. Rich, C. Arizmendi, D.W. Demarest, and C. Thompson (eds.). *Tundra to Tropics: Connecting Birds, Habitats and People*. Proceedings 4<sup>th</sup> International Partners in Flight Conference, McAllen, Texas.
- Manville, A.M., II. 2011. Estimates of annual human-caused mortality to North American birds (with literature citations). Division of Migratory Bird Management, USFWS, for public distribution. 12 pages.
- Manville, A.M., II. 2013a. Anthropogenic-related bird mortality focusing on steps to address human-caused problems. A White Paper for the Anthropogenic Panel, 5<sup>th</sup> International Partners in Flight Conference, Snowbird, Utah. August 27, 2013. 16 page peer-reviewed White Paper.
- Manville, A.M., II. 2013b. U.S. Fish and Wildlife Service (USFWS) revised guidelines for communication tower design, siting, construction, operation, retrofitting, and decommissioning -- Suggestions based on previous USFWS recommendations to FCC regarding WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds," Docket No. 08-61, FCC's Antenna Structure Registration Program, and Service 2012 Wind Energy Guidelines. Division of Migratory Bird Management, Arlington, VA. 5 pages.
- U.S. Fish and Wildlife Service. 2008. *Birds of Conservation Concern, 2008*. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. 85 pages. <http://www.fws.gov/migratorybirds>.



| Enclosure 2:USFWS Wyoming Ecological Services Field Office<br>Comment Tracking Table<br>PDEIS for the Nationwide Public Safety Broadband Network |                   |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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| Page Number                                                                                                                                      | Section Number    | Line Number or Table Number                                    | Comment or Text Revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 31                                                                                                                                               | Executive Summary | Table ES5-6                                                    | In addition to the BMPs and mitigation measures listed here, particularly the “Install anti-perching or nesting devices on existing or new structures” measure, we recommend that structures containing the fewest perching options be used in areas where raptor and raven predation of sensitive resources is a concern. Where raptor electrocution is a concern, use of structures and components compatible with the guidance in the Avian Power Line Interaction Committee’s (APLIC) 2006 “Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006” electrocution manual should be implemented. Where collision is a hazard, we recommend the APLIC’s 2012 Reducing Avian Collisions with Power Lines: The State of the Art in 2012” manual be implemented.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 18-61                                                                                                                                            | 18.1.4.2          | Table 18.1.4-1:<br>Relevant Wyoming Water laws and Regulations | <p>It is important to consider the sensitive nature of water use in Wyoming. Two of our largest basins (Platte River and Colorado River) have recovery programs initiated to ensure depletions of the water do not cause jeopardy of federally listed plants and animals that occur downstream. Platte River: On June 16, 2006, the USFWS issued a programmatic biological opinion (PBO) for the Platte River Recovery Implementation Program (PRRIP) and water-related activities<sup>1</sup> affecting flow volume and timing in the central and lower reaches of the Platte River in Nebraska. The action area for the PBO included the Platte River basin upstream of the confluence with the Loup River in Nebraska and the mainstem of the Platte River downstream of the Loup River confluence. Federally listed species affected by depletions in Wyoming of the Platte River are the whooping crane and its critical habitat, the interior least tern, the northern Great Plains population of the piping plover, the pallid sturgeon, and the western prairie fringed orchid. For more information on the PRRIP, visit our website at <a href="https://www.fws.gov/platteriver/index.php">https://www.fws.gov/platteriver/index.php</a>.</p> <p>Colorado River: A Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) was initiated on January 22, 1988. The Recovery Program was intended to be the reasonable and prudent alternative to avoid jeopardy to the endangered fish by depletions from the Upper Colorado River. In order to further define and clarify the process in the Recovery Program, a section 7 agreement was implemented on October 15, 1993, by the Recovery Program participants. Federally listed species affected by depletions in Wyoming of the Colorado River are the humpback chub and its critical habitat, bonytail and its critical habitat, Colorado pikeminnow and its critical habitat, and razorback sucker and its critical habitat. For more information on the Recovery Program, visit the <a href="http://www.coloradoriverrecovery.org/">http://www.coloradoriverrecovery.org/</a> website.</p> <p>The effects of the Project on the federally listed species in both the Platte River and the Colorado River should be analyzed in the NEPA document and the section 7 consultation for this Project.</p> |

<sup>1</sup> The term “water-related activities” means activities and aspects of activities that (1) occur in the Platte River basin upstream of the confluence of the Loup River with the Platte River; and (2) may affect Platte River flow quantity or timing, including, but not limited to, water diversion, storage and use activities, and land use activities. Changes in



| <b>Enclosure 2:USFWS Wyoming Ecological Services Field Office<br/>Comment Tracking Table<br/>PDEIS for the Nationwide Public Safety Broadband Network</b> |                       |                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| 18-77                                                                                                                                                     | 18.1.6.2              | Table 18.1.6-1: Relevant Wyoming Biological Resources Laws and Regulations | The table here contains only three relevant statutes, laws, or regulations. These may be specific only to Wyoming, but a reader only interested in Wyoming will question where the national statutes, laws, and regulations are listed. Recommend pointing to a specific table where national or multi-state statutes, laws, and regulations are listed. Also recommend including Title 11, Chapter 5, Section 102.a.xi for the Wyoming Weed and Pest Control Act of 1973; BLM Special Status Species Management Policy 6840; USFS Manual 2670; Wyoming Statutes 23-3-102, 23-3-103, 23-1-101, 23-1-103, 23-1-302, and 23-3-108; and State of Wyoming Executive Order 2015-4.                                                                 |
| 18-87                                                                                                                                                     | 18.1.6.4              | Reptiles and Amphibians                                                    | The Wyoming toad ( <i>Bufo [Anaxyrus] baxteri</i> ) is a federally endangered amphibian that occurs only in the Laramie Basin in Wyoming. Recommend mentioning here or referencing a description of the species in 18.1.6.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 18-88                                                                                                                                                     | 18.1.6.4              | Invasive wildlife species                                                  | The text states that, "Species such as gypsy moth, Asian longhorn beetle, and emerald ash borer are of particular concern in Wyoming..." It is not made clear whether these species occur in Wyoming or whether the concern arises from the need to prevent these species from entering the state to "cause irreversible damage to native forests."                                                                                                                                                                                                                                                                                                                                                                                           |
| 18-93                                                                                                                                                     | 18.1.6.6              | Table 18.1.6-3 and Black-footed ferret section                             | The black-footed ferret does not have Endangered status in Wyoming. On October 30, 2015, the USFWS designated the nonessential experimental area in the State of Wyoming in accordance with section 10(j) of the ESA (80 FR 66821). This acknowledges that the likelihood of identifying wild ferrets in Wyoming, outside of those resulting from reintroductions, is distinctly minimal and that it is unlikely that black-footed ferrets in Wyoming have persisted through drastic reductions of prairie dog complexes even with recent expansions of prairie dog complexes. We encourage project proponents to protect all prairie dog towns or complexes for their value to the prairie ecosystem and the many species that rely on them. |
| 18-93 to 18-95                                                                                                                                            | 18.1.6.6              | Table 18.1.6-3 and Grizzly bear section                                    | The grizzly bear in the Greater Yellowstone Ecosystem Distinct Population Segment (GYEDPS) is threatened, but is currently under review and proposed for delisting. Outside of the GYEDPS, the grizzly bear will remain threatened.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

temperature and sediment transport will be considered impacts of a "water related activity" to the extent that such changes are caused by activities affecting flow quantity or timing. Impacts of "water related activities" do not include those components of land use activities or discharges of pollutants that do not affect flow quantity or timing.

**Enclosure 2:USFWS Wyoming Ecological Services Field Office  
Comment Tracking Table  
PDEIS for the Nationwide Public Safety Broadband Network**

| Page Number      | Section Number | Line Number or Table Number                                             | Comment or Text Revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| 18-95            | 18.1.6.6       | Northern long-eared bat section                                         | <p>The northern long-eared bat was not listed as endangered in 2013 as the text here states. Instead, it was proposed as endangered with an open comment period. The species was listed in 2015 as threatened with an interim 4(d) rule, which was finalized in January 2016. The 4(d) rule provides flexibility to landowners, land managers, government agencies and others as they conduct activities in areas that may affect the northern long-eared bat. In areas of the northern long-eared bat's range that have not yet been affected by white-nose syndrome (WNS), defined as outside the WNS zone in the final 4(d) rule, such as in Wyoming, incidental take (unintentional harm to bats incidental to otherwise lawful activities) is not prohibited. Even though the final 4(d) rule excepts incidental take, federal agencies still have an obligation to consult on may affect determinations. This obligation may be covered if the federal agency complies with measures outlined in the framework for the USFWS's January 5, 2016, programmatic biological opinion on the final 4(d) rule. In addition, purposeful take, other than for human safety or removal of bats from dwellings, is prohibited.</p> <p>In addition to the three counties in northeastern Wyoming, the northern long-eared bat has been confirmed in the Laramie Peak region of the Medicine Bow National Forest in northeastern Albany County, though the individuals recorded here may not represent a breeding population.</p> |
| 18-99            | 18.1.6.6       | Colorado butterfly plant section                                        | <p>The text states that the Colorado butterfly plant is a perennial flowering plant and that it is approximately 2 feet tall. These are generally true, though the better description of the species is that it is perennial but semelparous (vegetative for one to three years; then bolts, flowers, sets seed, and dies in one year), and that individuals can reach over four feet tall, depending on competition with surrounding vegetation.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 18-100           | 18.1.6.6       | Ute ladies'-tresses orchid                                              | <p>The text states that the ULT occurs in 22 counties across the entirety of the state. This is a misinterpretation of the area of influence map found on the species' website (labeled here as USFWS 2015r). We actually have far fewer known occurrences than the map would suggest, but the state has not been extensively surveyed and so we modeled suitable habitat and provided a buffer of those suitable habitats. The area of influence is the area in which the species may occur and projects within which may affect the species.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 18-242           | 18.2.4.2       | Table 18.2.4-1: Impact significance rating criteria for water resources | <p>The potential effects from water usage in the Platte River and Colorado River basins should be analyzed here. Water use may include construction (such as concrete batch plants), dust abatement (such as on constructed or utilized access roads), and water use of constructed facilities.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 18-280 to 18-287 | 18.2.6.4       | Birds                                                                   | <p>The USFWS recommends that the suggested practices by the Avian Power Line Interaction Committee be followed to minimize impacts to migratory birds through collision and electrocution (see <a href="http://www.aplic.org">www.aplic.org</a> for the 2006 electrocution and 2012 collision manuals) for all overhead lines.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |



| Enclosure 2:USFWS Wyoming Ecological Services Field Office<br>Comment Tracking Table<br>PDEIS for the Nationwide Public Safety Broadband Network |                |                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| Page Number                                                                                                                                      | Section Number | Line Number or Table Number       | Comment or Text Revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 18-290                                                                                                                                           | 18.2.6.4       | New Wireless Communication Towers | <p>Communication towers are currently estimated to kill between four and five million birds per year. A great deal of the mortality is a result of collisions with supporting guy wires. Additionally, the type of safety lighting on these towers appears to influence their attractiveness to birds. In order to minimize the potential for impacts to migratory birds, the USFWS urges consideration of the following siting and construction recommendations.</p> <ol style="list-style-type: none"> <li>1. If possible, new communications equipment should be co-located on an existing tower or similar structure (e.g. billboard, water tower, or building mount). Depending on tower load factors, from 6 to 10 providers may co-locate on an existing tower.</li> <li>2. Where co-location is not feasible and a new tower must be constructed, all efforts should be taken to construct towers no more than 199 feet above ground level (AGL), that do not require guy wires (e.g. use a lattice, monopole structure, etc.). Such towers should be unlighted if Federal Aviation Administration (FAA) regulations permit.</li> <li>3. If constructing multiple towers, providers should consider the cumulative effects of all of those towers to endangered, threatened, proposed, and candidate species and migratory birds as well as the effects of each individual tower.</li> <li>4. If at all possible, new towers should be sited within existing antenna farms. Avoid siting towers near (within 3 to 5 miles of) wetlands, other known bird concentration areas (e.g., state or Federal refuges, staging areas, rookeries), in known migratory or daily movement flyways, or in habitat of threatened or endangered species. Towers should not be sited in areas with a high incidence of fog, mist, or low ceilings.</li> <li>5. If taller (greater than 199 feet AGL) towers requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used. Unless required by the FAA, only white strobe lights should be used at night, preferably with the minimum number, minimum intensity, and minimum number of flashes per minute (longest duration between flashes) allowable by the FAA. Current research indicates that solid or pulsating (beacon) red lights attract night-migrating birds at a much higher rate than white strobe lights.</li> <li>6. Towers designed using guy wires for support that are proposed to be located in known raptor or waterbird concentration areas or daily movement routes, or in major diurnal migratory bird movement routes or stopover sites, should have daytime visual markers (e.g., bird diverter devices) on the wires to prevent collisions by these diurnal moving species. For guidance on markers, the Avian Power Line Interaction Committee has published guidance (<i>Reducing Avian Collisions with Power Lines: The State of the Art in 2012</i> and <i>Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006</i>). Copies can be obtained at <a href="http://www.aplic.org/">http://www.aplic.org/</a>.</li> </ol> |

**Enclosure 2:USFWS Wyoming Ecological Services Field Office  
Comment Tracking Table  
PDEIS for the Nationwide Public Safety Broadband Network**

| Page Number      | Section Number | Line Number or Table Number                                 | Comment or Text Revision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------|----------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18-290           | 18.2.6.4       | New Wireless Communication Towers                           | <p>(continued from previous page)</p> <p>7. Towers and attendant facilities should be sited, designed, and constructed to avoid or minimize habitat loss within and adjacent to the tower footprint. Road access and fencing should be minimized to reduce or prevent habitat fragmentation and disturbance, and to reduce above-ground obstacles to birds in flight.</p> <p>8. If significant numbers of breeding, feeding, or roosting birds are known to occur within the tower construction area, relocation to an alternate site is recommended. If this is not possible, seasonal restrictions on construction may be advisable in order to avoid disturbance during periods of high bird activity.</p> <p>9. New towers should be designed structurally and electrically to accommodate the applicant/licensee's antennas and comparable antennas for at least two additional users (minimum of 3 users for each tower structure), unless this design would require the addition of lights or guy wires to an otherwise unlighted and/or non-guyed tower.</p> <p>10. Security lighting for on-ground facilities and equipment should be down-shielded to keep light within the boundaries of the site.</p> <p>11. USFWS personnel and/or researchers from the Communication Tower Working Group or its designees should be allowed access to the site to evaluate bird use, conduct dead-bird searches, and to conduct various research.</p> <p>12. Towers no longer in use or determined to be obsolete should be removed within 12 months of cessation of use.</p> <p>Although these measures will provide significant protection for migratory birds, implementation of these measures alone will not remove any liability should violations of the MBTA or the Eagle Act occur. The U.S. Fish and Wildlife Service Division of Law Enforcement and the U.S. Department of Justice have used enforcement and prosecutorial discretion in the past regarding individuals or companies who have made good faith efforts to avoid the take of migratory birds. We acknowledge that you intend to avoid construction during sensitive time periods and within specific spatial buffers for listed species. We recommend that nesting migratory birds also be avoided during the nesting season within species-specific buffers. As a part of the Project, we recommend monitoring of avian use of Project facilities as well as reporting avian mortality events.</p> |
| 18-293 to 18-294 | 18.2.6.5       | Indirect Injury/Mortality to Fisheries and Aquatic Habitats | <p>Water quantity is a significant concern in the arid west, particularly for the Platte River Basin and the Colorado River Basin. See comment above on page 18-61, section 18.1.4.2, Table 18.1.4-1: Relevant Wyoming Water laws and Regulations regarding impacts to the Platte and Colorado River Basins.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| <b>Enclosure 2:USFWS Wyoming Ecological Services Field Office<br/>Comment Tracking Table<br/>PDEIS for the Nationwide Public Safety Broadband Network</b> |                       |                                                                     |                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Page Number</b>                                                                                                                                        | <b>Section Number</b> | <b>Line Number or Table Number</b>                                  | <b>Comment or Text Revision</b>                                                                                                                                                                                                                                            |
| 18-301 to 18-302                                                                                                                                          | 18.2.6.6              | Table 18.2.6-2: Impact Significance Rating Criteria for T&E Species | The breakdown presented here regarding what level of effects will lead to no effect, may affect and not likely to adversely affect, and may affect and likely to adversely affect provides a good basis for the consultation on listed species under section 7 of the ESA. |
| 18-304                                                                                                                                                    | 18.2.6.6              | T&E Plants                                                          | The Fremont County rockcress is a federal Candidate species, similar to the Whitebark pine. It should be considered here as well, since it is mentioned on page 18-98 in section 18.1.6.6.                                                                                 |
| 18-305                                                                                                                                                    | 18.2.6.6              | Reproductive effects to T&E Plants                                  | The reproductive success of federally listed plants may be impacted by the Project, particularly through use of insecticides or pesticides as well as dust generated from construction and use of access roads.                                                            |
| 19-7 to 19-10                                                                                                                                             | 19.4.1                | Water Resources BMPs                                                | A spill prevention, control, and countermeasure plan (SPCCP) should be developed for the Project. This would also apply to 19.5.1 (Wetlands), 19.6.3.1 (Fisheries and Aquatic Habitats), 19.6.4.1 (T&E Species), and 19.15.1 (Human Health and Safety).                    |
| 19-22                                                                                                                                                     | 19.6.4.1              | T&E Species BMPs                                                    | Recommend adding a measure about control of fugitive dust generated by the Project's use of unpaved roads and construction. Dust can settle on plants and block their ability to photosynthesize, and can disrupt pollination success.                                     |
| 19-22                                                                                                                                                     | 19.6.4.1              | T&E Species BMPs                                                    | Recommend adding a measure on controlling speed limits on access roads, particularly within areas where a federally listed animal may be struck by construction and/or maintenance vehicles.                                                                               |

| Enclosure 2: USFS Bloomington Field Office<br>Comment Tracking Table<br>PDEIS for the Nationwide Public Safety Broadband Network –Indiana Portion of Proposed project |         |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5-98                                                                                                                                                                  | 5.1.6.6 | T&E Species | Indiana has 25 federally listed species, four of which have designated critical habitat, and one candidate species. Critical habitat has been designated in Indiana for the following species: the Indiana bat ( <i>Myotis sodalis</i> ), the piping plover ( <i>Charadrius melodus</i> ), the rabbitsfoot ( <i>Quadrula cylindrica cylindrica</i> ), and the Short's bladderpod ( <i>Physaria globosa</i> ). The Eastern massasauga ( <i>Sistrurus catenatus</i> ) is a candidate species found in Indiana that has been proposed as threatened                                                                                             |
| 5-99 and 5-100                                                                                                                                                        | 5.1.6.6 | T&E Species | <p>The gray bat (<i>Myotis grisescens</i>) is found in six counties in Indiana, not five as listed in Table 5.1.6-3 and in the gray bat narrative. The six counties are Clark, Crawford, Floyd, Harrison, Perry, and Spencer.</p> <p>The table should also be updated to indicate that critical habitat has been designated for the Indiana bat in Indiana, as is correctly defined in the Indiana bat narrative.</p> <p>The northern long-eared bat was proposed as endangered in 2013 (78 FR 61046-61080, October 2, 2013). The northern long-eared bat was listed as threatened with a 4(d) rule on April 2, 2015 (80FR 17948-18033).</p> |
| 5-102                                                                                                                                                                 | 5.1.6.6 | T&E Species | There are two endangered and one threatened bird species in Indiana. The piping plover is federally endangered with critical habitat designated in Porter County, Indiana                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 5-104                                                                                                                                                                 | 5.1.6.6 | T&E Species | <p>The clubshell (<i>Pleurobema clava</i>) is found in the Tippecanoe River and Fish Creek in northern Indiana.</p> <p>The fanshell (<i>Cyrogenia stegaria</i>) is found in the Wabash, Tippecanoe and East Fork White Rivers in Indiana.</p> <p>The Tippecanoe River in Carroll, Pulaski, Tippecanoe and White Counties has been designated as critical habitat for the rabbitsfoot.</p>                                                                                                                                                                                                                                                    |

|                |          |                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------|----------|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5-311          | 5.1.6.6  | Loss or Degradation of Designated Critical Habitat         | A discussion of the designated critical habitat for the Indiana bat and piping plover should be included in the Terrestrial Mammals and Birds sections, respectively (p.5-311).                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 5-312 to 5-317 | 5.1.6.6  | Alternative                                                | Bloomington Field Office does not agree with the effects determinations for the Preferred Alternative. Any activity that may impact threatened and endangered species and their critical habitat, even if those effects are temporary, infrequent and not conducted in vital or critical locations would not meet a no effect determination. Likewise, any activity that could result in direct injury/mortality, reproductive effects, behavioral changes, and loss/degradation of designated critical habitat for threatened and endangered species would be likely to adversely affect those species. |
|                | 19.6.2.2 | Project-Type Specific BMPs and Mitigation Measures (p. 16) | Additional information is requested as to what type of bat exclusions would be installed for wired projects, and if these exclusions would be effective for birds also.                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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**Naveen Albert**

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**From:** InterLinked CEO  
**Sent:** Friday, December 16, 2016 6:48:49 AM  
**To:** Genevieve Walker  
**Subject:** Comment on FirstNet Draft Environmental Impact Statements

**Wired technologies are far more reliable, far more secure, and much faster than wireless technologies. In addition, the electromagnetic radiation emitted by wireless technologies, such as cell phones, cordless phones, smart meters, cell towers, and Wi-Fi, has been declared a Class 2B carcinogen by the World Health Organization. Numerous peer reviewed studies have also found biological health impacts down to very low exposure levels, far below our FCC guidelines which are largely ineffective,**

I kindly request that Congress eliminate the provision of wireless broadband from the FirstNet mission. At the very least, delay implementation of the wireless First Responder component until a system is designed that minimizes RF emissions from antennas and communicators.

There are numerous cancer studies with findings regarding first responders,

Please also see this NTP study: <http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/>

Thus, communicators should be able to contact each other directly, not require an outside antenna (certain types of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed.

Here are just a few more studies:

The Central Region document is available at the following site:  
<https://www.regulations.gov/document?D=FIRSTNET-2016-0003-0001>

The East Region  
<https://www.regulations.gov/document?D=FIRSTNET-2016-0002-0001>

The South region is available for review and comment at the following link:  
<https://www.regulations.gov/document?D=FIRSTNET-2016-0005-0001>

West Region  
<https://www.regulations.gov/document?D=FIRSTNET-2016-0004-0001> or  
<https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&D=FIRSTNET-2016-0004>

*"The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer"*

([http://emrstop.org/index.php?option=com\\_docman&task=doc\\_details&gid=4&Itemid=18](http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18))

*"Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions"*

([http://www.radiationresearch.org/images/RRT\\_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2020July%202011.pdf](http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2020July%202011.pdf))

*"How does long term exposure to base stations and mobile phones affect human hormone profiles?," Eskander et al.*

(<http://www.sciencedirect.com/science/article/pii/S0009912011027330>)

FirstNet wireless technology is supposed to be LTE 4G - much higher RF levels are emitted by 4G technologies than necessary,

Remember, in a disaster, wireless technologies fail. Please make sure we keep safe, affordable, reliable corded landline telephone service, and abandon initiatives to do otherwise

Do not stand behind FCC regulations. FCC regulations do not protect from "any potential effects," as this letter from Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, regarding the limitations and purpose of the FCC exposure standards notes

([http://www.emrpolicy.org/litigation/case\\_law/docs/noi\\_epa\\_response.pdf](http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf))

) This very credible evidence is unmentioned and ignored. Furthermore FCC regulations are poorly enforced. (An issue which is completely ignored in the PEIS.) Rampant violations are documented by the Wall Street Journal and EMR Policy Institute. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (<http://www.marketwire.com/press-release/-1770139.htm>)

). A Wall Street Journal investigation (<http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055>)

) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.

A fully elucidated mechanism should not be required to take action to protect public health when detrimental effects are found. Serious biological effects are acknowledged and then ignored on page 2-20.

**The two mechanisms that are extremely plausible and well-supported in the literature are completely ignored:**

**Oxidation -**

1. Yakymenko, I., Tsybulin, O., Sidorik, E., et al. (2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. Electromagn Biol Med. Jul;7:1-16. <http://www.ncbi.nlm.nih.gov/pubmed/26151230#>

**Ca 2+ channels**

1. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard Recent Res Devel Mol Cell Biol 7.
2. Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. J Chem Neuroanat DOI: 10.1016/j.jchemneu.2015.08.001. <http://dx.doi.org/10.1016/j.jchemneu.2015.08.001>
3. Pall, M.L. (2016)
4. Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1.

The PEIS uses outdated documents to excuse inaction.

Contrary to their assertion, FCC limits do not protect against adverse effects, even the DOI noted **"the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today"** ([http://www.ntia.doc.gov/files/ntia/us\\_doi\\_comments.pdf](http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf))

The opening of the FCC docket to re-evaluate limits is acknowledged, but then ignored. The logical step of delaying implementation of the wireless component until that is completed is not even mentioned.

The National Toxicology Program findings are not even mentioned.

Their exposure calculations are based on only one antenna and work out to 477uW/m2, which is over the level shown to cause biological effects (<http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf> see graph at end). Most towers or building antenna sites have more than one antenna radiating in any given direction, plus signals come from other nearby sites, and the ground infrastructure such as cellphones, tablets etc. So levels at ground level are likely to be far higher than that and levels in apartments or homes which get a direct hit from neighboring buildings could be far higher depending on distance.

Several IARC panelists have made public statements that the evidence now shows that radiofrequency radiation should be classified as either a class 2A or class 1 human carcinogen. The recent (ignored) National Toxicology Program findings support this. This should cause the wireless portion to be stopped and FirstNet should explain why to Congress, but no mention is made and therefore no such action is recommended.

They refuse to take action to protect birds in spite of lab and epidemiological evidence that support each other in finding hard because it requires "interpretation and extrapolation." (2-20) Doesn't it always?

They hardly touch on tree damage and totally ignore the following tree and plant studies:

- Radiofrequency radiation injures trees around mobile phone base stations: [https://www.researchgate.net/publication/306435017\\_Radiofrequency\\_radiation\\_injures\\_trees\\_around\\_mobile\\_phone\\_base\\_stations](https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations)
- Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations <https://www.hindawi.com/journals/ijfr/2010/836278/>
- Review: Weak radiofrequency radiation exposure from mobile phone radiation on plants: <http://www.ncbi.nlm.nih.gov/pubmed/27650031?dopt=Abstract>
- Tree damage in the vicinity of mobile phone base stations: <http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf>
- The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: <http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Dokumentation-2006-2016.pdf>
- Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. **-IMPORTANT MECHANISTIC DISCUSSION**

On 2-20 the PEIS acknowledges "A number of other studies generally touch upon the nature of RF exposure and the disruption of biological processes that are fundamental to plant and animal growth and health, including but not limited to behavior, DNA damage, immune deficiencies, reproductive system effects, hormone dysregulation, degraded cognition and sleep, and desynchronization of neural activity (BioInitiative Working Group, 2012) (Balmori, A., 2005)," **but then no protective action is being taken because** "The common practice for NEPA documents related to cellular towers is to cite FCC standards and point to the fact that they would be built and operated according to allowable FCC RF emission limits. Some NEPA documents that have more directly addressed the RF emissions potential largely point to the existing literature and suggest that although there is evidence that RF emissions could potentially affect some species, the evidence is insufficient to support a finding of adverse impacts on these species due to RF emissions (Ballistic Missile Defense Organization, 2000) (FCC, 2012)."

This approach was not allowable by the courts in other situations. Especially since the inadequacy of the FCC RF limits is now acknowledged by both the DOI and the EPA. In addition, numerous studies have added to the knowledge about the hazard that RF poses to human health since both 2000 and 2012, including the NTP study which has found that RF is carcinogenic and breaks DNA.

Please consider the best interests of us and the environment before making a potentially poor choice. DO THE RIGHT THING (hint: it's not hard!)

Naveen Albert

*Naveen Albert*

CEO, InterLinked Project - [www.interlinked.x10host.com](http://www.interlinked.x10host.com)

Director, Wireless Action - Your Health, Safety, and Privacy are at stake!

Member, Save Landlines & Stop Smart Meters Coalitions - [www.savelandlines.org](http://www.savelandlines.org) ; [www.stopsmartmeters.org](http://www.stopsmartmeters.org)

Cell phones, cordless phones, and Wi-Fi have been linked to cancer and other negative health effects. Learn more, sign petitions, and take the survey at <https://wirelessaction.wordpress.com/>

"Getting rid of your landline is like getting rid of your refrigerator and using a cooler"

"Getting rid of your landline is like disconnecting from the water utility because they sell bottled water at the store"

This message was sent safely and securely over an Ethernet cable.

**Michelle Illiatovitch**

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**From:** Michelle Illiatovitch

**Sent:** Thursday, December 15, 2016 4:12:27 PM

**To:** Genevieve Walker

**Subject:** Pending bill regarding RF emissions

Dear Ms. Walker,

I am a 70 year old woman who's health has been compromised by the increasing amount of RF due to wireless implements. My world has become smaller as it is impossible to do many things I would have done such as going to the library, shopping in stores or having a coffee with a friend at a coffee shop to name a few. Not earth shattering you might say, but my world has diminished nonetheless. I also watched the health of my daughter, who is a young woman, 26 years, deteriorate dramatically when living in a building with cell phone towers on top. I have read scientific reports about fire fighters contracting brain cancer due to the cell phone towers on their firehall. The studies are numerous and even if for some strange reason you do not find it conclusive, it should be enough to at least give pause, be cautious and err on the side of safety.

I urge you to consider the science and support better regulations regarding cell use and first responders.

Sincerely,  
Michelle Illiatovitch

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**Catherine Kleiber**

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**From:** Kleiber

**Sent:** Friday, December 16, 2016 2:26:09 AM

**To:** Genevieve Walker

**Subject:** Re: FirstNet PEIS

Dear Ms. Walker,

Thank you for your patience. Please find my comments and supporting documentation attached. Please let me know if you are unable to obtain copies of other references I mention.

Thank you again,

Catherine Kleiber

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**From:** Kleiber

**Sent:** Saturday, January 28, 2017 4:55 PM

**To:** Genevieve Walker

**Subject:** Re: FirstNet PEIS

Dear Ms. Walker,

I did not become aware of the paper, *When theory and observation collide: Can non-ionizing radiation cause cancer?*, until after I sent my comment on the FirstNet PEIS to you. I am sending it now so that you can include the information in the PEIS. It provides further support for my contention that "FirstNet must inform Congress of the health and environmental hazard posed by the RF radiation emission required for wireless broadband and request Congress to eliminate provision of wireless broadband internet from FirstNet's mission." and also my further points that "FirstNet must inform Congress of the health and environmental hazard posed by the RF radiation emission required for wireless broadband and request Congress to eliminate provision of wireless broadband internet from FirstNet's mission." and "FirstNet should request that the NTP quickly undertake and complete toxicology studies comparing the different communication technologies, including, but not necessarily limited to, 3G, 4G, and 5G LTE technologies so that FirstNet can utilize the least toxic least biologically active technology for its first responder's interoperable communication system."

The guideline authored by the **European Academy for Environmental Medicine (EUROPAEM)**, which I also did not have yet at the time I sent you my comment, provides further support for the above mentioned points. *EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses* (<https://www.degruyter.com/view/j/reveh.ahead-of-print/reveh-2016-0011/reveh-2016-0011.xml?format=INT>) states "Studies, empirical observations, and patient reports clearly indicate interactions between EMF exposure and health problems." They are clear that in treating individuals experiencing health problems related to EMF exposure, including from radiation emitted by wireless technology, that the preferred treatment is to eliminate exposure - "The primary method of treatment should mainly focus on the prevention or reduction of EMF exposure, that is, reducing or eliminating all sources of high EMF exposure at home and at the workplace." The authors reiterate and support the statement by Hedendahl, Carlberg, and Hardell that "It is time to consider ELF EMF and RF EMF as environmental pollutants that need to be controlled". They also make it clear that sources of EMF, including radiation from wireless technology, should be minimized in society so that previously injured individuals can fully participate.

Neither the population nor first responders should be exposed involuntarily to radiation from wireless technology since studies have found it to be carcinogenic and biologically harmful.

Thank you for adding this letter and these studies to the commentary on the First Net PEIS.

Sincerely,  
Catherine Kleiber

## **Public Comment - NIDILRR**

Catherine Kleiber

### **Public Listening Session Comment November 18, 2016**

My name is Catherine Kleiber. I have radiofrequency sickness, an environmentally-induced functional impairment caused by exposure to radiofrequencies, from either wireless technology or “dirty” electricity. I am addressing you today to highlight the need to again make public places and buildings accessible for people with radiofrequency sickness.

I experience many symptoms, including cardiac arrhythmias, cognitive difficulties, memory problems, headaches, and fatigue when I am around radiation from wireless technology. The presence of wireless internet and wireless devices in public places now prevents me from using the public library or the judicial system, participating in public meetings, going to restaurants, going shopping, and using public transportation. All are things that I used to be able to do without experiencing functional impairment prior to the proliferation of wireless devices. Most importantly, I can no longer safely access medical care due to the ubiquitous presence of wireless technology in hospitals and clinics. I am not alone. Over 300 comments from U.S. citizens pleading with the FCC to establish biologically-based safety limits for radiofrequency radiation to replace the existing outdated thermally-based radiofrequency limits were submitted in their docket to re-evaluate the RF limits.

It is extremely important that people with radiofrequency sickness be able to access hospitals, medical facilities, and government buildings. WiFi and other wireless technology poses a significant, potentially life-threatening, access barrier for people with radiofrequency sickness. Access to medical care is generally considered a human right, a right now being denied those with radiofrequency sickness. Access to public facilities by people with radiofrequency sickness is protected under the 2008 ADA Amendments which specifically protects individuals with environmentally-induced functional impairments. Radiofrequency sickness is a functional impairment induced by radiofrequency exposure, which can cause serious, even life-threatening functional impairment.

A replicated double-blind placebo-controlled study documented that cardiac arrhythmias occur in some people in response to exposure to radiation from cordless phones. This is obviously a potentially life-threatening functional impairment. My children experience cardiac arrhythmia in response to radiation from wireless technology, as do I.

My husband, a type 1 diabetic, finds that his blood sugar elevates markedly in response to radiation from wireless technology. If he tries to compensate by taking additional insulin, as he normally would, his blood sugar plunges dangerously low upon leaving the affected area. He recently had a new and very scary reaction. While at a federal office for an essential appointment, he was forced into close proximity to two functional smart phones and a WiFiing computer. He went into the office feeling fine with a normal blood sugar and came out with a very high blood sugar, a very elevated body temperature of 101 degrees Fahrenheit, and feeling awful. It took two days for his blood sugar and body temperature to return to normal and about a week to feel well. RF has been shown to cause calcium ion efflux.

Inappropriate calcium efflux is known to cause a condition called malignant hyperthermia which can be fatal and is usually caused by certain anesthetics. Fortunately for him, the reaction stopped accelerating when he came home to our shielded house and then crawled into our shielded bed. It could easily be a fatal reaction for someone who did not realize what was happening.

The presence of wireless radiation at levels which cause functional impairment is making it harder for us to earn our living. We had to quit bringing our pasture-raised meat products to the local farmers markets two years ago since my husband could no longer be at the market without experiencing serious neurological effects suggestive of early ALS that disappeared when he stopped attending market. I have not been able to function well enough cognitively at the market to vend for several years. Being unable to sell at the market has decreased our ability to earn our living.

Obviously, if we cannot tolerate the RF environment outside in the city, working in an office or store in the city with their multiplicity of WiFi routers and high volumes of individual cellphones would not be possible.

Disability claims related to symptoms or syndromes which have been connected to functional impairment by RF (RF Sickness) are rising. People with multiple sclerosis, fibromyalgia, chronic fatigue syndrome, asthma, and diabetes have improved when their RF exposure from wireless technology and “dirty” electricity is minimized. Eliminating RF from public places will improve accessibility and decrease disability.

It is time that national accessibility standards address the very serious access barrier posed by radiofrequency pollution.

## **Background**

### **Our Experience: Wireless Technology is an Access Barrier**

Radiofrequency radiation, such as the radiation given off by wireless devices and their base stations (antennas) can cause an environmentally-induced functional impairment called Radiofrequency sickness (see Dodge [http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge\\_1969.pdf](http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge_1969.pdf)).

I have radiofrequency sickness which was originally misdiagnosed as chronic fatigue syndrome. However, once I found out I was being exposed to large amounts of radiofrequencies from electrical pollution, including “dirty” power on my wires and plumbing, and reduced that exposure as much as I was able, I began to recover almost immediately.

Here is a brief summary of symptoms I experienced as a result of the functional impairment caused by radiofrequency exposure from electrical pollution: heart palpitations, very pain sensitive, constant nerve pain, sluggish reactions, poor depth perception, muscle weakness, lactic acid buildup with little exertion, unrefreshing sleep, often wakeful in the night, fatigue, night sweats, poor circulation to my extremities, reflux, difficulty concentrating, difficulty thinking, inability to make decisions, low-grade fever and chills, headaches, and a dry sore throat.

After we reduced our exposure as much as possible, I was well at home for years and able to participate in family gatherings, go to the doctors, and generally participate in society because I could always plug



in filters to minimize the electrical pollution. We had children. When my youngest was about three, our utility began installing transmitting electrical meters in the area. Shortly after that we all began experiencing serious functional impairment, even at home, from the radiofrequency pollution the transmitting electrical meters put on the electrical wiring along with the power line communications frequencies.

Utilities providing basic service (electricity, gas, and water) should not be allowed to use transmitting utility meters. There are many examples of utility companies bullying customers with threats of disconnected service to force them to take transmitting utility meters, including my family. There are many examples of people being disabled by the radiation from transmitting utility meters and even forced from the neighborhood by the radiation from neighbors' utility meters, even when they have been able to have an analog meter on their own home (see FCC docket below for some of them). We still had analog meters and yet, the radiation coming off of our end-of-the-line transformer from all the meters and cell towers caused cardiac arrhythmias in our two young children and for my husband and me.

We slept in a tent well away from the building site while we tried to deal with the utility and PSC. Our younger son's heart rate got so slow one night when we were forced by broken tent poles to sleep at home that he lost bladder control, wetting only his underwear because the volume of urine was so small. When I went to him in response to his call, he was agitated and upset, but his heart rate was very slow and the beats were weak and irregular. This continued for a couple of hours. We did not sleep in the house again after that until the utility company removed the secondary power line from their transformer to our house. It was obvious the situation was too dangerous to be allowed to continue. So, we did the only thing we could do and told the utilities to remove our service and we went off-grid since they refused to even properly investigate the situation, never mind do anything.

After going completely off-grid, we had three heavenly weeks. We slept well, felt well, and had lots of energy. Our pets' health improved. Most importantly, our sons' cardiac rhythms had almost completely normalized.

Unfortunately, the toxic exposure we received has left our whole family extremely sensitized to radiofrequency radiation so when, in early January 2012, 4G cellphone service was installed in our area we began to experience impairment quickly. Within a week, our sons' cardiac rhythms were again highly irregular. Our younger son was again waking us in the night crying and feeling unwell with a highly irregular cardiac rhythm. We have shielded in various ways and keep pulling them back from the brink.

The drastic measures we have taken (e.g. going off-grid, shielding) to reduce their exposure have momentarily stabilized them at about early stage 2 radiofrequency sickness. (See Dodge) We are very concerned that any increase in the radiofrequency radiation levels could again push them over the edge toward stage 3 radiofrequency sickness. They should not be involuntarily exposed to a pollutant that has such profound detrimental effects on them.

We are literally trapped on our farm and in our home as outdoor radiofrequency radiation levels have climbed rapidly over the few years. We have had to restrict the amount of time our outdoors-loving sons can be outside. They are now only able to be out a half an hour at a time a few times a week. If they are out more than that with any regularity their cardiac arrhythmias become severe enough that they become symptomatic. We have difficulty going anywhere due to all the radiation from towers and the WiFi and cellphones present indoors are even worse, often causing symptomatic arrhythmias almost immediately.

Because of the serious effects exposure to radiofrequencies has on my health, we have never owned a cellphone, cordless phones, wireless router, baby monitors, or subscribed to wireless internet.

Our children both experience health problems when exposed to radiofrequencies. They feel sick, become hyperactive, less able to think logically and control their behavior. They also sleep poorly in bad radiofrequency environments. The recent increase in radiofrequency radiation exposure from the transmitting electrical meters and wireless technology has given them chronic cardiac arrhythmias which improve when we can reduce their exposure. We have done this several times only to have ambient levels increase and cause the arrhythmia to return.

We are homeschooling them so they will not be exposed to the dangerous radiofrequency environment in our local public school. The school has both WiFi and high electrical pollution levels. We are unable to bring them to the zoo, museums, most parks, indeed almost anywhere, because of the ubiquitous presence of radiation from wireless technology.

Our social isolation by wireless technology is a total violation of our civil rights. Wireless technology needs to be eliminated from public buildings and public places.

### **Elimination of Wireless from Public Buildings and Public Places is a Reasonable Accommodation**

In consideration of wireless technology's exclusionary effect and the very real threat it poses to public health (see [www.bioinitiative.org](http://www.bioinitiative.org) and [http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208\\_E.pdf](http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf)) and the environment ([http://www.moef.nic.in/downloads/public-information/final\\_mobile\\_towers\\_report.pdf](http://www.moef.nic.in/downloads/public-information/final_mobile_towers_report.pdf)), it is reasonable to eliminate radiation from wireless devices from the public arena. Internet access should be provided using publicly available wired connections. In addition, radiofrequency radiation detectors can remind people to turn off wireless devices as they enter public buildings.

My family's on-going nightmare of societal exclusion and serious functional impairment, caused by the presence of biologically active levels of radiofrequencies on the electrical grid and radiofrequency radiation transmitted into the environment through use of wireless technology, is illustrative of why it is essential to establish biologically-based radiofrequency radiation safety limits. The Environmental Protection Agency should be given the authority to do so since the FCC lacks the expertise. In the meantime, eliminating radiation from wireless technology from public places would allow people with radiofrequency sickness to participate in society.

I have maintained the website [www.electricalpollution.com](http://www.electricalpollution.com) since 2002, shortly after I discovered that the radiofrequencies present on building wiring and flowing across the ground from non-linear time varying loads were making me, and others, sick. Research on the health effects of electrical pollution is available on the website on the Research Page. More technical information is available on the Technical Page. Electrical pollution is a very potent form of exposure to radiofrequencies. Exposure to all forms of radiofrequencies, including electrical pollution, must be included in standards regulating exposure of the general public to protect the public health during continuous exposure.

I have read widely on the research into the health effects of exposure to radiofrequencies. There is a growing body of evidence that the increased exposure to radiofrequencies from radiowave and

microwave transmitters and from electrical pollution are behind the public health crisis that has dramatically increased utilization of our medical system for chronic conditions. The article by Halberg and Johansson in *Pathophysiology*<sup>1</sup> supports this contention. The comprehensive review by Dr. Cherry, which documents health effects and explores mechanisms, besides thermal mechanisms, through which microwave and radiowave radiation can impact health, also supports the contention that exposure to microwave and radiowave radiation is a public health threat which is probably contributing to significant public illness. A review of the Soviet literature on radiofrequency sickness by Christopher Dodge<sup>3</sup> of the Naval Observatory discusses radiofrequency sickness in detail. The symptoms attributed to chronic exposure to radiofrequency radiation mirror the deterioration of health being seen in the U.S. in recent years, probably due to the dramatic increase in exposure to radiofrequencies from electrical pollution and wireless technology. Papers by Dr. Milham<sup>4</sup>, Dr. Havas<sup>5,6,7</sup> and Dr. Wertheimer<sup>8</sup> also show that exposure to electrical pollution constitutes a public health threat, as does a report by Char Sbraggia regarding health improvements experienced by teachers and students when the electrical pollution in their school was cleaned up (<http://www.electricalpollution.com/images/MelMinNurse.jpeg>). These are just a few of the papers I have read. However, **they provide a picture which should illustrate how reasonable it is to institute the accommodations necessary to enable people with radiofrequency sickness to participate in community life, utilize public services, and enter public buildings.**

1. Ö. Hallberg, O. Johansson, Apparent decreases in Swedish public health indicators after 1997 — Are they due to improved diagnostics or to environmental factors? *Pathophysiology* (2009)
2. Cherry, N. 2000 Criticism of the Health Assessment in the ICNIRP Guidelines for Radiofrequency and Microwave Radiation (100 kHz- 300 GHz)
3. Dodge C. Clinical and Hygienic Aspects of Exposure to Electromagnetic Fields. Biological Effects and Health Implications of Microwave Radiation, Symposium Proceedings, Richmond, Virginia, September 17-19, 1969.
4. Milham S, Morgan L. 2008 A New Electromagnetic Exposure Metric: High Frequency Voltage Transients Associated With Increased Cancer Incidence in Teachers in a California School. *American Journal of Industrial Medicine*.
5. Havas M, Olstad A. 2008. Power quality affects teacher wellbeing and student behavior in three Minnesota Schools, *Science of the Total Environment*, July.
6. Havas M. 2006. Electromagnetic hypersensitivity: biological effects of dirty electricity with emphasis on diabetes and multiple sclerosis. *Electromagnetic Biology Medicine* 25(4):259-68.
7. Havas M. 2008. Dirty Electricity Elevates Blood Sugar Among Electrically Sensitive Diabetics and May Explain Brittle Diabetes. *Electromagnetic Biology and Medicine*, 27:135-146.
8. Wertheimer N, Savitz DA, Leeper E. 1995 Childhood Cancer in Relation to Indicators of Magnetic Fields from Ground Current Sources *Bioelectromagnetics* 16: 86-96.

Accommodations for people with radiofrequency sickness are really common sense and societally beneficial because radiofrequency radiation poses a serious threat to the public health.

*“Public safety standards are 1,000 – 10,000 or more times higher than levels now commonly reported in mobile phone base station studies to cause bioeffects.”* (<http://www.bioinitiative.org/conclusions/>)

## **Accommodations necessary for people with radiofrequency sickness**

### **Provision of Basic Services:**

#### **Utilities - water, gas, electric**

People with radiofrequency sickness are being forced to choose between forced to experience serious environmentally-induced functional impairment in order to access utility services. NIDILRR needs to

put the PSC/PUCs on notice that it is their job to force utility companies to comply with the 2008 ADA Amendments which require accommodation of people with environmentally-induced functional impairment. At this time, many utilities and PSC/PUCs are flatly refusing to provide any accommodation, never mind the important accommodation of metering utility service with an analog mechanical meter which used to be standard operating procedure until recently. Many utilities are pretending these meters are no longer available. They are.

### **Telephone**

Telephone companies must be required to provide RF interference-free copperwire telephone service to people with RF sickness. Most people with RF sickness cannot use cellphones. Cable phones and fiber optic phones can come with electronics that emit biologically significant RFI (RF interference - which can be Incidental or Unintentional, but is still biologically active) and are intolerable to some people with RF sickness. Phone companies need to provide RF filters and DSL filters to people with RF sickness without a hassle. Experience has shown that RF cross-contamination between lines (DSL to non-DSL lines) and between lines and electrical grid RF can be biologically significant so all lines should be equipped with filters. (From a public health perspective, it would be best if these were provided to all customers as a matter of course. All people experience biological effects from RF exposure, but many are either still compensating well enough they are not symptomatic or they simply do not make the connection between exposure and symptoms.)

### **Transportation**

Most people with RF sickness are unable to use public transportation due to the presence of wireless radiation. Therefore, it is of paramount importance that people with RF sickness have access to stripped-down low RF automobiles. These would be the safest automobiles for everyone, but they are essential for those with RF sickness to retain independent mobility. For more details, please read my attached comment related to cars which was submitted into the TECHNOLOGICAL ADVISORY COUNCIL (TAC) NOISE FLOOR TECHNICAL INQUIRY (ET Docket No. 16-191).

### **Regulatory**

The FCC Noise Rules urgently need to be updated to prevent new electrical devices, lighting, etc. from being sold and used in the public arena that block access by people with radiofrequency sickness. The existing FCC Noise Rules are solely designed to prevent technological interference. They need to be revised to prevent new electrical devices from being access barriers or from causing a public health threat. For more details, please read my attached comment about the need to update the noise limits which was submitted into the TECHNOLOGICAL ADVISORY COUNCIL (TAC) NOISE FLOOR TECHNICAL INQUIRY (ET Docket No. 16-191).

Below is a list of accommodations necessary to allow people with radiofrequency sickness to once again participate fully in public and community life. It is divided into two categories - one for transmitted radiofrequency radiation and one for radiofrequency exposure from “dirty” electricity.

### **Transmitted radiofrequency radiation accommodations:**

- Adopt Salzburg, Austria radiofrequency radiation safety limits until biologically-based population-protective RF safety limits can be established (1microW/m<sup>2</sup> inside and 10microW/m<sup>2</sup> outside - lowered as necessary to prevent biological effects because our experience shows that levels should be below 3microW/m<sup>2</sup>).
- Eliminate wireless internet service from public places (including transportation).
- Transmitters on wireless devices turned off in public places - detectors should be installed at entrances to remind people.
- Hospitals only use wired internet, wired in-building networks, and wired devices within the hospital. This would also protect privacy and security.

- Cell and broadband antennas situated at a distance from hospitals and residential areas such that Salzburg radiation limits of 1microW/m<sup>2</sup> not exceeded inside the hospital or homes.
- Medical clinics use only wired in-office network and internet service and devices.

#### **“Dirty” electricity radiofrequency accommodations:**

- Kazakhstan “dirty” power standard adopted globally - maximum of 50 G/S units on Stetzerizer meter on building wiring. ([www.stetzerelectric.com](http://www.stetzerelectric.com))
- Daylighting should be encouraged. All new lighting installations must be low radiofrequency lighting e.g. properly engineered lighting with very low or no emission of Incidental or Unintentional RF. LED lights can be engineered to this standard, but many are not at this time and therefore emit high amounts of RF. (Additional benefits - LEDs are more energy efficient than fluorescent lighting and do not emit UV thereby allowing greater access for people with lupus.)
- Use of tiered lighting instead of dimmer switches (also saves energy).

See the Solutions page at [www.electricalpollution.com](http://www.electricalpollution.com) for a more comprehensive list of steps to minimize RF exposure.

### **Supplementary Information**

Please visit ([http://apps.fcc.gov/ecfs/comment\\_search/input?z=iw0f](http://apps.fcc.gov/ecfs/comment_search/input?z=iw0f) and search proceedings 03-137 and 12-357) to see the **over 300 comments from U.S. citizens pleading with the FCC to establish biologically-based safety limits for radiofrequency radiation** to replace the existing outdated thermally-based radiofrequency limits.

**The 1500-page BioInitiative Report on RF/MW health effects was published in 2012.** The authors are 29 scientists from ten countries. They reviewed thousands of studies showing interference with chemical processes in the body, implicating RF/MW in a whole spectrum of alarming effects including genetic damage, cancer, immune dysfunction, neurological injury, and infertility. The report can be found at [www.bioinitiative.org](http://www.bioinitiative.org). For people with radiofrequency sickness, these effects can be immediate and serious.

**Cardiac arrhythmias can be caused by wireless technology.** Recent replicated double blind studies show that a cordless phone base station operating at WiFi frequencies can cause cardiac arrhythmias in susceptible individuals. This short video discusses the cardiac effect that wireless can have- <http://www.youtube.com/watch?v=EI9fZX4iww>. View this video <http://www.youtube.com/watch?v=sv1E9IXUd6M> to see further discussion. You can read the studies at <http://www.magdahavas.com/wordpress/wp-content/uploads/2012/01/Havas-HRV-Ramazzini.pdf> and <http://www.ncbi.nlm.nih.gov/pubmed/23675629#>. Obviously, for susceptible people (like those of us with radiofrequency sickness), WiFi can make whole buildings inaccessible and unsafe. A recent study in rabbits found that not only did WiFi change heart function parameters, but it dramatically changed the cardiac effects of both dopamine and epinephrine: Saili L, et al. *Effects of acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit*. Environmental Toxicology and Pharmacology 40 (2015) 600–605. This should be of great concern since WiFi has become ubiquitous in medical settings and may compromise the effectiveness of essential medical interventions, especially for people with radiofrequency sickness. **Medical care is considered to be a basic human right, but people with radiofrequency sickness can no longer access it without potentially endangering their lives or at least experiencing severe functional impairment.**

**Causal connections between radiofrequency exposure and biological functional impairment.** More recent papers look specifically at causality such as Pall ML *Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression*. J Chem Neuroanat. 2015 Aug 20. (<http://www.sciencedirect.com/science/article/pii/S0891061815000599>). It discusses the causal relationship between exposure to radiation from wireless technology and neuropsychiatric effects. Mechanisms of action are also discussed. Yakymenko et al discuss the fact that RF radiation is documented in numerous studies to cause oxidative damage and discusses mechanisms for bioeffects (*Low intensity radiofrequency radiation: a new oxidant for living cells* in Oxid Antioxid Med Sci 2014; 3(1):1-3) (<http://www.sciencedirect.com/science/article/pii/S1382668915300594>).

**This case report documents the serious neurological functional impairment that exposure to radiation from wireless technology can cause.** Johansson O and Redmayne M *Exacerbation of demyelinating syndrome after exposure to wireless modem with public hotspot* Electromagnetic Biology and Medicine (<http://dx.doi.org/10.3109/15368378.2015.1107839>).

**The International Commission on Non-Ionizing Radiation Protection (ICNIRP) sets radiofrequency (RF) exposure limits for Europe that are similar to what the IEEE sets for the U.S. According to ICNIRP, FCC guidelines would not be protective for individuals with sensitivities/ impairments from low exposures of RF/MW.** It is a scientific fact that even small amounts of these environmental exposures are harmful to some. ICNIRP stated the following: “*Different groups in a population may have differences in their ability to tolerate a particular NIR (non-ionizing radiation) exposure. For example, children, the elderly, and some chronically ill people might have a lower tolerance for one or more forms of NIR exposure than the rest of the population. Under such circumstances, it may be useful or necessary to develop separate guideline levels for different groups within the general population, but it may be more effective to adjust the guidelines for the general population to include such groups. Some guidelines may still not provide adequate protection for certain sensitive individuals nor for normal individuals exposed concomitantly to other agents, which may exacerbate the effect of the NIR exposure, an example being individuals with photosensitivity.*” from ICNIRP STATEMENT, GENERAL APPROACH TO PROTECTION AGAINST NON-IONIZING RADIATION PROTECTION, (HEALTH PHYSICS 82(4):540-548; 2002) (<https://www.icnirp.org/documents/philosophy.pdf>)

In light of this statement and all the other evidence, it is time that accessibility guidelines for hospitals, medical facilities, and other essential government buildings prohibit the presence of facility provided WiFi and other wireless transmissions within the facility. Medical records, electronic data, and the internet can be accessed perfectly well (and far more securely) using dedicated communication cables. Our doctors office has used electronic records for years which they accessed using direct cabled connections which they plugged their laptop into upon entering the office.

**The Threat to Public Health Posed by Wireless Technology Makes Elimination of Wireless from Public Buildings, Hospitals, Medical Facilities, Schools, and Public Places a Very Reasonable Accommodation**

The following links are of interest in spite of the fact that they relate to public health since they help with understanding that the accommodations needed for people with radiofrequency sickness are actually beneficial for public health. Wireless technology not only restricts accessibility for people with radiofrequency sickness, it jeopardizes public health.



**U.S. National Toxicology Program (NTP)** recently released findings that the radiation utilized by wireless technology is carcinogenic and breaks DNA. A replicated European study found that wireless radiation is also a cancer growth promoter. This excellent article by the Environmental Health Trust (<http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/>) provides a good overview of the carcinogenicity findings.

**International Scientists Appeal to U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology** (<http://www.EMFscientist.org>) "Today 190 scientists from 39 nations submitted an appeal to the United Nations, UN member states and the World Health Organization (WHO) requesting they adopt more protective exposure guidelines for electromagnetic fields (EMF) and wireless technology in the face of increasing evidence of risk. These exposures are a rapidly growing form of environmental pollution worldwide."

**Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates by Norm Alster.** ([http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency\\_alster.pdf](http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf)) A damning report reinforcing the contention of the International Scientist Appeal to the U.N. that regulatory agencies and standard-setting boards are not listening to researchers - read why this is happening in the U.S.

**FCC Not Enforcing Existing Inadequate Radiofrequency Limits** A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (<http://www.marketwire.com/press-release/-1770139.htm>). A Wall Street Journal investigation (<http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055>) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.

**The International Agency for Research on Cancer (IARC)**, a committee of the World Health Organization, has classified RF radiation, including that emitted by wireless technology, as a class 2B carcinogen. [http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208\\_E.pdf](http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf).

**"Electromagnetic Radiation, Health and Children 2014"** by Dr. Erica Mallery-Blythe (<https://www.youtube.com/watch?v=sNFdZVeXw7M>) is a must-watch presentation about the hazard that RF radiation emitted by wireless technology poses to children. Dr. Mallery-Blythe does an excellent job of presenting the information in an interesting, coherent, and accessible way, but with enough detail to justify immediate action to minimize children's exposure to radiation from wireless technology.

Department of Interior: **"the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today."** ([http://www.ntia.doc.gov/files/ntia/us\\_doi\\_comments.pdf](http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf))

#### **RF radiation disrupts the endocrine system:**

- Klaus Buchner and Horst Eger. Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields A Long-term Study under Real-life Conditions. Original study in German: BUCHNER K, EGER H (2011) Umwelt-Medizin-Gesellschaft 24(1): 44-57. [http://www.radiationresearch.org/images/RRT\\_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf](http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf)

- Eskander EF, Estefan SF, Abd-Rabou AA. How does long term exposure to base stations and mobile phones affect human hormone profiles? Clinical Biochemistry 45 (2012) 157–161

**RF radiation alters heart electrical activities and causes ventricular enlargement in rats.**

Additionally, “The histopathological examination revealed hypertrophy, fragmentation and vacuolation of the myocardium, which were directly proportional to the exposure time.” Fatma A. Mohamed, Azza A. Ahmed, Bataa M.A. El- Kafoury, & Noha N. Lasheen. **Study Of The Cardiovascular Effects Of Exposure To Electromagnetic Field**. Life Science Journal. 2011;8(1):260-274. These findings have enormous implications for cardiac health in a chronically RF exposed population.



Catherine Kleiber

December 15, 2016

Dear Ms. Walker,

Thank you for your attention to my comments. My main interest in critiquing the FirstNet PEIS documents is making sure that the environmental and health effects of the radiofrequency (RF) radiation that the wireless component of FirstNet will emit are appropriately factored into decisions about how to implement FirstNet. I address the serious deficiencies below. (Page numbers listed originate from Volume 1 Chapter 2 Draft Programmatic Environmental Impact Statement for the Central United States, but the critique should be broadly applicable to the RF radiation section for all four regions.)

There were seriously inaccurate statements made about the safety level assured by existing FCC RF radiation limits:

- p. 2-10 “For 20 years, the regulatory levels for human exposure to RF emissions have been established by the FCC as a means of protecting both workers and the general public from any potential effects.”
- p. 2-12 “These limits are based on thermal effects (i.e., the amount of RF energy required to heat tissue). According to the FCC, the established limits are well below levels that are considered to have adverse health effects.”

Other government officials dispute claims such as these that FCC RF radiation limits provide sufficient population-based protection from harm during continuous exposures. The Department of Interior (DOI) said “**the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today**” ([http://www.ntia.doc.gov/files/ntia/us\\_doi\\_comments.pdf](http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf)), clearly indicating that they do not consider FCC RF radiation limits to be “protecting both workers and the general public from any potential effects” as the PEIS states.

Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, makes it clear in his correspondence with the EMR Policy Institute that “The FCC's current exposure guidelines, as well as those of the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-ionizing Radiation Protection, **are thermally based, and do not apply to chronic, nonthermal exposure situations**. They are believed to protect against injury that may be caused by acute exposures that result in tissue heating or electric shock and burn. The hazard level (for frequencies generally at or greater than 3 MHz) is based on a specific absorption dose-rate, SAR, associated with an effect that results from an increase in body temperature. The FCC's exposure guideline **is considered protective of effects arising from a thermal mechanism but not from all possible mechanisms**. Therefore, the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified.” (emphasis added) ([http://www.emrpolicy.org/litigation/case\\_law/docs/noi\\_epa\\_response.pdf](http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf)) This very credible evidence is unmentioned and ignored.

As Mr. Hankin makes plain above, the FCC RF radiation limits are not protective from all adverse effects only those from thermal mechanisms during acute exposures, so the second sentence of the quote

from the PEIS (p 2-12), and copied above, is an implicit lie. Whether this is intentional or inadvertent, it should be corrected. FCC RF radiation limits are based on thermal effects in a large male. They are not population-protective. They do not and were never intended to protect from biological effects or even thermal effects during the chronic exposures we all experience today and which FirstNet would increase.

Even ICNIRP acknowledges the need to adjust their RF radiation guidelines (referred to here as NIR): *“Different groups in a population may have differences in their ability to tolerate a particular NIR (non-ionizing radiation) exposure. For example, children, the elderly, and some chronically ill people might have a lower tolerance for one or more forms of NIR exposure than the rest of the population. Under such circumstances, it may be useful or necessary to develop separate guideline levels for different groups within the general population, but it may be more effective to adjust the guidelines for the general population to include such groups. Some guidelines may still not provide adequate protection for certain sensitive individuals nor for normal individuals exposed concomitantly to other agents, which may exacerbate the effect of the NIR exposure, an example being individuals with photosensitivity.”* from ICNIRP STATEMENT, GENERAL APPROACH TO PROTECTION AGAINST NON-IONIZING RADIATION PROTECTION, (HEALTH PHYSICS 82(4):540-548; 2002) <https://www.icnirp.org/documents/philosophy.pdf>

After the release of the U.S. National Toxicology Program (NTP) findings showing that non-thermal RF radiation exposures cause DNA breakage and cancer, the Institute for Electrical and Electronics Engineers (IEEE) posted an article with comments from Kenneth Foster of the IEEE committee that reviews RF radiation exposure limits:

*With the NTP study results, Foster expects more governments to put out [cautionary guidelines](#) and radiation labeling for cellphones. He says he wouldn't be surprised if [California](#) adds RF radiation to its [Proposition 65](#) list of carcinogenic chemicals, and if the IARC ups its [classification rating](#) from 2B: possibly carcinogenic to humans to 2A: probably carcinogenic to humans. “And they wouldn't be out of line in doing that,” he says. “This is going to change the rhetoric in the field. People can point to much more hard evidence that [cellphone RF exposure] really is a problem.”* (<http://spectrum.ieee.org/the-human-os/biomedical/ethics/cellphone-radiation-causes-cancer-in-rats>)

The omission of the U.S. NTP findings from the PEIS RF radiation section is a very serious one and should be remedied. FirstNet cannot argue the U.S. National Toxicology Program is not a sufficiently reputable.

P. 2-18 “However, the BWG [BioInitiative Working Group] itself has been criticized by other scientific, professional, and governmental bodies for ignoring conflicting, inconsistent, or other credible evidence that clashed with its report (e.g., (Dolan, M. and J. Rowley, 2009)).” The BioInitiative Working Group, a group of researchers and public health experts, are criticized in this quote with attribution to a paper written by representatives of telecom industry interest groups. This is analogous to dismissing the body of research on the health effects of tobacco, asbestos, or lead paint due to a critique by industry representatives. This was done for years and we have now seen what a mistake it was to allow it. Hundreds of thousands of people lost their lives due to the regulatory delays that resulted from allowing industry to dismiss research critical of it. This article is not different. If its opinions warrant inclusion in the PEIS at all, they should be clearly attributed as representing the telecom industry. This was definitely not done.

On p. 2-12, studies are cited as finding that even with roof-top antennas, measurements inside those buildings are low compared to FCC limits, scant comfort since we already established that the government knows that the FCC limits are “...**now nearly 30 years out of date and inapplicable today.**”

Discussion about findings of widespread violations of FCC limits are omitted from the discussion, but are highly relevant and should be included. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF radiation limits and rampant violations (<http://www.marketwire.com/press-release/-1770139.htm>). A Wall Street Journal investigation (<http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055>) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.

The fact that the FCC is incredibly lax, even negligent, in taking regulatory action even when violations are reported, never mind going out and conducting unannounced spot inspections, should be of great concern and should be a factor considered in the PEIS.

Additionally, these studies are old and date to a time when few people used wireless in many areas and there were many fewer antennas. One major failing of the FCC limits that merits discussion in the PEIS is the fact that they govern each antenna separately. Collocations result in much higher RF radiation levels around the site because each antenna still broadcasts at the same level as if there were no collocation. Transmission from other antenna sites and mobile devices further increase ambient exposure levels. This must be discussed in the PEIS as an environmental impact since the purpose of the broadband provision portion of FirstNet’s mission mentioned on p. 2-8 is to encourage the use of wireless technology which will in turn increase the ambient RF radiation levels from both devices and base station antennas. In the example on p. 2-14, each antenna produces a field of  $477\mu\text{W}/\text{m}^2$  at ground level, but collocation of 4 such arrays (which is not uncommon) would result in  $1,908\mu\text{W}/\text{m}^2$  at ground level. This is still below the FCC RF radiation limits, but which we established above are outdated and meaningless according to the DOI and not protective in chronic exposure situations according to the EPA. Even  $477\mu\text{W}/\text{m}^2$  exceeds levels shown in studies to cause biological effects, specifically negative effects related to sleep, stress, immune function, brain cancer, breakage of the blood-brain barrier, other cancers, reproduction, and oxidative damage. A ground level of  $1,908\mu\text{W}/\text{m}^2$  exceeds levels shown in studies to cause heart effects and calcium metabolic effects (<http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf>). Thus, surrounding areas will certainly be exposed to high enough RF radiation levels on the ground to cause serious biological effects. RF radiation levels in portions of neighboring buildings elevated above ground level are likely to be even higher.

On p. 2-11, there is a list of “Some of the major problems with demonstrating cause and effect for RF” which seem to be cited as excusing FirstNet from an obligation to take action to protect the public and the environment. Each point is addressed below.

*“No consistent measures of exposure. Exposure is changing with the proliferation of cell phone use, and there is no real unexposed or “control” population (Ahlbom et al., 2004) (Khurana et al., 2010)”*

While the absence of a control population cannot be used to justify inaction, it does support the high level of urgency to making sure that public health policy and regulations related to RF radiation exposure are sufficiently protective since **everyone is exposed**. Exact continuity of exposure

measurement is not necessary between studies as long as care has been used within each study to be consistent. Studies show that RF radiation has very serious biological effects at levels far below existing FCC RF radiation limits. Below are some examples of serious clinically important biological effects resulting from real-life RF radiation exposures:

**Cardiac arrhythmias can be caused by wireless technology.** Recent replicated double blind studies show that a cordless phone base station operating at WiFi frequencies can cause cardiac arrhythmias in susceptible individuals. This short video discusses the cardiac effect that wireless can have- <http://www.youtube.com/watch?v=EI9fZX4iww>. View this video <http://www.youtube.com/watch?v=sv1E9IXUd6M> to see further discussion. You can read the studies at <http://www.magdahavas.com/wordpress/wp-content/uploads/2012/01/Havas-HRV-Ramazzini.pdf> and <http://www.ncbi.nlm.nih.gov/pubmed/23675629#>. Obviously, for susceptible people (like those of us with radiofrequency sickness), WiFi can make whole buildings inaccessible and unsafe. A recent study in rabbits found that not only did WiFi change heart function parameters, but it dramatically changed the cardiac effects of both dopamine and epinephrine: Saili L, et al. *Effects of acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit*. Environmental Toxicology and Pharmacology 40 (2015) 600–605. A mouse cardiac study showed that mice exposed to RF radiation from a cellphone had significantly lower vitamin D levels, low calcium, low antioxidant capacity, low cardiac tissue MDA and elevated renin levels compared to controls. They also had enlarged left ventricles and ECG abnormalities (Fatma 2011). Both these cardiac effects are pre-disposing factors toward cardiac arrest. Obviously, these serious cardiac effects caused by RF radiation exposures from consumer devices ought to be discussed in the PEIS, since FirstNet will be promoting their use and emitting radiation levels from its antennas comparable to these exposures.

**Cancer levels around antennas are elevated** and FirstNet will either be elevating already heightened risks by adding collocation antennas, increasing emissions of existing antennas by increasing use, or putting up new towers and increasing cancer risk in those around them. This should be discussed in the PEIS. “*The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer*” ([http://emrstop.org/index.php?option=com\\_docman&task=doc\\_details&gid=4&Itemid=18](http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18)) found significant increases in cancer risk at RF radiation levels below FCC RF radiation limits. Other studies have as well. These merit serious consideration in the FirstNet PEIS and should not be omitted. Anything that will increase cancer risk for a large segment of the population should be considered very carefully. A review by Dr. Cherry (2000). Criticism of the Health Assessment in the ICNIRP Guidelines for Radiofrequency and Microwave Radiation (100 kHz- 300 GHz) [www.electricalpollution.com/documents/Cherry2000EMR\\_ICNIRP\\_critique\\_09-02.pdf](http://www.electricalpollution.com/documents/Cherry2000EMR_ICNIRP_critique_09-02.pdf) discusses common errors in understanding about RF radiation exposures and studies and is, as its title states a criticism of ICNIRP.

**Radiofrequency radiation exposure causes important endocrine changes.** “*Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions*” ([http://www.radiationresearch.org/images/RRT\\_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf](http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf)) is an important study documenting hormonal changes in residents before installation of a cellphone antenna and for a year and a half afterward. They found initial hormone level increases consistent with a stress response to RF radiation exposure levels as low as 60μW/m<sup>2</sup>. Initially adrenaline and noradrenaline increased and dopamine and phenylethylamine (PEA) levels decreased. While adrenaline and noradrenaline did decrease, dopamine and PEA levels never returned to pre-base station levels, remaining substantially lower during the year and a half of the study. According to the authors “This is of considerable clinical relevance because psychiatric symptoms also exhibit altered PEA levels. In

Rimbach, the increase in sleep problems, cephalgia, vertigo, concentration problems, and allergies could be clinically documented after the cell phone base station had been activated. The newly developed symptoms can be explained clinically with the help of disturbances in the humoral stress axis.” These long-term debilitating effects of cell towers must be mentioned in the PEIS and weighed in the decision making about how to move forward with FirstNet.

*“How does long term exposure to base stations and mobile phones affect human hormone profiles?”* Eskander et al. (<http://www.sciencedirect.com/science/article/pii/S0009912011027330>) is a very important study which documented hormonal changes occurring over time with chronic exposures to base station antennas or cell phones. It is extremely important that ACTH, cortisol, and T4 were significantly reduced in exposed individuals compared to controls. So were testosterone, progesterone, and prolactin. These effects became more pronounced over time. Endocrine disruption is extremely important clinically and should be considered as an extremely negative effect of the planned wireless portion of FirstNet. It should not be omitted from the FirstNet PEIS.

*“No scientifically agreed upon biological mechanism for harm. The lack of a clear biological mechanism increases uncertainty into whether the health end point that the study examined is the correct endpoint to try and measure (Hauri et al., 2014) (Ahlbom et al., 2004)”*

Agreed upon by whom? The telecom industry? There are two mechanisms by which RF radiation produces biological effects that are currently well-supported by research literature.

**One is oxidation caused by RF radiation exposure** (<http://www.ncbi.nlm.nih.gov/pubmed/26151230>). Oxidation can occur even with non-ionizing radiation exposure. At least 93 studies have now found that RF radiation has oxidative effects. Oxidation has important biological effects. Yakymenko states “In addition, ROS at relatively low concentrations can modulate inflammation via activation of NF-kB pathway (Hayden and Ghosh, 2011). Therefore, even subtle exposures to RFR with generation of hardly detectable quantities of free radicals can have their meaningful biological consequences.” This is because “free radicals/ROS are an intrinsic part of the cellular signaling cascades.” Increasing population-wide exposure to an unavoidable oxidant will have profound effects on public health and the environment and should be discussed and weighed appropriately in the FirstNet PEIS.

**The second is the ability of non-thermal levels of RF radiation to cause voltage-gated  $\text{Ca}^{2+}$  ion channels to open inappropriately.** This can have profound and detrimental biological effects because  $\text{Ca}^{2+}$  is utilized in many cellular and intercellular systems as a messenger, meaning that when the voltage-gated  $\text{Ca}^{2+}$  ion channel opens inappropriately it sets off a cascade that affects metabolic activities within the cell or body.

Not only is  $\text{Ca}^{2+}$  efflux well-documented in the literature, but a reasonable mechanistic explanation for how very low RF radiation levels can cause voltage-gated  $\text{Ca}^{2+}$  channels to open is elucidated by Dr. Martin Pall in *Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor*, *Current Chemical Biology*, 2016, Vol. 10, No. 1., as follows:

*“The voltage sensor opens the ion channel due to the action of changes in the electrical force across the plasma membrane acting directly on these 20 voltage sensor charges [8]. The structure of the VGCC voltage sensor is discussed in more detail in the Discussion section below. It is plausible, therefore, that*



*the electrical forces of these low intensity EMFs act through their electrical effects on the voltage sensor to activate the VGCCs. It is predicted that the forces on the 20 charges in the VGCC voltage sensor are highly amplified because of two important factors [2]. The law of physics called Coulomb's law predicts that forces on charged groups are inversely proportional to the dielectric constant of the medium in which the charges occur. Because the dielectric constant of the aqueous phases in the cell or extra-cellular medium are about 120 times higher than the dielectric constant of the lipid bilayer [2], this predicts that forces on the each of the 20 charges of the voltage sensor are about 120 times higher than are electrical forces on singly charged groups in the aqueous phases. In addition, Sheppard et al. [10], predicted that the electrical forces produced by EMFs across the plasma membrane are amplified about 3000-fold compared with the forces in the aqueous phases because of the high electrical resistance of the plasma membrane. It follows from this, that the forces on the voltage sensor are estimated to be vastly increased as compared with forces on aqueous phase single charges, where most if not all charged groups occur:*

*20(# of charges in voltage sensor) X 120 (from the dielectric constant) X 3000 (amplification at the plasma membrane) = 7.2 million*

*Because of this, the electrical forces placed on the voltage sensor by these EMFs is calculated to be approximately 7.2 million times higher than are the forces placed on singly charged groups located elsewhere in the cell because these singly charged groups are predominantly in the aqueous phase [2]. It is highly plausible, therefore, that this extraordinary sensitivity of the voltage sensor to such weak electrical effects is the final answer to this long puzzle of how such low intensity EMFs can produce biological effects in many animals, including humans.”*

This important mechanism explains many of the biological effects RF radiation can have at levels far below the outdated FCC RF radiation limits and far below the levels that FirstNet would emit. Obviously this should be discussed in the PEIS and provides reasons for modifying the execution of FirstNet.

*“Some potential effects of major concern are rare, such as brain cancer and acoustic neuroma, both of which have been potentially linked to RF exposure. If the health outcome is rare, it is even harder to demonstrate cause and effect (Ahlbom et al., 2004).”*

Even rare effects are significant when the whole population is being exposed to the causal agent. The early study cited here likely contain gross underestimates of the effect of RF radiation exposure on brain cancers and acoustic neuroma due to the long latencies normally involved in brain cancers (30-40 years). That studies are already finding effects should highlight the truly dangerous nature of RF radiation as a carcinogen. The U.S. NTP study should be discussed here. It found that non-thermal levels of RF radiation break DNA (considered the hallmark of a carcinogen) and increases the risk of glioma of the brain and heart (<http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/>). Furthermore, rates of Glioblastoma Multiforme, a type of glioma, is increasing 1.3%-2.3% per year over a 15-year period, which was statistically significant (<http://microwavenews.com/news-center/ntp-and-brain-tumor-rates>). Thus, controlled lab studies and epidemiological findings are in agreement. A replicated European study found that RF radiation promotes cancer growth, supporting the carcinogenicity of RF radiation (Lerchl, et. al., 2015 <http://www.ncbi.nlm.nih.gov/pubmed/25749340>). Exposures were non-thermal and well-below existing FCC RF radiation limits. These findings, especially taken together, should carry a lot of weight and strongly suggest the need for precaution,

especially with the studies above showing that cellular base station antennas cause increases in cancer. They must be included in the Firstnet PEIS.

Research findings are sufficiently strong now related to carcinogenicity that former IARC panelists like Dr. Dariusz Leszczynski warn that RF-EMF should be classified as a Group 2A carcinogen, and Dr. Lennart Hardell reports that several studies indicate a Group 1 classification is justified, placing RF-EMF in the same category as tobacco, asbestos, and benzene.

Dr. Dariusz Leszczynski MSc, DSc, PhD <https://betweenrockandhardplace.wordpress.com/2014/08/14/carcinogenicity-of-cell-phone-radiation-2b-or-not-2b/>

*“In conclusion, I consider that currently the scientific evidence is sufficient to classify cell phone radiation as a probable human carcinogen – 2A category in IARC scale. Time will show whether ‘the probable’ will change into ‘the certain’. However, it will take tens of years before the issue is really resolved. In the mean time we should implement the Precautionary Principle. There is a serious reason for doing so.”*

Dr. Lennart Hardell MD, PhD <http://www.ncbi.nlm.nih.gov/pubmed/24192496>

*“Based on the Hill criteria, glioma and acoustic neuroma should be considered to be caused by RF-EMF emissions from wireless phones and regarded as carcinogenic to humans, classifying it as group 1 according to the IARC classification. Current guidelines for exposure need to be urgently revised.”*

These opinions are important because these researchers were among the IARC panelists that decided in 2013 only to classify RF radiation as a class 2B carcinogen and now they consider the evidence significant enough to warrant changing the classification to “probably carcinogenic” or even carcinogenic. The U.S. NTP study results have been released since these statements were made, probably further weighting them in the direction of carcinogenicity. These factors should definitely be discussed in the PEIS. They should also have real influence over whether the scope of the FirstNet project should be adjusted.

On pages 2-19 to 2-20 serious effects of RF radiation and RF infrastructure are discussed and dismissed in a bizarre manner. Nine studies showing harm to bird populations via a variety of mechanisms are discussed, including reproductive failure. Then two laboratory studies showing reproductive failure in chickens are discussed *“Laboratory studies conducted with domestic chicken embryos have shown that emissions at the same frequency and intensity as that used in cellular telephones have appeared to result in death (DiCarlo et al., 2002) (Manville II, A., 2007).”* Then the idea that these studies show that low level RF radiation emissions support the findings in the environmental studies is ridiculed because *“given the controlled nature of the studies and potential exposure differences in the wild, this causation is left to interpretation and extrapolation.”* This is a case where bird epidemiological findings and bird lab studies are in agreement. Thus, the evidence show that towers affect birds negatively, at least reproductively. This should be given great weight. FirstNet should be adjusting its plans accordingly.

### **RF radiation kills and damages trees**

Very little attention is paid to tree studies. This is an egregious oversight. We rely on trees for the very health of our planet. Trees are being killed and damaged across the U.S. and world-wide by RF radiation even without full-scale implementation of either FirstNet or 5G . RF radiation is being implicated as the cause. Several studies show the very serious effects that RF radiation has on the health of trees. Trees are essential to the welfare of the global environment and the continuation of the human race. They

convert carbon dioxide into oxygen for us and purify our air. These are essential services. They also cool and provide shade in our cities and countryside. Additionally, they provide important wildlife habitat. Decimation of the Amazon rainforest by direct human actions has been oft-cited as endangering the global environment. FirstNet should not be moving forward with plans to increase RF radiation exposure in urban or rural areas since it will hasten the RF radiation-induced death of our urban and rural forests. We cannot afford additional forest die-off. Large mature trees are being seriously damaged and killed, this damage will take 50 years or more to repair. The references listed below clearly show that RF radiation has detrimental effects on tree health at levels far below the outdated FCC RF radiation limits.

- Radiofrequency radiation injures trees around mobile phone base stations [https://www.researchgate.net/publication/306435017\\_Radiofrequency\\_radiation\\_injures\\_trees\\_around\\_mobile\\_phone\\_base\\_stations](https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations)
- Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations <https://www.hindawi.com/journals/ijfr/2010/836278/>
- Tree damage in the vicinity of mobile phone base stations <http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf>
- The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: <http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Dokumentation-2006-2016.pdf>

The damage to trees is not theoretical. We are seeing it on our farm now. We have seen it in the city for years, but now we are seeing it in the country as well, on a widespread basis. Please see attached file. The damage is becoming serious and widespread. The nation's trees cannot survive continued chronic increases in RF radiation levels such as FirstNet would bring through direct infrastructure-induced increases and increases caused by increased utilization and greater numbers of devices.

Please read the following reports which demonstrate that wireless technology is causing serious harm to wildlife:

“The Report on Possible Impacts of Communication Towers on Wildlife Including Birds and Bees” commissioned on 30th August 2010 by the Ministry of Environment and Forest, Government of India [http://www.moef.nic.in/downloads/public-information/final\\_mobile\\_towers\\_report.pdf](http://www.moef.nic.in/downloads/public-information/final_mobile_towers_report.pdf)

“Impacts of radio-frequency electromagnetic field (RF-EMF) from cell phone towers and wireless devices on biosystem and ecosystem – a review” [http://www.biolmedonline.com/Articles/Vol4\\_4\\_2012/Vol4\\_4\\_202-216\\_BM-8.pdf](http://www.biolmedonline.com/Articles/Vol4_4_2012/Vol4_4_202-216_BM-8.pdf)

Balmori, A. “Electromagnetic pollution from phone masts. Effects on wildlife,” Pathophysiology (2009), doi:10.1016/j.pathophys.2009.01.007 <http://www.ncbi.nlm.nih.gov/pubmed/19264463>

The Supreme Court of India ordered cell towers removed from schools, colleges, hospitals and playgrounds in Rajasthan because of radiation being “hazardous to life.” The court’s amazing 200+ page decision thoroughly reviews the worldwide evidence that cell towers are harming human beings



and wildlife (<http://timesofindia.indiatimes.com/city/jaipur/No-mobile-towers-near-schools-hospitals-directs-Rajasthan-HC/articleshow/17399705.cms>).

On July 5, 2013 the Supreme Court of India upheld this decision.

None of these are mentioned in the PEIS. They are of great relevance.

The PEIS also did not mention the fact that increasing RF radiation exposure would increase RF radiation-induced functional impairments, violating the rights of those already experiencing serious effects from RF radiation (RF radiation sickness - see [http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge\\_1969.pdf](http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge_1969.pdf)). Furthermore, FirstNet would be in violation of the 2008 ADA Amendments, causing further exclusion from society and greater levels of disability for those already experiencing RF radiation sickness and increasing the numbers of people developing RF radiation sickness since it is caused by chronic over exposure to RF radiation. The only cure for RF radiation sickness is avoiding exposure and the wireless broadband portion of FirstNet would make that virtually impossible. I have attached a comment I made to The National Institute on Disability, Independent Living and Rehabilitation Research (NIDILRR) regarding the need for the elimination of wireless from public places, public buildings, and medical facilities. Numerous other people also made comments. My comment also has relevance for ensuring that wired FirstNet infrastructure does not cause additional disability by causing “dirty” electricity. I hope that FirstNet will steps to ensure that its systems do not cause “dirty” electricity.

As noted on p. 2-12, in 1996 the FCC was given the responsibility to “prescribe and make effective rules regarding the environmental effects of radio frequency emissions” (TCA, 104 Pub. L. 104), obviously it has not done this, as discussed above the rules are outdated and inapplicable. The FCC is in the process of updating them so the common practice of relying on compliance with FCC RF radiation limits as being sufficient for protection of health and the environment must end (see p.2-12). As discussed previously, until the FCC completes revision of the FCC RF radiation limits so that they are population-based biologically-protective RF radiation limits the FCC is in violation of their Congressional delegated responsibility to adopt “uniform, consistent requirements, with adequate safeguards of the public health and safety” these were to be “established as soon as possible” (H.R. Report No. 104-204, p. 94). Unfortunately, it appears that the undue industry influence at the FCC documented in a report published by Harvard ([http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency\\_alster.pdf](http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf)), may have compromised the agency’s ability to promptly revise its RF radiation safety limits.

The need for biologically-based RF radiation safety limits is supported by the RF/EMF research community. Over 220 scientists have signed an appeal to the UN ([www.emfscientist.org](http://www.emfscientist.org)).

The need for FirstNet to do its own due diligence is supported by case law. In *Massachusetts v. E.P.A.*, 549 U.S. 497 (2007) Justice Stevens wrote for the majority that agencies cannot ignore Congresses command to regulate. Thus, the fact that FCC has abrogated its duty to maintain protective up-to-date RF radiation limits does not excuse FirstNet from having to consider the serious health and environmental consequences of its program in the PEIS and find a reasonable alternative to protect public health and the environment. In *Scenic Hudson Preservation Conference v. Federal Power Commission*, 354 F.2d 608 (2d Cir. 1965), cert. denied 384 U.S. 941 (1966), on appeal the Circuit Court pointed out (at p. 620) that Congress gave the FPC a broader responsibility.

The Scenic Hudson Court noted “In this case, as in many others, the Commission has claimed to be the representative of the public interest. This role does not permit it to act as an umpire blandly calling balls and strikes for adversaries appearing before it; the right of the public must receive active and affirmative protection at the hands of the Commission.” This decision has obvious applicability to the need for FirstNet to act proactively to protect the health of the American people, as well as the environmental health, not just do a *pro forma* PEIS without real consideration of the great potential for harm that a portion of the FirstNet program has.

Given both the serious inadequacy of the FCC RF radiation limits and the potential for serious harm to public health and the environment that can result if FirstNet implements the program as originally envisioned, FirstNet needs to take steps to amend the program to prevent that harm.

### **Recommended reasonable modifications to FirstNet:**

FirstNet must inform Congress of the health and environmental hazard posed by the RF radiation emission required for wireless broadband and request Congress to eliminate provision of wireless broadband internet from FirstNet's mission. As discussed earlier in this document, it is now acknowledged by government agencies, particularly the Department of Interior and the Environmental Protection Agency that the FCC RF radiation limits are not protective of the public during the chronic exposures experienced today. Furthermore, the U.S. National Toxicology Program has found that RF radiation damages DNA and causes cancer. These are sufficient reasons to halt the portion of the FirstNet Program aimed at increasing wireless broadband coverage and usage. Increasing wired, cabled, and fiber optic access to broadband could be substituted instead. Thereby, achieving a comparable result without causing public health or environmental problems.

For the same reasons, FirstNet should delay implementation of the wireless first responder's component until they design a system that provides good interoperable first responder communication while minimizing radiofrequency emissions from antennas and first responder's communicators. Thus, communicators should be able to contact each other directly, not require an outside antenna (certain types of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed.

FirstNet should request that the NTP quickly undertake and complete toxicology studies comparing the different communication technologies, including, but not necessarily limited to, 3G, 4G, and 5G LTE technologies so that FirstNet can utilize the least toxic least biologically active technology for its first responder's interoperable communication system. Oxidative parameters and calcium efflux should be among the measures used.

Please make the necessary modifications to all the FirstNet Draft PEIS documents. Please also make the next versions more readily available. You should, for instance, include links to the different sections on your website so they can be readily located and downloaded.

Thank you.

Sincerely,

Catherine Kleiber

## References

1. Alster, N. (2015). Captured Agency: How the Federal Communications Commission Is Dominated by the Industries It Presumably Regulates. Harvard University's Edmond J. Safra Center for Ethics. [http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency\\_alster.pdf](http://ethics.harvard.edu/files/center-for-ethics/files/capturedagency_alster.pdf)
2. Buchner, K. and Eger, H. 2010 Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields A Long-term Study under Real-life Conditions
3. Cherry, N. (2000). Criticism of the Health Assessment in the ICNIRP Guidelines for Radiofrequency and Microwave Radiation (100 kHz- 300 GHz) [www.electricalpollution.com/documents/Cherry2000EMR\\_ICNIRP\\_critique\\_09-02.pdf](http://www.electricalpollution.com/documents/Cherry2000EMR_ICNIRP_critique_09-02.pdf)
4. Dodge, C. (1969). Clinical and Hygienic Aspects of Exposure to Electromagnetic Fields. Biological Effects and Health Implications of Microwave Radiation, Symposium Proceedings, Richmond, Virginia, September 17-19. [http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge\\_1969.pdf](http://www.magdahavas.com/wordpress/wp-content/uploads/2010/08/Dodge_1969.pdf)
5. EMF Scientist (2015). International Scientists Appeal to U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology <http://www.EMFscientist.org>
6. Eskander, E.F., Estefan, S.F., and Abd-Rabou, A.A. Case Report How does long term exposure to base stations and mobile phones affect human hormone profiles? Clinical Biochemistry 45 (2012) 157–161.
7. Fatma A. Mohamed, Azza A. Ahmed, Bataa M.A. El- Kafoury, & Noha N. Lasheen. Study Of The Cardiovascular Effects Of Exposure To Electromagnetic Field. Life Science Journal. 2011;8(1): 260-274] (ISSN:1097–8135). <http://www.lifesciencesite.com>.
8. Hankin, N (2002), Center for Science and Risk Assessment, Radiation Protection Division, EPA, correspondence regarding the limitations and purpose of the FCC exposure standards. [http://www.emrpolicy.org/litigation/case\\_law/docs/noi\\_epa\\_response.pdf](http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf)
9. Havas M, Marrongelle J, Pollner B, et al. (2010). Provocation study using heart rate variability shows microwave radiation from DECT phone affects autonomic nervous system. Eur. J. Oncol. Library, ; 5:273-300. <http://www.magdahavas.com/wordpress/wp-content/uploads/2012/01/Havas-HRV-Ramazzini.pdf>
10. Havas, M., Marrongelle, J. (2013). Replication of Heart Rate Variability Provocation Study with 2.4 GHz Cordless Phone Confirms Original Findings. Electromagn Biol Med Jun;32(2):253-66. doi: 10.3109/15368378.2013.776437. <http://www.ncbi.nlm.nih.gov/pubmed/23675629#>
11. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. (2013) Non-Ionizing Radiation, Part 2: Radiofrequency Electromagnetic Fields.102. <http://monographs.iarc.fr/ENG/Monographs/vol102/mono102.pdf>
12. ICNIRP Statement (2002). General Approach to Protection Against Non-Ionizing Radiation Protection. Health Physics 82(4):540-548. <https://www.icnirp.org/documents/philosophy.pdf>
13. Marha K, Musil J, Tuha H. Electromagnetic Fields and the Life Environment. San Francisco (CA): San Francisco Press, Inc.; 1971.
14. NTP (2016). Report of Partial Findings from the National Toxicology Program Carcinogenesis Studies of Cell Phone Radiofrequency Radiation in Hsd: Sprague Dawley® SD rats (Whole Body Exposures) bioRxiv preprint first posted online May. 26, 2016; <http://dx.doi.org/10.1101/055699>
15. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard Recent Res Devel Mol Cell Biol 7.

16. Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. *J Chem Neuroanat* DOI: 10.1016/j.jchemneu.2015.08.001. <http://dx.doi.org/10.1016/j.jchemneu.2015.08.001>
17. Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current *Chemical Biology*, 2016, Vol. 10, No. 1.
18. Powell, R. (2013). "Biological Effects from RF Radiation at Low-Intensity Exposure, based on the BioInitiative 2012 Report, and the Implications for Smart Meters and Smart Appliances" <http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf>
19. Sage, C., Carpenter D., ed. (2012) BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Radiation. BioInitiative Working Group, at [www.bioinitiative.org](http://www.bioinitiative.org), December 31, 2012.
20. Sailia, L., Hanini, A., Smirani, C., et al. (2015). Effects of acute exposure to WIFI signals (2.45 GHz) on heart variability and blood pressure in Albinos rabbit. *Environmental Toxicology and Pharmacology* 40:600–605.
21. Taylor, W. (2014). U.S. Department of Interior, Willie Taylor, Director of the Office of Environmental Policy and Compliance, Comment on National Telecommunications and Information Administration plans for FirstNet, Feb 7, 2014, ER 14/0001 and ER 14/0004. [http://www.ntia.doc.gov/files/ntia/us\\_doi\\_comments.pdf](http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf)
22. Wyde, M. (2016) The U.S. NTP Study: A Real Game Changer or Just Another Study? BioElectroMagnetic Society Conference: June 8, 2016.
23. Yakymenko, I., Tsybulin, O., Sidorik, E., et al. (2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. *Electromagn Biol Med*. Jul;7:1-16. <http://www.ncbi.nlm.nih.gov/pubmed/26151230#>

## RF Radiation From Wireless Technology Kills and Damages Trees By Catherine Kleiber

Trees are being killed and damaged across the U.S. and world-wide even without full-scale implementation of 5G. RF radiation is being implicated as the cause. Several studies show the very serious effects that RF radiation has on the health of trees. Trees are essential to the welfare of the global environment and the continuation of the human race. Decimation of the Amazon rainforest by direct human actions has been oft-cited as endangering the global environment, the FCC should not be moving forward with implementing a technology, 5G wireless technology, that will hasten the RF caused death of our urban and rural forests. Please read the following papers to see the toll RF is already taking on trees. We cannot afford additional forest die-off. Large mature trees are being seriously damaged and killed, this damage will take 50 years or more to repair.

- Radiofrequency radiation injures trees around mobile phone base stations [https://www.researchgate.net/publication/306435017\\_Radiofrequency\\_radiation\\_injures\\_trees\\_around\\_mobile\\_phone\\_base\\_stations](https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations)
- Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations <https://www.hindawi.com/journals/ijfr/2010/836278/>
- Tree damage in the vicinity of mobile phone base stations <http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf>
- The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: <http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Dokumentation-2006-2016.pdf>

The damage to trees is not theoretical. We are seeing it on our farm now. We have seen it in the city for years, but now we are seeing it in the country as well, on a widespread basis.



July 24, 2016  
Note thinness in tree on right and bare spot developing between trees (both cottonwoods)



September 12, 2016  
More leaves lost. No sign of healthy fall leaf color so fall is not the



August 9, 2016  
Damage progressing quickly



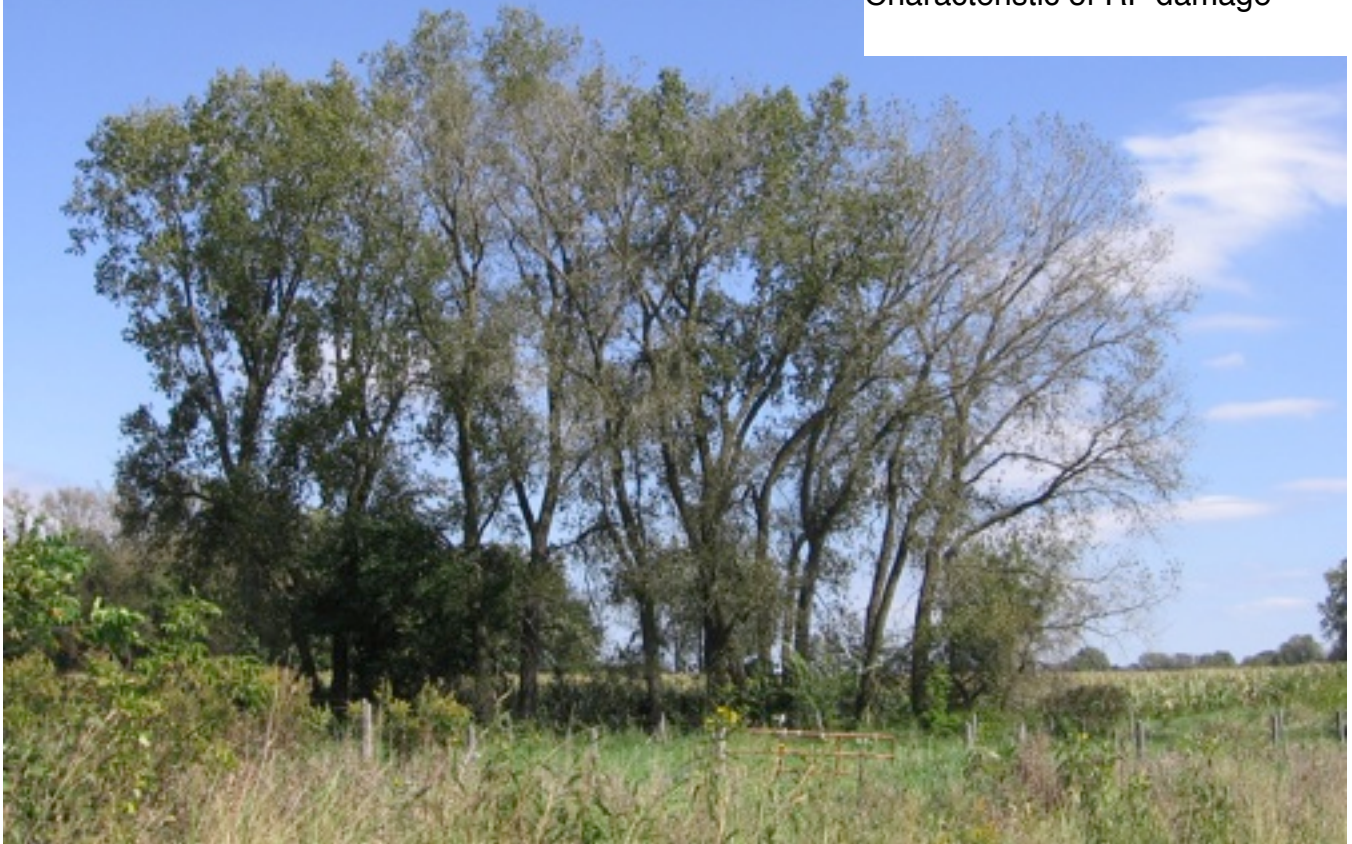


July 24, 2016

These cottonwoods trees began exhibiting damage similar to the trees above in 2015. Most of them greened up this spring, then had the leaves die and drop. Two still retain leaves low down. Others are completely dead.

As you can see the damage to trees is progressing quickly to death. Balimori discusses the fact that *"White and black poplars (Populus sp.) and willows (Salix sp.) are more sensitive. There may be a special sensitivity of this family exists or it could be due to their ecological characteristics forcing them to live near water, and thus electric conductivity."* Certainly the trees that are worst off in our area are willows and cottonwoods and they are growing in areas that are wet, but I have seen trees of all types exhibiting damage. Please think of the future. We cannot live without a healthy tree population. We rely on them for the very oxygen we breathe. **No technology is worth endangering something as essential as our source of oxygen.**

September 18, 2016  
Notice uneven leaf drop, unhealthy  
green, and absence of fall color.  
Characteristic of RF damage



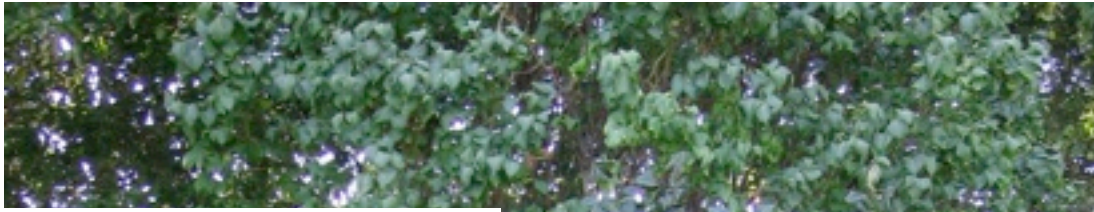
Notice necrotic lesions and off color  
characteristic of RF leave damage.  
No normal fall color present, despite  
on-going leaf drop.



Note the small damaged leaves  
across the top of the tree. Trees of  
all different species around our yard  
are demonstrating this damage. Also  
mentioned in the aforementioned  
papers. We own no transmitters so  
all RF from outside sources.



Lilac showing marked one sided damage. Signal appears to be coming from a WiFi tower on a hill about a mile away.



**Green lilac nearly touching green side of affected lilac. The bases are only 8 ft apart.  
0.6 microwatts/m2 max  
no audible or visible spikes in over 5 minutes**



**Green side of lilac  
2.8 microwatts/m2 max  
only periodic audible or visible spikes**

**Bare side of lilac  
83.5 microwatts/m2 max  
audible and visible spikes every 9 seconds**







39 microwatts/m<sup>2</sup> max  
Bare spot pointing S/SW  
Line of sight to cell tower  
6 miles away

10 microwatts/m<sup>2</sup> max  
Measured near bottom of  
bare spot which points N



2.8 microwatts/m<sup>2</sup> max  
In first whorl where still has needles

### **Additional References Provided**

- Belyeav, Igor, Amy Dean, Horst Eger, Gerhard Hubmann, Reinhold Jandrisovits, Markus Kern, Michael Kundi, Hanns Moshhammer, Piero Lercher, Kurt Müller, Gerd Oberfeld, Peter Ohnsorge, Peter Pelzmann, Claus Scheingraber, and Roby Thill. 2016. "EUROPAEM EMF Guideline 2016 for the prevention, diagnosis and treatment of EMF-related health problems and illnesses." *Reviews on Environmental Health*, 31(3): 363-397.
- Havas, Magda. 2017. "When theory and observation collide: Can non-ionizing radiation cause cancer?" *Environmental Pollution*, 221(2017): 501-505.
- Pall, Martin L. 2015. "Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression." *Journal of Chemical Neuroanatomy*, Volume 75, Part B, Pages 43-51.
- \_\_\_\_\_. 2016. "Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium channels via Their Voltage Sensor." *Current Chemical Biology*, 10(1): 74-82.
- Unknown Author. 2003. *Permissible levels of high-frequency electromagnetic pollutions' voltage in a wires of industrial frequency alternating current Sanitary-epidemiologic norms*. Confirmed: The order of the Head State Sanitary Physician of the Republic of Kazakhstan. 28 November 2003.
- Yakymenko, Igor, Olexandr Tsybulin, Evgeniy Sidorik, Diane Henshel, Olga Kyrylenko, and Sergiy Kyrylenko. 2015. "Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation." *Electromagnetic Biology and Medicine*, 35(2): 186-202.

**Tara Schell**

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**From:**

**Sent:** Thursday, December 15, 2016 10:50:53 AM

**To:** Genevieve Walker

**Subject:** Urgent: Comment on FirstNet Draft Environmental Impact Statements

**I would like to re-butt your arguments based on personal experience and studies regarding your FirstNet Draft Environmental Impact Statements.**

Please see attached two documents below:

**I would like to re-butt your arguments based on personal experience and studies regarding your FirstNet Draft Environmental Impact Statements.**

I also am requesting that Congress eliminate your provision of wireless broadband internet from FirstNet's mission and:

Delay implementation of wireless first responder's component until they design a system that provides good interoperable first responder communication while minimizing radiofrequency emissions from antennas and first responder's communicators

- Cancer findings with radios in first responders

- Cancer findings from cellphone radiation from NTP - <http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/>

Thus, communicators should be able to contact each other directly, not require an outside antenna (certain types of buildings might make communication to an outside antenna impossible anyway), but also be able to utilize it if needed and available. Radiofrequency emissions should not occur continuously, only as needed.

**There is direct evidence of human and environmental harm with thousands of modern studies that trump the old ones. Please read through the list of critiques below for a list of some of the most problematic points and omissions.**

We (and the Department of Interior) were successful in getting FirstNet to complete a Programmatic Environmental Impact Statement (PEIS).

The Central Region document is available at the following site:

<https://www.regulations.gov/document?D=FIRSTNET-2016-0003-0001>

The East Region

<https://www.regulations.gov/document?D=FIRSTNET-2016-0002-0001>

The South region is available for review and comment at the following link:

<https://www.regulations.gov/document?D=FIRSTNET-2016-0005-0001>

West Region

<https://www.regulations.gov/document?D=FIRSTNET-2016-0004-0001> or

<https://www.regulations.gov/docketBrowser?rpp=25&so=DESC&sb=commentDueDate&po=0&D=FIRSTNET-2016-0004>

The documents are huge, **however the RF portion is tiny**. It is not dealt with throughout the documents. It seems to be in 2.4 which I believe means Chapter 2 section 4 for the two PEIS documents that I was able to obtain.

**Here are my critiques:**

RF health risks to workers, the population, and the environment are not addressed throughout the document - they are isolated to the RF section and quickly dismissed.

*“The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer”*

([http://emrstop.org/index.php?option=com\\_docman&task=doc\\_details&gid=4&Itemid=18](http://emrstop.org/index.php?option=com_docman&task=doc_details&gid=4&Itemid=18))

*“Changes of Clinically Important Neurotransmitters under the Influence of Modulated RF Fields- A Long-term Study under Real-life Conditions”* ([http://www.radiationresearch.org/images/RRT\\_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf](http://www.radiationresearch.org/images/RRT_articles/Buchner%20Eger%20Rimbach%20Study%202011%20ENG%20FINAL%20Revised%2029%20July%202011.pdf))

*“How does long term exposure to base stations and mobile phones affect human hormone profiles?”* Eskander et al. (<http://www.sciencedirect.com/science/article/pii/S0009912011027330>)

FirstNet wireless technology will be LTE 4G or higher. Toxicology studies should be done comparing 4G and other communications protocols so that first responders and the population are exposed to the safest.

FirstNet has created to allow first responders to communicate easily AND TO PROVIDE WIRELESS BROADBAND NATIONWIDE (2-8).

Contrary to their statement FCC regulations do not protect from "any potential effects," as this letter from Mr. Norbert Hankin from the Center for Science and Risk Assessment, Radiation Protection Division, EPA, regarding the limitations and purpose of the FCC exposure standards notes ([http://www.emrpolicy.org/litigation/case\\_law/docs/noi\\_epa\\_response.pdf](http://www.emrpolicy.org/litigation/case_law/docs/noi_epa_response.pdf)) This very credible evidence is unmentioned and ignored.

FCC regulations are poorly enforced. (An issue which is completely ignored in the PEIS.) Rampant violations are documented by the Wall Street Journal and EMR Policy Institute. A detailed investigation by the EMR Policy Institute showed almost no enforcement of existing FCC RF limits and rampant violations (<http://www.marketwire.com/press-release/-1770139.htm>). A Wall Street Journal investigation (<http://online.wsj.com/articles/cellphone-boom-spurs-antenna-safety-worries-1412293055>) reports similar findings with one in ten towers out of compliance and experts concerned that out of compliance towers could be transmitting in the thermal range by around the end of 2015.

A fully elucidated mechanism should not be required to take action to protect public health when detrimental effects are found. Serious biological effects are acknowledged and then ignored on page 2-20.

**The two mechanisms that are extremely plausible and well-supported in the literature are completely ignored:**

**Oxidation -**

1. Yakymenko, I., Tsybulin, O., Sidorik, E., et al. (2015). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. *Electromagn Biol Med.* Jul;7:1-16. <http://www.ncbi.nlm.nih.gov/pubmed/26151230#>

**Ca 2+ channels**

1. Pall, M. (2014). Microwave electromagnetic fields act by activating voltage-gated calcium channels: why the current international safety standards do not predict biological hazard *Recent Res Devel Mol Cell Biol* 7.
2. Pall, M. L. (2015). Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression. *J Chem Neuroanat* DOI: 10.1016/j.jchemneu.2015.08.001. <http://dx.doi.org/10.1016/j.jchemneu.2015.08.001>
3. Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current *Chemical Biology*, 2016, Vol. 10, No. 1.

The PEIS uses outdated documents to excuse inaction.

Contrary to their assertion, FCC limits do not protect against adverse effects, even the DOI noted **“the electromagnetic radiation standards used by the Federal Communications Commission (FCC) continue to be based on thermal heating, a criterion now nearly 30 years out of date and inapplicable today”** ([http://www.ntia.doc.gov/files/ntia/us\\_doi\\_comments.pdf](http://www.ntia.doc.gov/files/ntia/us_doi_comments.pdf))

The opening of the FCC docket to re-evaluate limits is acknowledged, but then ignored. The logical step of delaying implementation of the wireless component until that is completed is not even mentioned.

The National Toxicology Program findings are not even mentioned.



Their exposure calculations are based on only one antenna and work out to 477uW/m2, which is over the level shown to cause biological effects (<http://emfsafetynetwork.org/wp-content/uploads/2013/08/Biological-Effects-From-RF-Radiation-and-Implications-for-Smart-Meters-June-5-2013-2.pdf> see graph at end). Most towers or building antenna sites have more than one antenna radiating in any given direction, plus signals come from other nearby sites, and the ground infrastructure such as cellphones, tablets etc. So levels at ground level are likely to be far higher than that and levels in apartments or homes which get a direct hit from neighboring buildings could be far higher depending on distance.

Several IARC panelists have made public statements that the evidence now shows that radiofrequency radiation should be classified as either a class 2A or class 1 human carcinogen. The recent (ignored) National Toxicology Program findings support this. This should cause the wireless portion to be stopped and FirstNet should explain why to Congress, but no mention is made and therefore no such action is recommended.

They refuse to take action to protect birds in spite of lab and epidemiological evidence that support each other in finding hard because it requires "interpretation and extrapolation."(2-20) Doesn't it always?

They hardly touch on tree damage and totally ignore the following tree and plant studies:

- Radiofrequency radiation injures trees around mobile phone base stations: [https://www.researchgate.net/publication/306435017\\_Radiofrequency\\_radiation\\_injures\\_trees\\_around\\_mobile\\_phone\\_base\\_stations](https://www.researchgate.net/publication/306435017_Radiofrequency_radiation_injures_trees_around_mobile_phone_base_stations)
- Adverse Influence of Radio Frequency Background on Trembling Aspen Seedlings: Preliminary Observations <https://www.hindawi.com/journals/ijfr/2010/836278/>
- Review: Weak radiofrequency radiation exposure from mobile phone radiation on plants: <http://www.ncbi.nlm.nih.gov/pubmed/27650031?dopt=Abstract>
- Tree damage in the vicinity of mobile phone base stations: <http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/06/Tree-damages-in-the-vicinity-of-mobile-phone-base-stations.pdf>
- The trees make it easy to recognize the effects of RF-EMF. Examples of tree damage: <http://kompetenzinitiative.net/KIT/wp-content/uploads/2016/09/Trees-in-Bamberg-and-Hallstadt-Documentation-2006-2016.pdf>
- Pall, M.L. (2016) Electromagnetic Fields Act Similarly in Plants as in Animals: Probably Activation of Calcium Channels via Their Voltage Sensor Current Chemical Biology, 2016, Vol. 10, No. 1. - **IMPORTANT MECHANISTIC DISCUSSION**

On 2-20 the PEIS acknowledges "*A number of other studies generally touch upon the nature of RF exposure and the disruption of biological processes that are fundamental to plant and animal growth and health, including but not limited to behavior, DNA damage, immune deficiencies, reproductive system effects, hormone dysregulation, degraded cognition and sleep, and desynchronization of neural activity (BioInitiative Working Group, 2012) (Balmori, A., 2005), but then no protective action is being taken because "The common practice for NEPA documents related to cellular towers is to cite FCC standards and point to the fact that they would be built and operated according to allowable FCC RF emission limits. Some NEPA documents that have more directly addressed the RF emissions potential largely point to the existing literature and suggest that although there is evidence that RF emissions could potentially affect some species, the evidence is insufficient to support a finding of adverse impacts on these species due to RF emissions (Ballistic Missile Defense Organization, 2000) (FCC, 2012)."*

This approach was not allowable by the courts in other situations. Especially since the inadequacy of the FCC RF limits is now acknowledged by both the DOI and the EPA. In addition, numerous studies have added to the knowledge about the hazard that RF poses to human health since both 2000 and 2012, including the NTP study which has found that RF is carcinogenic and breaks DNA.

I am fully disabled from wireless damage and exposure. Wireless has also caused a hypersensitivity in me to all types of EMFs.



It is against the Nuremberg Treaty to experiment on us without informed consent and it is unconstitutional to take away basic human rights and freedoms from me. I can not work, drive, access most public places or medical facilities, and can not even live on my own property without exposure with wireless being spread everywhere. Millions of Americans are already disabled from EMFs and most can not even use a wired device anymore because their sensitivity is too high. You are destroying the health of America and the environment creating a large microwave oven cooking everything within it. Radio Waves do not end. They continue forever.

The younger generation that was raised with this technology is already severely damaged. Young kids, teenagers, and young adults are already disabled from EMFs and environmental toxins and can not go out in public without a complete meltdown from EMFs including EMFs found in artificial lighting (except incandescent which is the safest artificial lighting there is and is the hardest to get now). I get contacts regularly from young adults and parents with kids who have no place to go or live without EMF exposure. Their lives have already been stripped from them. Disabling America and ruining our economy with all this sickness and medical issues is not the answer. Foreign countries are removing wireless from their cities and public places because it is a worldwide epidemic and they are having to pay out disability for it. Russia never allowed high amounts of radiation to begin with and told the world that these cell towers and RF levels were way too high. Will they be the only country left without damaged DNA to reproduce and without their whole country disabled, sick, economically collapsed and famined?

Wireless RF/EMFs reach everyone and everything 24/7. You can not opt out of it. It causes severe pain, brain fog, dementia, shuts down mitochondria and causes severe abnormal chronic fatigue, Parkinsons, Alzheimers, Diabetes type 3, shuts down kidneys/liver function, stops/paralyzes my heart, causes irregular heartbeat, anxiety, sharp painful heart jerking, rapid heart beat, cardiac arrest, headaches, joint pain, damages DNA, fertility, constant bleeding and severe abdominal pain, seizures, autism, ADHD, and so much more. It is the number one killer of bees and all pollinators along with birds, bats, frogs, etc. It makes animals and humans sick and destroys crops, trees, plants, etc as it weakens them and makes them more prone to sickness, disease, insect damage, etc.

It also increases mold both in your body and environment over 600 times including Lyme disease. There is now a mold epidemic due to all the wireless. When wireless hits mold, mold creates a self-defense against it and creates mycotoxins to survive. Mycotoxins are a chemical toxin that can be more deadly than mold itself and is still toxic will killed. It is too small to filter and extremely hard to kill but the dead spores are just as dangerous. Your body creates autoimmune disease the same way when wireless radiation hits your body to try to defend itself against the radiation poison. RF/wireless is a carcinogenic, neurotoxin and genotoxin.

Create safer technologies and safe zones where people can live with no wireless/RF radiation. Zone yourselves in and radiate only yourselves. Then when you are all dying from cancer, tumors, and sickness and have no more food after killing off all the pollinators, then let me know what ya think then?

I will be sending all my construction and medical bills to any company or government that causes radiation to be on my property. The answer isn't to cover up symptoms. The answer is to remove the problem. Just because there is a new technology, it does not mean that we have to use it. Every person who has a part in wireless deployments will be personally held accountable in court for the damage it has created as crimes against humanity and the environment. The law suits are coming!

I will attach a second word document with a list of videos, studies, medical information and more on the dangers of wireless radiation/EMFs along with a Worldwide list of wireless deactivation and removal that has already taken place due to this epidemic.

Citizen Fully Disabled from EMFs and Tired of Corrupt Companies Destroying Our Health, Children, and Environment:

Tara Schell  
Virginia

**Here are just a few links on the dangers of EMFs:**

<https://www.emfanalysis.com/>

**Engineer Discusses the Dangers of Wireless:**

<https://www.emfanalysis.com/new-paradigm-emf-science/>

<http://www.electricsense.com/>

<http://electricalpollution.com/>

<http://www.bioinitiative.org/>

[www.emfields-solutions.com](http://www.emfields-solutions.com)

[www.powerwatch.org.uk](http://www.powerwatch.org.uk)

[Radiation-Limits-at-Wireless-Antenna-Sites,16,3024](http://www.radiationlimits.com/sites/articles/archive/2010/02/09/new-study-confirms-electrical-pollution-from-cell-phones-and-wifi-is-hazardous.aspx)

<http://articles.mercola.com/sites/articles/archive/2010/02/09/new-study-confirms-electrical-pollution-from-cell-phones-and-wifi-is-hazardous.aspx>

**Recent US Government Study Showing Wireless Causes Cancer & Brain Tumors**

<http://www.saferemr.com/2016/05/national-toxicology-program-finds-cell.html>

<http://microwavenews.com/news-center/ntp-nyt>

**Town in Italy Bans Wifi in schools:**

<https://www.thelocal.it/20160108/italy-town-turns-off-school-wifi-over-health-concerns>

**European Leaders Ban wifi in schools:**

<http://articles.mercola.com/sites/articles/archive/2011/06/02/european-leaders-call-for-ban-of-cell-phones-and-wifi-in-schools.aspx>

**France Bans wifi from schools & daycares:**

<http://francesfox.com/france-bans-wifi-school/>

<http://www.earthcalm.com/wifi-dangers-to-children-france-bans-wifi-in-nurseries>

**Canada schools Ban wifi:**

[http://www.safeschool.ca/School\\_Bans\\_WiFi.html](http://www.safeschool.ca/School_Bans_WiFi.html)

**More Bans:**

<http://www.wifi-in-schools-australia.org/p/worldwide.html>

**Quiet Zones:**

<http://www.emfs.com/article/emf-quiet-zones>

**EMFs & Bees, Birds, Bats, Insects, Frogs, & Pollinators**

<http://www.citizensforsafetechnology.org/bees-in-wildlife-and-environment,31,0>

<http://emfsafetynetwork.org/cell-phone-radiation-disturbs-honey-bees/>

<http://www.emfhealthalert.com/emf-and-the-bees/>

<http://rense.com/general81/emfs.htm>

[http://www.newmediaexplorer.org/sepp/2007/03/06/millions\\_of\\_bees\\_die\\_are\\_electromagnetic\\_signals\\_to\\_blame.htm](http://www.newmediaexplorer.org/sepp/2007/03/06/millions_of_bees_die_are_electromagnetic_signals_to_blame.htm)

<http://apps.fcc.gov/ecfs/document/view?id=7520941855>

<http://naturalsociety.com/is-the-cellphone-killing-the-honeybee/>

[http://www.bibliotecapleyades.net/scalar\\_tech/esp\\_scalar\\_tech\\_cellphonesmicrowave.htm](http://www.bibliotecapleyades.net/scalar_tech/esp_scalar_tech_cellphonesmicrowave.htm)

<http://www.shiftfrequency.com/tag/scalar-waves/>

<https://lindasepp.wordpress.com/mcs-and-housing/>

[http://www.stopumts.nl/doc.php/Berichten%20Internationaal/8317/electrohypersensitivity\\_sanctuaries](http://www.stopumts.nl/doc.php/Berichten%20Internationaal/8317/electrohypersensitivity_sanctuaries)

<http://www.nettally.com/prusty/mcs.htm>

<http://www.ecolibria.com.au/electromagnetic-radiation-emr-and-potential-adverse-health-affects/>

<http://reesewellness.com/electromagnetic-wellness-destroyers/>

**EMFs and Mold/Mycotoxins:**

<http://agoodhealthadvocate.com/health/mold-produces-600-times-more-bio-toxins-with-emf/>

<http://www.electricsense.com/6580/emfs-indoor-mold-connection/>

<http://www.klinghardtacademy.com/>

<http://www.earthcalm.com/emfs-and-mold-a-deadly-combination>

<http://www.helladelicious.com/diy/2012/06/biofilms-parasites-mold-and-electromagnetic-frequencies/>

**Dangers of Mold:**

<http://articles.mercola.com/sites/articles/archive/2011/09/03/molds-making-you-ill.aspx>

**Mold, Lyme, and EMFs**

<http://www.betterhealthguy.com/a-deep-look-beyond-lyme>

**EMFs and Heavy Metals:**

<http://articles.mercola.com/sites/articles/archive/2012/08/25/heavy-metal-electromagnetic-fields.aspx>

**EMFs & Autism:**

<http://naturalhealthforlife.com/autism/electromagnetic-radiation-emf-autism-hidden-connection/>

**Smart Meters Blowing Up & Catching on Fire Video:**

[https://www.change.org/p/stop-new-york-state-wireless-smart-meter-program/u/16015406?tk=kfdvUq27cMO2C2KHvc\\_GLYEMyifgVTAEuya\\_XeZi3yc&utm\\_source=petition\\_update&utm\\_medium=email](https://www.change.org/p/stop-new-york-state-wireless-smart-meter-program/u/16015406?tk=kfdvUq27cMO2C2KHvc_GLYEMyifgVTAEuya_XeZi3yc&utm_source=petition_update&utm_medium=email)

<http://smartmeterdangers.org/smart-meter-scientific-research/new-studies-niradiation/>

**Dangers of Smart Meters & EMFs:**

<http://stopsmartmeters.org.uk/prof-martin-pall-how-wifi-other-emfs-cause-biological-harm/>

<http://www.freedomtaker.com>

<http://stopsmartgrid.org/>

<http://citizensforaradiationfreecommunity.org/>

**Meter Differences & Electrical Engineer Report on their Dangers:**

<https://www.emfanalysis.com/do-you-have-a-smart-meter/>

<https://michiganstopsmartmeters.com/2016/10/12/the-meter-itself-is-the-hazardous-condition/>

**Take Back Your Power Video on Not So Smart Murder Meters:**

<https://www.youtube.com/watch?v=ETfiks3H4k>

**5G Spectrum Video:**

<https://www.youtube.com/watch?v=OMxfffqyDtc>

<http://www.parentsfor safetechnology.org/stop-5g-spectrum-frontiers.html>

<http://citizensfor safetechnology.org/Americans-Beware-Nationwide-Violations-of-FCC->

<https://wearetheevidence.org/>

**Microwave Radiation Expert: Search Barrie Trower on youtube. Lots of videos available.**

**Wi-Fried Video:**

<https://www.youtube.com/watch?v=iTNYCMIgg7E>

**Jenny Fry Commits Suicide from Wifi in School:**

<https://www.youtube.com/watch?v=m6FcCtFAUcs>

**Israel's 3<sup>rd</sup> largest city bans wifi from schools:**

**Israel Video with English Subtitles discussing the epidemic of Wireless on our World titled "How we kill ourself –Radiation"**

<https://www.youtube.com/watch?v=bpJslWuV-PA>

**How to Use the Cornet ED78s Scanning Meter taught by a Building Biologist:**

<https://www.youtube.com/watch?v=D64sr4kkbm8&feature=youtu.be>  
<http://emfhelpcenter.com/>

### **Radiation/EMFs Explained:**

<http://rense.com/general56/rad.htm>  
<https://www.jackkruse.com/emf-5-what-are-the-biologic-effects-of-emf/>  
<http://emwatch.com/what-emf-does-to-your-body/>  
<http://www.americanassociationforcellphonesafety.org/>  
<http://thepeoplesinitiative.org/>  
<http://boilthefrogradio.com/kevin-mottus-joins-the-show/>  
<http://www.saferemr.com/>  
<http://articles.mercola.com/sites/articles/archive/2013/09/21/cell-phone-wifi-radiation.aspx#!>

### **Dangers of Microwave Ovens:**

<http://naturalsociety.com/microwaves/>  
<http://www.globalresearch.ca/the-dangers-of-microwave-radiation-cannot-be-ignored/24342>  
<http://articles.mercola.com/sites/articles/archive/2010/05/18/microwave-hazards.aspx>

### **Books:**

#### **Scientist Nick Begich “Angels Don’t Play This Harp”**

<https://www.amazon.com/Angels-Dont-Play-This-Haarp/dp/0964881209>

#### **Tox-Sick by Suzanne Somers**

- <https://wh.gov/iewmv> Petition: Please publicize the U.S. National Toxicology Program results that wireless radiation causes DNA breakage and cancer
- <http://ehtrust.org/science/facts-national-toxicology-program-cellphone-rat-cancer-study/> An excellent write-up about the NTP findings
- <https://www.youtube.com/watch?v=DIIQVJd0IA8> Jimmy Gonzalez died at age 42 after he developed cancer where he was in contact with his phone: brain cancer, cancer under his chest pocket where he stored his phone, and cancer in the hand that held it.
- <http://ehtrust.org/key-issues/cell-phoneswireless/cell-phone-survivors/> Cell Phone Survivors & Non-Survivors
- [www.EMFscientist.org](http://www.EMFscientist.org) Over 220 EMF/RF researchers from around the globe agree - existing RF limits are not protective and urgently need revision to protect people from getting cancer and other biological effects
- <http://www.bioinitiative.org/whats-new-2/> The response of the authors of the 2012 BioInitiative Report to the NTP findings.

**If you have had cancer that you link to wireless technology or RF** or know someone who has, please submit your story to:

<https://www.whitehouse.gov/webform/cancer-touches-all-us-share-your-story-here>

### **Dangers of Blue Light:**

All artificial lighting has blue light except old fashioned incandescent bulbs or red and purple lamps. Even LEDs have blue light.

“Morning sun has blue light in the spectrum, but it is balanced with the other colors in the sun so you get the exact amount you need to reset your circadian rhythm by getting out in the morning soon after

rising and being grounded outside as well. No lenses should be worn for the 15 minutes you do this. This helps to reset melatonin as well.

Blue light doesn't just affect our eye clock, it also affects our skin surface, and our skin detects this color. Jack always recommends that if there is blue light exposure and you're inside, make sure your body is covered up from the blue light exposure, as well as your eyes. Outside, you take everything off if possible."

**Here is an app for the computer to block the blue light:** It will change the lighting to go down with the sun and in the apps section, you can make it more orange.

<https://justgetflux.com/>

**Here is a blue light map to see how much there is where you live. You want to live in the darkest places possible and avoid as much light as you can especially at night:**

<http://www.lightpollutionmap.info/#zoom=10&lat=4647733&lon=-8861149&layers=B0TFFFF>

**Regular glasses to block blue light:**

Zenni Optical sells them. They shouldn't be worn out in the sunlight though because our eyes need the full spectrum UV light. These lenses block all UV and blue light but have a clear lens.

You can get any style you want, and when you order them, you'll have the option to add Beyond UV to your glasses. You can get them in prescription and nonprescription.

<http://www.zennioptical.com/beyond-uv-blue-blocker>

**Goggles to block blue light buy here:**

<https://www.amazon.com/Uvex-Blocking-Computer-SCT-Orange-S1933X/dp/B000USRG90>

**Here is some info on blue light from a friend:**

"Jack Kruse believes that its the blue light that is at the heart of all health problems because it destroys DHA that is used by our mitochondria. Once the mitochondria doesn't work well, EMF problems loom large as well as other autoimmune conditions, cancer, etc. Once blue light is mitigated by using blue blockers, getting natural sunlight in our eyes, grounding outside barefoot, and setting our circadian rhythms right again, we can reverse the problems. In EMF fields he believes we need a LOT of fatty fish to replace our lost DHA.

Jack Kruse is really the top of the list when it comes to having information on blue light, non-native EMF, circadian biology and quantum biology. He is very wordy, and it takes a long time to read his work. He has a lot of videos online, and even podcasts you can follow. He's highly arrogant, but that's just his way.

You either like Jack or you don't.

**Here is a list of different videos, podcasts, and links to his articles about blue light, and emf:**

<http://jamieguard.com/2016/08/14/2-dr-jack-kruse-mitochondria-sunglight-quantum-biology/>

<https://www.youtube.com/watch?v=vAZR0tmhMqY>

<https://www.youtube.com/watch?v=VLmhs6dalok>

**These two videos were from this July in Vermont. Rubin and Jack give these talks. They would be good to watch first:**

<https://www.youtube.com/watch?v=wHDNW4qQI9I>

<https://www.youtube.com/watch?v=N-DTk9hYvI>

**Here's his website:**

<https://www.jackkruse.com/>

It's much easier to listen to him talk than to read his work. He does have a book as well available on his site. He doesn't seem to have a word quota and can just talk and talk."

**Article on Lighting and Insulin Resistance:**

<http://www.naturalhealth365.com/insulin-resistance-blood-glucose-1939.html>

## **Worldwide Actions on Cell Phones/Wireless Radiation**

### **Government Actions on Cell Phones/Wireless Radiation**

*Snapshot of the item below:*



#### **INTERNATIONAL POLICY BRIEFING**

#### **Radiofrequency Radiation in Communities and Schools**

#### **Actions by Governments, Health Authorities and Schools Worldwide**

**Please go to source documents by clicking on the blue underlined hyperlink.**

**(Last updated 11/28/2016)**

## **France**

[2016 The National Agency of Health Security of Food, Environment and Labour Report](#) recommends

- regulatory changes to ensure "sufficiently large safety margins" to protect the health of young children.
- "ALL wireless devices, including tablets, cordless phones, remote controlled toys, wireless toys, baby monitors and surveillance bracelets, should be subjected to the same regulatory obligations as cell phones."

National Legislation "Law on sobriety, transparency, information and consultation for exposure to electromagnetic waves" passed in 2015.

- **WiFi Banned in Nursery Schools:** WIFI and Wireless devices will be banned in "the spaces dedicated to home, to rest and activities of children under 3 years".
- **WiFi on "OFF" as Default to Minimize Exposures in Schools:** In elementary schools, WIFI routers should be turned off when not in use.
- **Schools Will be Informed:** The school board should be informed when new tech equipment is being installed.
- **Cell Tower Emission Compliance Will Be Verified:** A decree will define the limits of emission of equipments for electronic communications or transmission to which the public is exposed. These values can be verified by accredited organizations and results will be made accessible to the public through a National Radiofrequency Agency.
- **Citizens Will Have Access to Environmental/Cell Tower Radiation Measurements** Near homes: Every resident may get access to the results of measurements for their living space.
- **Cell Antennae Maps For the Country:** A description and map of the places with atypical (higher than the limits) places will be conducted at regular intervals with follow up of the actions being taken to limit the exposure. A map of all antennas will be produced for each town.
- **Continued Evaluation of Health Effects:** The National Radiofrequency Agency will be in charge of surveillance and vigilance, evaluating potential risks and setting up scientific research, including information on health effects.
- **SAR Radiation Labeling Mandated:** The SAR of cell phones must be clearly indicated on the package.
- **Information on Reducing Exposures Mandatory:** Information on ways to reduce exposure will be detailed in the contents of the cell phone package. .
- **WIFI Hotspots will be Labeled:** Places where WIFI is provided should be clearly marked with a pictogram.
- **Advertisements Must Recommend Devices That Reduce Radiation Exposure to the Brain:** Advertising for cell phones should clearly indicate the recommendation of hand free kits for protection of the head of the user and it will be included in the package. Advertising for cell phone not accompanied by such a kit is forbidden. Companies in violation will be fined 75,000 Euros.
- **Children Must Be Provided Protections:** At the request of the buyer, equipment reducing cell phone radiation exposures to the head for children less than 14 years should be provided.
- **The Public Will Be Informed:** Within a year, a policy of information on awareness and information on a responsible and reasonable use of cell phones and other apparatus emitting radiofrequencies will be set up.
- **Electrohyper-sensitivity Report To Be Submitted:** Within a year, a report on electrohyper-sensitivity must be given to the Parliament.

France: As of January 2017, new regulations aimed to protect employees from electromagnetic fields emitted by the electronic devices present in the workplace. A decree was issued by the French Government on 6 August 2016:

- Specific precautions will be taken regarding pregnant women.



- It is forbidden to place workers under age 18 in posts where EMF is apt to exceed limit values
- each employer has to evaluate EMF risks.
- When exposure exceeding limit values is detected or when an undesirable or unexpected health effect from exposure to EMF is reported, the worker will benefit from a medical visit.
- The employer must provide information and training to his employees regarding the characteristics of EMF emissions, the direct and indirect biophysical effects that could result from exposure to EMF, etc.
- The employer must adapt as much as possible the post in order to limit exposure to EMF.
- [Read about it here.](#)

#### 2011 French Cell Phone Statute:

- Merchants must display SAR Radiation levels for different phone models, all phones must be sold with a headset, cell phone ads aimed at children younger than 14 are banned and phones made for children under 6 are banned.

#### 2013 French Agency for Food, Environmental and Occupational Health & Safety Report

- Recommends hands free phones, SAR labeling, and “limiting the population's exposure to radiofrequencies... especially for children and intensive users, and controlling the overall exposure that results from relay antennas.”
- [The French National Library](#) along with other libraries in Paris, and a number of universities have removed all Wi-Fi networks.
- [Herouville-Saint-Clair](#) has removed all Wi-Fi equipment installed in municipalities.

The City of Lyon France ran a Campaign “No Cell Phone Before 12 Years old” [See colorful poster here.](#)

## Belgium

[Federal Public Health Regulations](#) passed on March 2013 due to Health Concerns for Children.

- **Phones designed for children under 7 years old are prohibited from sale.**
- **Total Advertising Ban on cell phones aimed at children.**
- Mandatory Radiation SAR levels must be available for consumers at point of sale.
- Warning label on phones: **“Think about your health – use your mobile phone moderately, make your calls wearing an earpiece and choose a set with a lower SAR value.”**
- Recommendations include use of hands-free methods to keep the phone away from the body such as text messaging and not making calls when the signal is weak, such as in elevator/vehicle.
- See examples of the posters that shops must display.
- Read Belgium’s [frequently asked questions about the new law.](#)
- [Powerpoint Presentation IMPLEMENTATION OF the Council Recommendations in Belgium Introduction of new rules for mobile phone sales Presentation by Dr.Marina Lukovnikova \(Ministry of Public Health, Belgium\)](#)
- [Read the Belgium Health Food and Safety Brochure on Wireless devices here.](#)
- [Read Dr. Moskowitz Press Release on the Belgium Law.](#)
- Read the News article [Flanders Today: Belgium bans sale of mobile phones designed for children](#)
- The Belgian Foundation Against Cancer warns that intensive use of a mobile phone can increase the risk of contracting cancer. They suggest that children younger than 12 should not use a mobile phone, and that using a mobile phone as an alarm clock is not desirable because the phone is in close proximity to the head the entire night. The

Cancer Foundation also strongly advises people not to use a mobile phone in the car or a train. [Read it here.](#)

- [Read the World Health Organization Belgium Report detailing the Law here.](#)

### **Belgium Health Agency Recommendations to Reduce Exposure**

- [Read Belgium's Statement on Wireless Networks:](#) "to reduce your exposure" which includes specific tips for Wi-Fi installations and I quote, " In order to limit the exposure, the following simple measures can be taken: Only switch on your wireless network connection when it is needed. This concerns the wifi adapter in your laptop in particular. Otherwise, your laptop tries to continually connect to the network, and that leads to unnecessary exposure and decreases the life expectancy of the batteries. Place the access point away from places where you spend lots of time."
- Read Belgium's [Tips for Reducing Cell Phone Exposure HERE](#); "Experts – including those on the [Superior Health Council\(link is external\)](#) – advise everyone to limit their exposure to mobile phone radiation. The following simple tips will help you."
- [Children and Cell Phones:](#) "The use of the mobile phone by children is a special point of attention. Children may be more sensitive to radio waves. Children absorb twice as much radiation in the brain than adults do, and 10 times more in the bone marrow of the skull. In addition, due to the popularity of the mobile phone, the cumulative exposure of the current generation of children will be much higher by the time they reach their adulthood than that of the current adults."

Belgium's [Ghent Municipality:](#) Wireless internet is banned from spaces that cater to children between 0 and three: preschools and daycares to reduce exposure to microwave radiation. [Read news article about the ban here.](#)

## **Spain**

- [The Parliament of Navarra voted to urge removal of WIFI in schools](#) and to apply the precautionary principle in relation to exposure limits to electromagnetic fields whose boundaries have become "obsolete".
  - The Parliament voted to adopt a resolution which calls to implement the Parliamentary Assembly of the Council of Europe resolution 1815 of 2011, which recommends to "review the scientific basis for the standards of exposure to electromagnetic fields" and " set thresholds for levels of preventive long-term exposure in all indoor areas not exceeding 0.6 volts per meter ".
- **2016 The High Court of Madrid recognizes "Electrosensitivity" as grounds for disability:** A telecommunications engineer who worked at Ericsson had his sensitivity recognized. "This is the first we have achieved total disability due exclusively to this syndrome," says attorney Jaume Cortés, the Col·lectiu Ronda. [Read the news article here.](#)
- [The Vitoria City Council unanimously approved](#) a precautionary approach with wireless: Citizens will be informed of the location of wireless transmitters are in civic centers and municipal buildings. It is recommended that children's spaces such as playgrounds and family libraries, will be free of WiFi or have decreased wifi and wifi free zones will be established in playgrounds and building entrances.
- **The Basque Parliament** joined the resolution of the Parliamentary Assembly of Council of Europe in 2011, which warns of the "potential risk" of electromagnetic fields and their effects on the environment and urged the promotion of campaigns against "excessive use "mobile phones among children.In a statement, the parliamentary Aralar, Dani Maeztustated, "To protect children's health, recommends the implementation of information campaigns and portable devices that emit microwaves, and prioritizes the use of cable connections in schools."

- **City of Tarragona Municipal Government (Tarragona is a major city 100 kilometres south of Barcelona) approved the “Institutional Declaration of support for people with Central Sensitivity Syndromes”**
  1. Carry out (with a yearly update) a diagnosis and census of those affected by CSS in the City of Tarragona, showing what is the actual situation and the specific needs of these patients and their families.
  2. An intervention protocol for the staff of the Area of Services to Citizens of the Tarragona City Government to look after those with CSS- including a list of economic subsidies for food, first necessity elements, reduced water bill, and home help specific to the needs of these patients.
  3. Housing protocol for people with CSS, especially those who have MCS and/or EHS, those threatened by eviction or those who are forced to leave their home. This protocol has to include a series of safe social housing (green/white spaces: free of xenobiotics and electromagnetic waves).
  4. Create green/white spaces in all municipal buildings (free of xenobiotics and electromagnetic waves).
  5. Eliminate, as much as possible, the use of pesticides in the whole of the municipality. In the case when this is not possible, establish a communication protocol to contact those affected and the press regarding the places and dates of the interventions with preventive advice.
  6. Training for social workers and educators about CSS, its social, health and economic reality. Elaboration of information and education to increase the knowledge about these illnesses amongst the general population and of the city workers in particular, with the objective of diminishing the stigma that is now present regarding these illnesses.
  7. Protocol for adapting working conditions of the municipal workers who have CSS with specific measures of support when having a flare up. These would be the measures: work schedule flexibility, encourage work from home through internet (teleworking), reserved parking spaces and include in the collective agreement not deduct the salary of the first 20 days of sick leave.
  8. [Read the full article detailing the actions here.](#)

## Canada

- **Health Canada offers “Practical Advice”** on reducing exposure to wireless radiation:
  1. Limit the length of cell phone calls, 2. Replace cell phone calls with text, use "hands-free" devices and 3. Encourage children under the age of 18 to limit their cell phone usage. [Read it here.](#)

*“Health Canada reminds cell phone users that they can take practical measures to reduce RF exposure. The department also encourages parents to reduce their children’s RF exposure from cell phones since children are typically more sensitive to a variety of environmental agents. As well, there is currently a lack of scientific information regarding the potential health impacts of cell phones on children.”*
- [Canadian Parliament Standing Committee on Health of the House of Commons issued a report "Radio Frequency Electromagnetic Radiation and the Health of Canadians"](#) on June, 2015 after holding public hearings regarding Health Canada’s Safety Code 6 recommended limits. They made 12 recommendations including an awareness campaign on reducing exposures, improved information collecting and policy measures regarding the marketing of radiation emitting devices to children under the age of 14, "in order to ensure they are aware of the health risks and how they can be avoided."
- **2015: [National Bill C-648 was Introduced into the House Of Commons.](#)** “An Act Respecting the Prevention of Potential Health Risks From Radiofrequency Electromagnetic Radiation” would require manufacturers of all wireless devices to place specific health warning labels clearly on packaging, or face daily penalties /fines and/or

imprisonment. Although the Bill did *not pass*, it made headlines. Press Conference for [Bill C-648 Video](#).

- Canadian Pediatric Association issued a Position Statement [Healthy active living: Physical activity guidelines for children and adolescents](#) which states:  
For healthy growth and development: screen time (eg, TV, computer, electronic games) is not recommended for children under 2 years old. For children 2-4 years, screen time should be limited to <1 h/day; less is better. [Read the Position Statement Here](#).

## European Parliament

[Resolution 1815](#): In 2011 The Parliamentary Assembly of the Council of Europe issued ***The Potential Dangers of Electromagnetic Fields and Their Effect on the Environment***.

*A call to European governments to “take all reasonable measures” to reduce exposure to electromagnetic fields “particularly the exposure to children and young people who seem to be most at risk from head tumours.”* The Resolution calls for member states to:

- Implement “information campaigns about the risk of biological effects on the environment and human health, especially targeting children and young people of reproductive age.”
- “Reconsider the scientific basis for the present standards on exposure to electromagnetic fields set by the International Commission on Non-Ionising Radiation Protection, which have serious limitations, and apply ALARA principles, covering both thermal effects and the athermic or biological effects of electromagnetic emissions or radiation.”

*“For children in general, and particularly in schools and classrooms, give preference to wired Internet connections, and strictly regulate the use of mobile phones by schoolchildren on school premises.”* [Read Resolution 1815](#)

[Read the 2009 Resolution: Health concerns associated with electromagnetic fields calling for a review of the issue.](#)

## Australia

The Australian Radiation Protection and Nuclear Safety Agency has issued a [Fact Sheet](#) titled *How to Reduce exposure from mobile phones and other wireless devices*.

- Reduce the risk from WiFi devices by “keeping them at a distance, for example placing the wireless router away from where people spend time”, and “reducing the amount of time you use them”.
- ARPANSA recommends that parents encourage their children to limit their exposure stating that “It is recommended that, due to the lack of sufficient data relating to children and their long term use of mobile phones, parents encourage their children to limit their exposure by reducing call time, by making calls where reception is good, by using hands-free devices or speaker options, or by texting.” [Read it HERE](#).

Queensland Department of Education, Training and Employment issued [Your Guide to Safe Technology](#) guide in 2015 to all schools that states:

*It’s not only physical hazards you need to consider when thinking about health and safety issues at work or home — you should also think about how you use technology. When using a computer, you need to think about:*

- ergonomics and posture
- radiation
- vision impacts
- harmful lack of exercise (DVT).

*“Wireless devices — smart/mobile phones, tablets, slates, monitors etc — all emit low levels of electromagnetic radiation and should be used correctly. When using electronic devices, the department recommends you follow WiFi/3G/4G best practice:*

- *follow the manufacturer's usage guideline operate from a table or bench — not on your lap*
- *use 'hands-free' devices to keep smart/mobile phones away from your head and body during phone calls limit the number and length of calls*
- *position the device antenna away from your body*
- *do not sit within 0.5 m of a wireless router use smart/mobile phone in areas of good reception to reduce exposure."*
- [Watch a video on these recommendations here.](#)

## New Zealand

[Rotokawa School implemented steps to minimize RF Exposure](#) on 2/2/2016

After concerns raised about e-learning by a small group of parents from the school, the principal has put some positive procedures in place as follows;

- Children will use ipads in flight mode
- Children using laptops and Chromebooks will work on the desk top
- Parents may request that their child use an Ethernet cord to access the internet
- Children are taught about the health precautions as part of their cyber citizenship
- Digital learning in the one to one Year 5 & 6 environment is kept to less than 2 hours per school day.
- The principal has also stated there are no plans to increase the existing Wi-Fi coverage at this stage.

## Italy

- **2016: Mayor of Borgofranco d'Ivrea has ordered Wi-Fi to be turned off in schools.** "Mayor Livio Tola told the town's high school and elementary school to return to using cables to connect to the internet after reading that the electromagnetic waves given off by wireless routers were especially harmful to young children." [Read the newspaper article here.](#) [Read the News article here "Ivrea, The Mayor Removes WiFi as it Could Be Dangerous".](#)
- **On June 10, 2015, the State Parliament of South Tyrol voted to [allow the application of the precautionary principle](#) mandating the state government to:**
  - 1. To replace existing wireless networks whenever possible with networks that emit less radiation at schools, preschools, hospitals, nursing homes, and other public facilities.
  - 2. Establish a working group whose mandate it is to assess these new technologies and their exposure levels. With regard to wireless communication technologies, mobile Internet access, and public health, the working group shall clarify which technologies emit less radiation and provide sustainable technology options and
  - 3. To start an education and awareness campaign that informs about possible health risks, especially regarding the unborn, infants, children, and adolescents and that develops guidelines for a safer use of cell phones, smartphones, and Wi-Fi ...[Discussion at the Plenary Session, 10 June 2015 \(in German\)](#) //Official Files, Resolutions (in German) //Previous Hearing at the Parliament of South Tyrol, 29 April 2015 (in German)
- **The [Italian Supreme Court](#) ruled a man's brain tumor was caused by his cell phone use in 2012.** The National Institute for Workmen's Compensation must compensate a worker with head tumor due to cell use. [Read news article with details here.](#) Read Daily Mail article [Mobile phones CAN cause brain tumours, court rules in landmark case.](#)
- **A school In Lecce, Italy, "Istituto Comprensivo Alighieri- Diaz" banned wifi.** Their two resolutions decided: a) to ban wifi in school and install a wired system for the use of



internet and b) Reject the request of the local government (Municipality) to install an antenna on the school roof for the wireless signal providing for the "Wireless city" program. The resolution also asks the Municipality to install the antenna at a reasonable distance from school. [Read the official resolutions number 1 here](#) and [Resolution 2 Here](#).

- **The Piemonte Region has adopted a resolution to limit EMF exposure**, to limit the use of wifi in schools and be considerate to the problem of EHS people. [Read about it here](#).
- **The Italian Society for Preventive and Social Pediatrics has officially called to prohibit cell phones for children under 10 years old.** Giuseppe Di Mauro, president of the Italian Society of social and preventive pediatrics [Società italiana di pediatria preventiva e sociale ([www.sipps.it](http://www.sipps.it))] "We do not know all the consequences associated with cell phone use, but excessive use could lead to concentration and memory loss, increase in aggressiveness and sleep disturbances." and he cites electromagnetic fields stating "The damage to health are increasingly evident" [Read it here](#).
- **Turin Mayor Chiara Appendino laid out plans "to cut back on Wi-Fi in state schools** and government buildings over concerns that radiation might damage people's health". Read 7/2016 News Report [Turin could slash Wi-Fi over 'radiation' concerns](#)

## Finland

In 2015 the Radiation and Nuclear Safety Authority (STUK) revamped their public information website to recommend reduced exposure to children and state the following:

- The page [Mobile phones are a major source of radio frequency radiation](#) states that, 'The level of exposure to radiation from a mobile phone held next to user's ear can approach the exposure limits. *Never before have humans been exposed to equally strong sources of radiation in their living environments.* Identifying any health impacts is highly important because practically everybody uses a mobile phone today.'
- [Read STUK Recommendations to reduce cell phone exposure HERE: Use a hands free device, don't use phones reception is poor, the phone should be kept on a table or similar location instead of in the user's pocket.](#)
- "STUK recommends that unnecessary exposure to radiation from mobile phones be avoided. In particular, children's unnecessary exposure should be avoided as their life-long exposure will be longer than that of those who begin using mobile phone as adults and as only scant research exists on health effects to children."

In 2009 the Radiation and Nuclear Safety Authority (STUK) initially issued recommendations to reduce exposure with more explicit cautionary language.

- [Read the information posted on the STUK website in 2009- now removed.](#)
- [Read a policy position paper by STUK from 2009](#) detailing why "It would be good to restrict children's use of mobile phones."
- [Read the 2011 policy position from STUK.](#)
- [Read a news article from 2009](#) when STUK first recommended restricting the use of mobile phones by children.

## Israel

- The Israeli Government created the EMF public education webpage [National Information Ctr for Non-Ionizing Radiation](#). [The Israeli Ministry Of Education](#) has issued guidelines limiting WiFi and [cell phone](#) use in schools.
  - Preschool through 2nd grade have banned the use of wireless networks. In third and fourth grade class internet is restricted to 3 hours per week.

- A hard wired direct cable connection is required if the teacher has a computer in the class.
- Magnetic fields below 4 mG are being reduced in schools representing the government's position that international guidelines are NOT protective of children.
- [The Israeli Supreme Court](#) ordered the Israeli government to reply on ceasing Wifi installations
- In third and fourth grade class internet is restricted to 3 hours per week.
- [The Education Ministry](#) has instructed all schools to perform radiation tests.
- Israel's Minister of Health Rabi Litzman [stated](#) that he supports a ban on Wi-Fi in schools.
- A hard wired direct cable connection is required if the teacher has a computer in the class.

2016: Cell phones are banned in classrooms per a memorandum from the Ministry of Education. [Watch a newsreport on this action here.](#)

Read the official [ISRAEL 2015 RF Safety Report](#) with actions being taken to reduce EMF.

The Ministry of Health published [Environmental Health in Israel 2014](#) which states that "Precautions should be strictly enforced with regard to children, who are more sensitive to developing cancer." and that "wireless communication networks in schools be reduced." The Health Ministry recommends "sensible use of cellular and wireless technology, including: considering alternatives like landline telephones, use of a speaker while talking on a cellphone, and refraining from installing the base of wireless phones in a bedroom, work room, or children's room." The Report states that "Findings in Israel clearly indicated a link between cellphone use for more than 10 years and the development of tumors in the salivary glands, particularly among people who held the telephone on the same side where the tumor developed and individuals in the highest category of exposure (heavy use in rural areas)."

- Linda S. Birnbaum, Director, USA National Institute of Environmental Health Sciences and National Toxicology Program wrote in the Israeli Report final chapter that, "If some of the om studies turn out to be harbingers of things to come, we may have major health consequences from the nearly ubiquitous presence of wireless equipment."

#### **Haifa (Israel's third largest city) removes Wi-fi from all schools.**

- Haifa Mayor Yona Yahav, said that "When there is a doubt, when it comes to our children, there is no doubt". Read the News Report [The - Wi-Fi in kindergartens and schools in Haifa severed.](#)
- "The roots of the decision go back to a 2013 petition by parents in four schools who claim that such networks are harmful. The case eventually made its way to the High Court, which has postponed a final decision on the matter...The movement has spread from Haifa to other cities as well, and petitions have been signed by parents in dozens of cities demanding the removal of the networks. Haifa is the first city to take action on the matter. Haifa Mayor Yona Yahav said that the city would replace the wireless network with a wired connection that will provide safer options to students." [Read the news article here.](#)
- This action occurred after this Israeli [TV Documentary – "HOW WE ARE KILLING OURSELVES – WIRELESS RADIATION"](#) aired.

Read the 2009 News article on the cell phone guidelines in Israel [Health Ministry.: Limit Kids' Use of Cell Phones](#)

## Switzerland

- **The Switzerland Federal Office for the Environment FOEN** has [a webpage on Wi-Fi](#) which states “caution should be exercised primarily when using devices held close to the body, such as laptops, PDAs and Internet telephones..” and gives recommendations on how to reduce exposure including turning the Wi-Fi off when not in use, installing the access point one metre away from places where you work, sit or rest for long periods of time and keeping laptops off laps.
- **The Switzerland Federal Office for the Environment FOEN** has [a webpage on Cell Phones](#) which details ways to reduce mobile phone radiation. FOEN also has additional EMF factsheets on various EMF sources including on [baby monitors](#) where they state that “it is **advisable to reduce the infant’s exposure to emissions as far as possible.**”
- **The 2015 Environmental Report Chapter 17 on Electromog** states “Effects can also be detected for weak radiation intensity. For example, weak high-frequency radiation can alter electric brain activity and influence brain metabolism and blood flow. Whether these effects have an impact on health is still unclear” and recommends the precautionary principle to reduce risk “Because major gaps still exist in our knowledge about the health impacts of long-term exposure to weak non-ionising radiation, the adopted protective strategy should be pursued consistently.” [Read it here.](#)
- [Switzerland FOEN 2012 Radiation of radio transmitters and Health](#) “In view of the fact that there are gaps in the available data, the absence of proof of health risks does not automatically also mean proof of their absence. From the scientific point of view, a cautious approach in dealing with non-ionising radiation is still called for. There remains a need for extensive research into the potential long-term effects”
- [The Governing Council of Thurgau Canton](#) 2008 “The Governing Council recommends for schools to forgo the use of wireless networks when the structural makeup of a given school building allows for a wired network.” [Read a letter by the Council here.](#)

### Swiss Physicians Association of Doctors for Environmental Protection

[2012 Swiss Physicians Letter](#) “the risk of cancer for this type of [wireless] radiation is similar to that of the insecticide DDT, rightfully banned... From the medical point of view, it is urgent to apply the precautionary principle for mobile telephony, WiFi, power lines, etc.”

[2014: Preliminary draft for a federal law on the protection against dangers:](#) Non-ionizing radiation (NIS) is growing steadily. Especially the everyday stress in the area of low-frequency and high-frequency. [Read it here.](#)

[2016: Press Release on the NTP Study and Policy Implications:](#) “There are increasingly clear indications that mobile radio is a health hazard. From a medical point of view it is clear: the scientific results so far show it is clear that prudent avoidance of unnecessary exposures is necessary.”

- Additional Links by Swiss Physicians for the Environment  
Report on [Smartphones- \(OEKOSKOP 1/16\)](#) [AefU-News about Electromog](#)

## Germany



- The Federal Office for Radiation Protection (FORP) provides tips for reducing radiation exposure to smartphones, tablets and wireless devices stating, “*Since long term effects could not be sufficiently examined up to now the Federal Office for Radiation Protection (BfS) recommends to keep exposures to these fields as low as reasonably achievable.*” [Read the precautionary advice here.](#)

*“There are uncertainties in the [risk](#) assessment that the German mobile communications research programme has not been able to remove completely. These include in particular:*

- *possible health risks of the long-term exposure of adults to [highfrequency](#) electromagnetic fields when making mobile telephone calls (intensive mobile use over more than 10 years)*
- *the question of whether the use of mobile phones by children could have an effect on health.*

*For these reasons, the BfS continues to consider that precautionary measures are necessary: exposure to electromagnetic fields should be as low as possible.”*

- **Smartphones and Tablets:** [Read the webpage with recommendations to reduce exposure here:](#)

***“Smartphones and tablets for children?***

*It is particularly important to minimise children’s exposure to radiation. They are still developing and could therefore react more sensitively in terms of health.”*

- The FORP recommends landline phone instead of mobile phone base stations and that schools should not connect wirelessly to the internet. [Read a 2015 statement here.](#)

[See their poster “Less radiation when Telephoning” here.](#)

[The German Federal Ministry](#) for Radiation Protection stated in 2007 ,“supplementary precautionary measures such as wired cable alternatives are to be preferred to the WLAN system.” See original German Bundestag document [here](#), and an English translation [here](#).

**[Bavaria:](#) The State Ministry of Education and Cultural Affairs:** “For precautionary reasons the Federal Office for Radiation Protection recommends for schools that if a wireless network is used to place its components in suitable locations and to prefer the use of wired network solutions whenever possible.” In 2007 Parliament recommendation to all schools to *not* install wireless LAN networks.

**[Frankfurt:](#)** “**In Frankfurt’s schools there will be no wireless networks in the short or mid term.** The Local Education Authority did not wish to conduct a “large scale human experiment,” said Michael Damian, spokesperson of the Head of the School Department Jutta Ebeling.

**2013: Four German Federal Agencies issued a guidebook recommending reducing cell phones and Wi-Fi to young children:** [“Parenting Guide: Environmental and Child Health”](#) by the Federal Office for Radiation Protection (BfS), the Federal Institute for Risk Assessment (BfR), the Robert Koch Institute (RKI ) and the Federal Environmental Agency (UBA). It contains practical information including reducing electromagnetic radiation from baby monitors and telephones: Baby monitors should be as far as possible away from the crib. Phones should be banished from the nursery. They are not suitable toys for

infants and toddlers. Use of cabled landline phones is preferable. Wi-Fi routers are not suitable in children's bedrooms, and should be switched off when not in use, especially at night.

- Download [Parenting Guide: Environmental and Child Health](#) here.
- [Read a news article about it by clicking here.](#)

## Austria

**Salzburg: The Public Health Department Advises Against Wi-Fi in Schools:** "The official advice of the [Public Health Department of the Salzburg Region](#) is not to use WLAN and DECT in Schools or Kindergartens." -Gerd Oberfeld, MD.

**The public health department of Salzburg (Landessanitätsdirektion) recommends to evaluate mobile phone base station exposures based on the [EUROPAEM EMF Guideline 2016](#)**

**[The Public Health Department of Salzburg lists Electrosmog studies](#)** highlighting the EUROPAEM EMF guideline 2016 as representing the current state of medical science that it is used by the Landessanitätsdirektion Salzburg for the health assessment of EMF.

**The Vienna Medical Association has issued [cell phone safety guidelines](#)** stating that cell phones should be used for as short of a time as possible and that children under 16 should not use cell phones at all. They also state that "wireless LAN leads to high microwave exposure".

January 2016 : [Vienna Medical Association has issued new Ten Cell Phone Guidelines](#). They are:

1. Make calls as short and little as possible - use a landline or write SMS. Children and teenagers under 16 years old should carry cell phones *only for emergencies!*
2. Distance is your friend- Keep the phone away from body during connection of Phone. Pay attention to the manufacturer's safer distance recommendation in the manual, keep a distance during the call set-up from the head and body. Take advantage of the built-in speakerphone or a headset!
3. When using headsets or integrated hands-free, do not position mobile phones directly on the body - special caution applies here for pregnant women. For men, mobile phones are a risk to fertility if Mobile is stowed in Trouser pockets. Persons with electronic implants (pacemakers, insulin pumps et cetera) must pay attention to distance. Unless otherwise possible, use coat pocket, backpack or purse.
4. Not in vehicles (car, bus, train) calls - without an external antenna, the radiation in the vehicle is higher. In addition, you will be distracted and you bother in public transport the other passengers!
5. During the car when driving should be an absolute ban on SMS and internetworking - the distraction leads to self-endangerment and endangering other road users!
6. Make calls at home and at work via the fixed corded (not wireless) network - Internet access via LAN cable (eg via ADSL, VDSL, fiber optic) no Radiation, is fast and secure data transfer. Constant radiation emitters like DECT cordless telephones, WLAN access points, data sticks and LTE Home base stations (Box, Cube etc.) should be avoided!
7. Go offline more often or use Airplane mode - Remember that for functions such as listening to music, camera, alarm clock, calculator or offline games an internet connection is not always required!

8. Fewer apps means less radiation - Minimize the number of apps and disable the most unnecessary background services on your smartphone. Disabling "Mobile services" / "data network mode" turns the smartphone again into a cell phone. You can still be reached, but avoid a lot of unnecessary radiation by background traffic!
9. Avoid Mobile phone calls in places with poor reception (basement, elevator etc) as it increases transmission power. Use in poor reception Area a headset or the speakerphone!
10. For buyers of mobile phones, Look out for a very low SAR value and an external antenna connection!

Read the [Press release \(in German\): http://www2.aekwien.at/1964.py?Page=1&id\\_news=8972](http://www2.aekwien.at/1964.py?Page=1&id_news=8972)

See The Poster (in German): <http://www.aekwien.at/aekmedia/Medizinische-Handy-Regeln.pdf>

[See the translated Poster with Tips in English](#)

**Austria's" Highest Health Council of the Ministry of Health"** has a brochure with advice to reduce exposure to cell phone radiation. It states that since the long term research is still not completed, it is advisable to take simple precautions to reduce exposure. [Read the Brochure here.](#) [See the WHO Report on Austria's EMF activities and research studies underway here.](#)

## India

2012 The Ministry of Communications and Information Technology issued [new EMF guidelines](#) with new Exposure Limits *lowered to 1/10 of the ICNIRP level, and SAR labeling on phones.*

- [Official cell phone radiation guidelines](#) *Precautionary Guidelines for mobile users:* 1. Keep distance – Hold the cell phone away from body to the extent possible. 2. Use a headset (wired or Bluetooth) to keep the handset away from your head. 3. Do not press the phone handset against your head. Radio Frequency (RF) energy is inversely proportional to the square of the distance from the source -- being very close increases energy absorption much more. 4. Limit the length of mobile calls. 5. Use text as compared to voice wherever possible. 6. Put the cell phone on speaker mode. 7. If the radio signal is weak, a mobile phone will increase its transmission power. Find a strong signal and avoid movement – Use your phone where reception is good. 8. Metal & water are good conductors of radio waves so avoid using a mobile phone while wearing metal-framed glasses or having wet hair. 9. Let the call connect before putting the handset on your ear or start speaking and listening – A mobile phone first makes the communication at higher power and then reduces power to an adequate level. More power is radiated during call connecting time. 10. If you have a choice, use a landline (wired) phone, not a mobile phone. 11. When your phone is ON, don't carry it in chest/breast or pants pocket. When a mobile phone is ON, it automatically transmits at high power every one or two minutes to check (poll) the network. 12. Reduce mobile phone use by children as a younger person will likely have a longer lifetime exposure to radiation from cell phones. 13. People having active medical implants should preferably keep the cell phone at least 15 cm away from the implant.
- [The Parliamentary Standing Committee on Science & Technology, Environment & Forests](#) issued a report in the Rajya Sabha on July 23, 2015, recommending "indigenous methodology and techniques to check the alarming increase in radiation from radio-active signals, RF and Electro-magnetic Fields (EMFs)." The committee said "Indians were more prone to risk from radiations as compared to Europeans because of their low body mass index (BMI) and low fat content.

Therefore, comprehensive scientific studies must be conducted to “conclusively establish the level of risks and adverse health effects of electromagnetic radiation (EMR) of cell towers”.

- 2013: [Supreme Court of India](#) upheld the High Court of the State of Rajasthan decision to remove all cell towers from the vicinity of schools, hospitals and playgrounds because of radiation “hazardous to life.” Two hundred and four mobile towers installed on the school premises of Rajasthan have been removed in compliance.
- [A Journey for EMF](#): The Ministry of Communications and Information Technology has developed an [EMF webpage](#).
- [Zilla Parishad orders removal of all cellphone towers](#) near schools citing exposure to “harmful radiation”.
- [Municipal Corporation of Greater Mumbai](#), the civic body that governs the capital city of [Mumbai](#) in [Maharashtra](#) (India's richest municipal organization) in 2016 in its new policy on mobile towers, no longer allows cell towers on playgrounds, recreational grounds, gardens and parks. [Read news article](#).
- Read a [Document prepared by Dr. Sharma, Sr. Deputy Director of the Indian Council of Medical Research on Indian Research Studies](#).
- See the Colorful graphic created by the Government [Ensuring Safety from Radiations : Mobile Towers and Handsets](#)
- [Read the 2011 Report: Ministry of Environment and Forest, Government of India's Expert Group study on the possible impacts of communication towers on Wildlife including Birds and Bees](#)
  - *“The review of existing literature shows that the Electro Magnetic Radiations (EMRs) are interfering with the biological systems in more ways than one. There had already been some warning bells sounded in the case of bees and birds, which probably heralds the seriousness of this issue and indicates the vulnerability of other species as well.”*

## Russia

- [The Russian National Committee on Non-Ionizing Radiation Protection](#) in [ELECTROMAGNETIC FIELDS FROM MOBILE PHONES: HEALTH EFFECT ON CHILDREN AND TEENAGERS \(2011\)](#) has repeatedly [warned](#) about electromagnetic radiation impacts on children and recommended WiFi not be used in schools.
- **Official Recommendations:** The Russian Federation specifically advises that those under the age of 18 should not use a mobile phone at all, recommends low- emission phones; and requires the following: on-device labelling notifying users that it is a source of RF-EMF, user guide information advising that “it is a source of harmful RF-EMF exposure” and the inclusion of courses in schools regarding mobile phones use and RF-EMF exposure issues. “Thus, for the first time in the human history, children using mobile telecommunications along with the adult population are included into the health risk group due to the RF EMF exposure.”
  - “In children, the amount of so-called stem cells is larger than in adults and the stem cells were shown to be the most sensitive to RF EMF exposure.”
  - “It is reasonable to set limits on mobile telecommunications use by children and adolescents, including ban on all types of advertisement of mobile telecommunications for children.”

[Decision of Russian National Committee on Non-Ionizing Radiation Protection](#) 2008, "Children and Mobile Phones: The Health of the Following Generations is in Danger"

## European Environment Agency

- The EEA's issued 2013 *Late Lessons From Early Warnings: Chapter 12: Mobile phone use and brain tumour risk: early warnings, early actions?* which concludes that "Precautionary actions now to reduce head exposures, as pointed out by the EEA in 2007, and many others since, would limit the size and seriousness of any brain tumour risk that may exist. Reducing exposures may also help to reduce the other possible harms..." [Read it here.](#)
- 2011 David Gee, EEA Senior Advisor on Science, Policy and Emerging Issues stated in a press release that "We recommend using the precautionary principle to guide policy decisions in cases like this. This means that although our understanding is incomplete, this should not prevent policy makers from taking preventative action." [Read it here.](#)
- [2009 EEA Recommendations based on current evidence \(2009\)](#) The evidence is now strong enough, using the precautionary principle, to justify the following steps: 1. For governments, the mobile phone industry, and the public to take all reasonable measures to reduce exposures to EMF, especially to radio frequencies from mobile phones, and particularly the exposures to children and young adults who seem to be most at risk from head tumours.
- 2007 Professor Jacqueline McGlade, the EEA's executive director issued a statement that "Recent research and reviews on the long-term effects of radiations from mobile telecommunications suggest that it would be prudent for health authorities to recommend actions to reduce exposures, especially to vulnerable groups, such as children." [Read it here.](#)

## Singapore

Singapore's National Environmental Agency specifically advises precautions. Below is the exact text found on the [Frequently asked Questions About Radiation Protection](#).

"What is NEA's advice to the public on the proper way of using mobile phones amidst all the concerns?

While further research is being carried out to study the long-term health effects of RF field, individuals could take precautionary measures to reduce RF exposure to themselves or their children by limiting the length of calls, or using 'hands-free' devices to keep the mobile phones away from the head and body."

## United Kingdom

The UK National Health Service has changed it's advice. Here is the story. As of 2011 it offered specific [Recommendations](#) to reduce cell phone radiation exposure to children.

- [Read the pre 2015 webpage entitled 'Risks of mobile phone use'](#) with recommendations which state; *"Children are thought to be at higher risk of health implications from the use of mobile phones. This is because their skulls and cells are still growing and tend to absorb radiation more easily. It is recommended that children use mobile phones only if absolutely necessary."*
- [Read the UK Department of Health pre- 2015 brochure](#) on mobile phones and health which reads:

*"The expert group has therefore recommended that in line with a precautionary approach, the widespread use of mobile phones by children (under the age of 16) should be discouraged for non-*

*essential calls. In the light of this recommendation the UK Chief Medical Officers strongly advise that where children and young people do use mobile phones, they should be encouraged to: • use mobile phones for essential purposes only • keep all calls short - talking for long periods prolongs exposure and should be discouraged The UK CMOs recommend that if parents want to avoid their children being subject to any possible risk that might be identified in the future, the way to do so is to exercise their choice not to let their children use mobile phones.”*

- [Read the 2011 brochure on base stations and health](#) which reads, “Therefore, as a precaution, the UK Chief Medical Officers advise that children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short. If you are concerned, you can take steps to reduce your exposure such as using hands free kits or texting.”
- The NHS also had additional website sections on health effects. The Mobiles and mums-to-be webpage was about the research showing cell phone was linked to behavioral issues in children. [Read it here](#). The NHS webpage [Mobile effect on sleep](#) detailed research which concluded RF “is associated with adverse effects on sleep quality within certain sleep stages”. These webpages were deleted from the current site.
- For the public they had “recommendations to help lower any potential long-term risks” which include keeping calls short, keep phone away from the body on standby mode, only use it when the reception is strong and use a phone with an external antenna.
- [2002 The Stewart Report](#) commissioned by the UK Government found that exposure to RF radiation below guidelines has not been “proven” to cause adverse health effects but it is not possible to say “that exposure to RF radiation, even at levels below national guidelines, is totally without potential adverse health effects” as “there is some scientific evidence which suggests that there may be biological effects and gaps in knowledge justify a precautionary approach to the use of mobile phone technologies until much more detailed and scientifically robust information on any health effects becomes available.”
- [Check out a slide presentation on people and wireless radiation by NHS here](#).

**Then, the UK National Health service changed the public advice text. Everything noted *above* was reworded. Now the website states:**

- “If there are any health risks from the use of mobile phones, children might be more vulnerable because their bodies and nervous systems are still developing. Research carried out to date hasn't supported a link between mobile phone use and childhood cancers such as leukaemia. However, if you have any concerns, you can lower your child's exposure to radio waves by only allowing them to use mobile phones for essential purposes and keeping calls short.” [Read this new text here](#).
- See the brochure (2011) entitled [“Mobile phones and base stations: Health advice on using mobile phones”](#) which states: The body and nervous system are still developing into the teenage years. Therefore, as a precaution, the UK Chief Medical Officers advise that children and young people under 16 should be encouraged to use mobile phones for essential purposes only, and to keep calls short.
- The newly edited section called [Mobile phone safety - FAQs states:](#)

***Do scientists know everything about mobile phones and health?***

*No, and research is continuing. Mobile phones have only been widely used for about 20 to 30 years, so it's not possible to be so certain about the safety of long-term use. More research on the effects of mobile phones on children is also needed, as they're known to be more sensitive than adults to many*



environmental agents, such as lead pollution and sunlight. **Government advice is to be on the safe side and limit mobile phone use by children.**

**2016 The Control of Electromagnetic Fields at Work Regulations 2016 (CEFAW)** requires employers to assess the levels of EMFs their employees may be exposed to, ensure compliance, provide information on risks and take action if necessary. Legislation [http://www.legislation.gov.uk/uksi/2016/588/pdfs/uksi\\_20160588\\_en.pdf](http://www.legislation.gov.uk/uksi/2016/588/pdfs/uksi_20160588_en.pdf)

- “You must ensure you take workers at particular risk, such as expectant mothers and workers with active or passive implanted or body worn medical devices, into account when appropriate, devise and implement an action plan to ensure compliance with the exposure limits.” [Read news article on regulations.](#)

## Cyprus

“Be Precautionary and reduce exposure to phones, Wi-Fi and other wireless devices,” states the Cyprus National Committee on Environment and Child Health (ECH). Dr. Stella Michaelidou, President of the ECH, states that society should respond by taking precautions because “Documentation of other potential and more serious biological side effects are on the tip of an emerging iceberg.” [This stance was documented in a recent news article](#) that quotes Michaelidou stating that “multiple and frequent exposure to this kind of radiation, which falls below the acceptable levels of thermal effects, pose a health risk to a developing embryo.” and children who use their mobile phone more frequently face a higher risk at having a weaker memory, attention deficit disorder, and similar issues.

[The Cyprus National Committee on Environment and Child Health](#) supported by Cyprus “has as its basic aim the prevention of illnesses, which also are related with the exposure of children in environmental dangers.” The activities of the National Committee are supported by the State of Cyprus. [Read about the Committee and it’s mission on their website here \(click on the British flag to get the English translation.\)](#)

### Official Statements and Documents

- [Protecting children from radiation emitted by Wi-Fi, mobile phones and wireless](#) by Dr. Stella Kanna Michailidou of the National Committee Chairman "Environment and Children's Health"
- [See the Commission’s EMF brochure](#) on reducing the risks to children from exposure to the Non Ionizing Radiation (mobile phones, Wi-Fi, tablets, etc.).
- The National Committee on Environment and Children's Health Website Information on EMFs can be accessed at <http://www.cyprus-child-environment.org/easyconsole.cfm/id/324>

### PSA Video Children’s Health and Wi-Fi

- The Cyprus National Committee on Environment and Child Health created a short PSA for citizens about children and wireless radiation and how to reduce Wi-Fi exposure.
- Watch the greek version here <https://www.youtube.com/watch?v=996vzcCYCnE>
- Watch the video translated into english here <https://www.youtube.com/watch?v=996vzcCYCnE>

### Scientific presentations:

- See the 12/2015 Powerpoint Slide Presentation by the President of the Commission, Dr. Stella Kanna Michaelides on EMFs (in Greek) [by clicking here](#) and Dr Michalis Tornaritis on media use (in Greek) [by clicking here](#).
- [IOANNINA UNIVERSITY COURSES IN PATHOLOGY](#) Neurological and behavior effects of Non Ionizing Radiation emitted from mobile devices on children: Steps to be taken ASAP for the protection of children and future generation by Dr. Michaelidou of the Cyprus National Committee on Environment and Health. [English slides at this link](#).

### News Reports

- Watch the President of the Cyprus National Committee "Environment and Health of the Child" presents the issue of Electromagnetic radiation and its effects on children's health. April 2016
- <https://www.youtube.com/watch?v=DatZGSq3bL4>
- Sigma TV News Report on children and Wi-fi <https://www.youtube.com/watch?v=WumF2qOUKrU>
- Watch the president of the National Committee "Environment and Child Health" with Professor Loukas Margaritis speaking in a news piece. <https://www.youtube.com/watch?v=WumF2qOUKrU>
- 2015 In-Cyprus News Report: [Mobile devices could harm kids](#)
- 9/2015 News Report Cyprus Mail: [‘Technology harming our children’ MPs say](#)

## Argentina

2016 National law on electromagnetic pollution *proposed*: [The law proposes a regulatory framework](#) to "radio infrastructure with radiant systems, antennas and all installations capable of generating electromagnetic radiation" in order to "ensure the protection of public health" considering "both thermal effects and biological." In education and health facilities only wired connections to data networks and Internet access may be used. [Translated Article](#). [Original text](#):

## Taiwan

In 2015 the government *Updated their* Protection of Children and Youths Welfare and Rights Act to ban cell phones for young children. [Read it here](#).

- Complete ban on children under the age of two from using electronic devices such as iPads, televisions and smartphones.
- Parents can be fined NT\$50,000 (about \$1600 US Dollars)
- The new law also states that parents must ensure that under-18s only use electronic products for a 'reasonable' length of time.
- Read a news article: Daily Mail- [Taiwan makes it ILLEGAL for parents to let children under two use electronic gadgets... and under-18s must limit use to 'reasonable' lengths](#)

## Namibia

Namibia's atomic energy review report states that current so called "safety" standards DO NOT protect citizens from long term health effects.

- "ICNIRP guidelines do not guarantee adequate protection against the long term effects of exposure, such as increased risk of cancer." -Republic of Namibia:Atomic Energy Board: [The Atomic Energy Review](#)



# Turkey

The Ministry of Health has issued public information brochures that recommend limiting exposure especially for pregnant women and children. In addition the Ministry is developing regulation on prohibiting phone use for children. The EMF in schools is monitored and the public can get measurements on EMF levels from cell towers and schools at a national site.

- [See the Ministry of Health Brochure Mobile Phones and Health Effects](#): The Brochure starts by saying the research on cell phone radiation shows low levels of electromagnetic frequencies “may cause cancer”. 13 Recommendations to Reduce Exposure *which include*: Pregnant women and children (under 16) are more vulnerable and they should use the phone only when necessary, Prefer speaker or headset, Decrease time on phones, Use low SAR phone, Keep phone away from the body, Keep phones out of baby and children’s bedroom, Turn phone off when you sleep or keep it one meter away from bedside, using phones in cars increases your EMF exposure so it is not recommended.
- **Education on Safer Phone Use:** [A Project funded by Ministry of Internal Affairs](#), accomplished by Temkoder (Prevention, Measurement of Electromagnetic Pollution and Training Organization) resulted in secondary school student training in the safer usage of cellular phones.
- **Development of regulations prohibiting children’s cell phone use.** In 2014, the Ministry of Health started working on new regulations to prohibit cellphone usage for children under 14 year-old children. ([See Turkey’s 2014 World Health Organization EMF Report here](#)). However by 2016 the regulation was weakened and in the [2016 WHO EMF Report](#) Turkey states that they are developing regulations that only would pertain to children under 7 years old.
- The Ministry of Communications and Maritime Affairs monitors Electromagnetic fields around the schools and homes. See the website here <http://ema-olcum.btk.gov.tr/>.

# Greece

**Greek law mandates lower RF exposures near schools, nurseries and hospitals:** The exposure limits in Greece are the 70% of the official European limits. In areas less than 300 m from schools, hospitals and nurseries the exposure limit is lower at 60% of the official European limits. Cell antennae are prohibited from being on top of schools and nurseries.

**2012: The Greek government website materials recommend reducing cell phone radiation to children under 16 and they inform citizens of non-ionizing radiation power levels in their community.**

- [The National Observatory of Electromagnetic Fields](#) which is an interactive web portal linked to a network of 500 fixed measurement stations throughout Greece that continuously monitor the EMF levels from all kinds of antenna stations in the frequency range 100 kHz – 7 GHz.
- ELF and EMF Site Measurements can be looked up for various locations at [EEAE](#).
- The Greek government funds research as detailed on the [WHO EMF report here](#).
- The Q and A on RF radiation states the following text about children. [Read it here on page 32 and 33](#)

*“Even though it hasn’t been proven conclusively that children are more sensitive/reactive than adults to exposure to radiation, nevertheless, the direct/pointed recommendation of international organizations is*

*that children be discouraged from [literally translated, learn not to trust] using cell phones. The above statement is supported by the following:*

- 1. Up to about the age of 16, the nervous system of the human body is in the process of development. Consequently, it's totally possible (although not conclusively proven by relevant scientific research) that up until this age, human being are more sensitive to any number of factors/elements/determinants.*
- 2. Younger people have more years ahead of them than older persons during which the long –term effects of mobile phones can be manifested.*
- 3. Environmental factors/elements have a greater general impact on the health of children than on the health of adults.”*

## Chile

**2012, Law No 20.599, The Antennae Law** ‘Regulates the installation of antennas used for the emission and transmission of telecommunications services’ This law limits the power of antennas, reduces urban impact of towers through ‘infrastructure sharing’ opens up a process for citizen participation in the approval or denial process, establishes mitigation measures in areas that are saturated with antennas and prohibits towers near “sensitive areas” institutions serving children, the elderly and medically compromised.

### **Cell antennae/towers are prohibited in “sensitive areas”.**

- Sensitive areas are those areas that demand special protection due to the presence of educational institutions, nurseries, kindergartens, hospitals, clinics, nursing homes or other institutions of similar nature. .
- Read [New communications antenna law in Chile in the International Bar Association Legal Practice Division Newsletter](#) for details on the Law. [Read a Press release with summary.](#)
- Read RCRWireless article [Chilean telecom companies need to comply with new antenna law](#)
- Chile’s Minister of Transportation and Telecommunications Pedro Pablo Errazuriz stated, “...in addition to protecting the urban landscape and the goodwill of the neighborhoods, the new law takes care of the most important: the health of people in a precautionary manner as recommended by the World Health Organization, setting strict limits on the powers of the antennas. Chile is setting standards in this regard.”

## Ireland

The Irish Department of the Environment, Community and Local Government has a webpage on Electromagnetic fields which directs people to the advice of the Chief Medical Officer.

“Advice from the Chief Medical Officer on mobile phone use: We may not truly understand the health affects of mobile phones for many years. However, research does show that using mobile phones affects brain activity. There is general consensus that children are more vulnerable to radiation from mobile phones than adults. Therefore the sensible thing to do is to adopt a precautionary approach rather than wait to have the risks confirmed.

In the light of these findings, the Chief Medical Officer of the Department of Health and Children strongly advises that children and young people who do use mobile phones, should be encouraged to use mobile phones for “essential purposes only” All calls should be kept short as talking for long periods prolongs exposure to radiofrequency electromagnetic fields.

All mobile phone users can reduce their exposure to radiofrequency energy by making fewer calls, reducing the length of calls, sending text messages instead of calling, using cell phones only when landline phones are unavailable, using a wired “hands free” device so that the phone need not be held against the head and refraining from keeping an active phone clipped to the belt or in the pocket”.

[Read the Advice of the Chief Medical Officer of Ireland.](#)

### **Irish Doctors Environmental Association**

The Irish Doctors Environmental Association wrote a statement in 2013 concerning health concerns with Wi-Fi in school:

“We urge you to use wired technologies for your own safety and that of your pupils and staff.” [Read the 2013 Letter](#)

## **Denmark**

Denmark Board of Health states: “As a precautionary measure, the Board of Health recommends a series of simple steps you should follow to reduce exposure from [mobile phones](#) :

- Use the headset or handsfree with earbud, conversation, or use the speakerphone feature
- When possible, use text instead of call
- Limit the duration of calls
- Did not sleep with the phone close to the head
- Limit conversations during low reception and while in transport.
- Do not cover the phone with aluminum foil, special covers, etc.
- Compare phones' SAR value. Lower SAR require less exposure
- [Denmark Board of Health Recommendations on Reducing Cell Phone Radiation](#)

## **Tanzania**

*2014: Director General of Tanzania Atomic Energy Commission (TAEC), Mr Idy Mkilaha publicly endorses precaution.*

*"Mr Mkilaha says that when weighing up this convenient tool with the questionable health impact control, caution and measures must be taken to reduce one's exposure from radio frequency (RF) emissions from the cell phone to prevent health hazards."*

*"According to TAEC, we should use hands-free devices or wireless headset to increase the distance between the phone and our heads. This is the best approach because it creates distance between us and the radiating phone..."*

*We should also keep phone away from us when dialling. Phones use more radiation during connection time, says TAEC."*

Read News Report: [Tanzania: We Should Manage Our Cell Phones Properly Otherwise..](#)

Read Tanzania Daily News: [Tanzania: Need to Protect Oneself When Using Cell Phone](#)

[Read the Tanzania Commission for Science and Technology Newsletter detailing how to reduce cell phone exposure \(page 11\)](#)

After complaints were raised by residents about health effects the Commission co-authored a published paper that reviews national RF level profiles of the radiation emitted from base stations. Read [Review on Measured and Calculated Radio Frequency Radiation Emission From The Base Stations](#) which states that

*In 2016, [Director General of Tanzania Atomic Energy Commission \(TAEC\), Mr Idy Mkilaha died under investigated circumstances](#) and at this time EHT is unable to find the Reports or official warnings as mentioned in the news reports on the current [Atomic Commission](#) webpage.*

## Ireland

### Irish Doctors Environmental Association

The Irish Doctors Environmental Association wrote a statement in 2013 concerning health concerns with Wi-Fi in school:

*"We urge you to use wired technologies for your own safety and that of your pupils and staff."* [Read the 2013 Letter](#)

## United States

Legislation has been introduced at the state and national level. Some Communities have issued proclamations, resolutions and started initiatives to inform the public of wireless health issues.

### CELL PHONE AND WIRELESS LABELING

**2014 California, Berkeley:** [May 12, 2015 Berkeley Adopted the Cell Phone "Right to Know" Ordinance on a Unanimous Vote](#). Berkeley is the first city in the nation to require cell phone retailers to provide those who purchase a new phone an informational fact sheet which informs buyers to read the user manual to learn the cell phone's minimum separation distance from the body. The text states:

"The City of Berkeley requires that you be provided the following notice:

To assure safety, the Federal Government requires that cell phones meet radio frequency (RF) exposure guidelines. If you carry or use your phone in a pants or shirt pocket or tucked into a bra when the phone is ON and connected to a wireless network, you may exceed the federal guidelines

for exposure to RF radiation. Refer to the instructions in your phone or user manual for information about how to use your phone safely." [Full text here](#).

Watch [a video of the historic vote](#) featuring Harvard Law professor Lawrence Lessig.

Watch [a video of testimony to Berkeley](#) from November 8, 2011 on the need for cell phone guidelines.

Watch a video of the [September 2016 Federal Appeals Court Hearing oral arguments CTIA vs. Berkeley as the CTIA tries to strike down the Ordinance](#). This is the hearing considering whether to overturn the district court's decision that denied the CTIA's request for an injunction to block Berkeley's cellphone ordinance.

**2014 New York:** [Wireless Router Labeling in all Suffolk Public buildings](#): 12/2014 The Suffolk County Legislature passed legislation to require all county buildings to post notices that wireless routers are in use such as, "Notice: Wireless technology in use." The resolution, sponsored by Legis. William Spencer (a physician), warns that every wireless device emits radio frequency radiation or microwave radiation. It notes that studies "that have looked at the effects of low-level RFR radiation on human cells and DNA have been inconclusive." [Read Press Release](#).

**2011 San Francisco, California: A *Passed*** 2011 Ordinance by the City of San Francisco required cell phone retailers to distribute an educational sheet created by the San Francisco Department of Environment that explains radiofrequency emissions from cell phones and details how consumers can minimize their exposure. However implementation was blocked after a [three year court battle](#). [The CTIA sued the city](#) and settled with the City to block implementation of the Ordinance in exchange for a waiver of attorney's fees. Although implementation was halted, the [City Cell Phone Radiation Webpage](#) remains online.

- Read the [Open Letter to San Francisco Mayor and Board of Supervisors](#)
- Read [San Francisco's Cell Phone Fact Sheet is Factual](#)
- [Watch video from testimony to the City of San Francisco](#)
- [Watch video of San Francisco Supervisor discussing the Ordinance here](#).

- [Watch a press conference with survivors speaking on cellphone health risks](#) at the San Francisco Commonwealth Club. Cellphone cancer victims tell their personal stories and those of their lost loved ones.

## **PUBLIC SCHOOLS**

**2016: Ontario School District in New York State USA:** District adopts “Best Practices with Wi-Fi [Read the April 20, 2016 Meeting Minutes Page 2.](#) “Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use. Always place device on a solid surface. Viewing distance should be a minimum of 12 inches from the screen. Staff was asked by the Principals to post this in areas that contain computers and devices. They are reminding staff to follow it.”

2015: [Ashland Public Schools, Mass \(USA\)](#): The District has passed "Best Practices" to turn the WiFi off when not in use and keep devices away from the body [Download Slides](#) . [Video of parent who initiated this.](#) [Video of school board member](#) discussing the process. [Read Magazine article on Ashland's Decision Here.](#)

## **Los Angeles California Public Schools**

- The LA School District Uses a RF-EMF Exposure Threshold 10,000 Less Than the FCC Limits: Read the RF Report the LA School District Used to recommend a cautionary exposure level. [RADIOFREQUENCY \(RF\) EVALUATION REPORT Use of Wireless Devices in Educational Settings](#)
- 2009 LA School Board Resolution Banning Cell Towers from schools and recommending against WiFi. Read the adopted resolution [HERE](#). 2009 Resolution *Condemning Cell towers NEAR Schools* as was this T-Mobile Cell Tower across the street from an elementary school. [Read it here.](#)

[Read the motion by Supervisors Zev Yaroslavsky and Michael Antonovich](#)

- [2000 LA School Board Resolution Opposing Cell Tower Placement on Schools](#) and calling for precautions with wireless. 'Whereas, Recent studies suggest there is evidence that radio-frequency radiation may produce “health effects” at “very low field” intensities' [Read it here.](#)

SEE A FULL LIST OF PUBLIC AND PRIVATE SCHOOLS THAT REMOVED WI-FI LATER IN DOCUMENT

## **HEALTH ADVICE TO THE PUBLIC**

### **2016: American Academy of Pediatrics Issues Recommendations to Reduce Exposure**

The AAP has updated their [Healthy Children Webpage on Cell Phones](#) entitled *Cell Phone Radiation & Children's Health: What Parents Need to Know*. The webpage reiterated children's unique vulnerability to cell phone radiation stating, “Another problem is that the cell phone radiation test used by the FCC is based on the devices' possible effect on large adults—not children. Children's skulls are thinner and can absorb more radiation.” The AAP issued the following cell phone safety tips specifically to reduce exposure to wireless radiation:

- Use text messaging when possible, and use cell phones in speaker mode or with the use of hands-free kits.
- When talking on the cell phone, try holding it an inch or more away from your head.

- Make only short or essential calls on cell phones.
- Avoid carrying your phone against the body like in a pocket, sock, or bra. Cell phone manufacturers can't guarantee that the amount of radiation you're absorbing will be at a safe level.
- Do not talk on the phone or text while driving. This increases the risk of automobile crashes.
- Exercise caution when using a phone or texting while walking or performing other activities. "Distracted walking" injuries are also on the rise.
- If you plan to watch a movie on your device, download it first, then switch to airplane mode while you watch in order to avoid unnecessary radiation exposure.
- Keep an eye on your signal strength (i.e. how many bars you have). The weaker your cell signal, the harder your phone has to work and the more radiation it gives off. It's better to wait until you have a stronger signal before using your device.
- Avoid making calls in cars, elevators, trains, and buses. The cell phone works harder to get a signal through metal, so the power level increases.
- Remember that cell phones are not toys or teething items.
- [Press Release: The AAP responds to study showing link between cell phone radiation, tumors in rats May 27, 2016](#)

#### [2015 AAP Healthy Child Web Page on Electromagnetic Fields: A Hazard to Your Health?](#)

This webpage states:

"Cell Phones: In recent years, concern has increased about exposure to radio frequency electromagnetic radiation emitted from cell phones and phone station antennae. An Egyptian study confirmed concerns that living nearby mobile phone base stations increased the risk for developing: *Headaches, Memory problems, Dizziness, Depression, Sleep problems*

Short-term exposure to these fields in experimental studies have not always shown negative effects, but this does not rule out cumulative damage from these fields, so larger studies over longer periods are needed to help understand who is at risk. In large studies, an association has been observed between symptoms and exposure to these fields in the everyday environment."

[2013 AAP Letter to FCC Commissioner Mignon Clyburn and FDA Commissioner Margaret Hamburg calling for a review of RF guidelines 8/29/2013](#)

[2012 AAP Letter to US Representative Dennis Kucinich in Support of the Cell Phone Right to Know Act](#)

[Time Magazine \(2012\): Pediatricians Say Cell Phone Radiation Standards Need Another Look](#)

**2012, the AAP published Pediatric Environmental Health, Textbook of Children's Environmental Health 3rd Edition edited by Philip J. Landrigan, Ruth A. Etzel. Chapter 41: Electromagnetic Fields. [Read it on Google Books Chapter 41: Electromagnetic Fields at this link page 383.](#) [Oxford Medicine Chapter 41 Link](#)**

AAP News 2011: [More study needed on risk of brain tumors from cell phone use by Ruth A. Etzel, AAP News, Oct 2011](#)

**The California Medical Association, USA**

The California Medical Association (CMA) passed a Wireless Resolution in 2014 that states :

“Whereas scientists are increasingly identifying EMF from wireless devices as a new form of environmental pollution ...

Whereas peer reviewed research has demonstrated adverse biological effects of wireless EMF including single and double stranded DNA breaks, creation of reactive oxygen species, immune dysfunction, cognitive processing effects, stress protein synthesis in the brain, altered brain development, sleep and memory disturbances, ADHD, abnormal behavior, sperm dysfunction, and brain tumors; and...Resolved, That CMA support efforts to implement new safety exposure limits for wireless devices to levels that do not cause human or environmental harm based on scientific research.” [Read the full CMA Resolution here.](#)

[Read a the Santa Clara Medical Bulletin article by Dr. Cindy Russell that explains the CMA resolution and gives recommendations for schools.](#)

**2014: The Connecticut Department of Public Health has issued specific recommendations to reduce exposure to cellphone radiation.** It is notable that the Department has provided information more in depth than the CDC, EPA and FDA in detailing 7 steps on *how* people can reduce exposure. Furthermore, the Department states *“It is wise to reduce your exposure to radiofrequency energy from cell phones whenever possible.”* [Read the Connecticut Department of Public Health Cell Phone Q and A about Cell phones here.](#)

#### **2016: Massachusetts Department of Health: Minimizing Exposure to RF**

“Below are common recommendations and include those for both cell phone and non-cell phone sources:

- Use wired communication devices instead of wireless devices
- Limit children’s use of cell phones except for emergencies
- Keep cell phones and other sources at a distance
- If using wireless devices like computers, laptops, tablets, and printers, place the wireless router away from where children and adults usually spend time.

[Read these recommendations from the Department of Health in full at this link.](#)

**2014 Maryland, Greenbelt:** [The Greenbelt Maryland City Council voted unanimously on November 24, 2014](#) to do the following:

1. Alert citizens about the fine print warnings and possible health risks of cell phones and wireless devices By sharing the Environmental Health Trusts 10 Steps to Safe Tech and Doctors Advice on Cell Phones Brochure in City health fairs and city centers.
2. To send the FCC Chairman a letter urging the adoption of “radiation standards that will protect human health and safety.” [Download the letter here.](#)



3. To oppose cell towers on school grounds and write a letter to the local school board and County Executive.

**2011 San Francisco, California:** [Cell Phone Radiation \(How to Reduce Exposures\)](#) Webpage launched with public information on [how to reduce exposures](#) to cell phone radiation. San Francisco developed the following public health information resources:

- Answers on [How to reduce exposures](#) to cell phone radiation.
- A [Poster](#) on Cell Phones and RF Radiation
- A [Factsheet](#) for the Public
- [Display stickers](#) for Cell Phone packaging.

**2012 Wyoming: Jackson Hole** issued a [Proclamation of Cell Phone Awareness](#) which cites concern over long term health effects as well as the increased risk that the radiation poses to children.

**2012 Florida: Pembroke Pines**, passed Resolution [3362](#) expressing the City's "Urgent Concerns" about Wireless Radiation and Health and which encourages citizens to read their manuals and presents information on how to reduce exposure by using a headset or speakerphone. Jimmy Gonzalez, an attorney who had developed brain cancer after heavy cell use, initially petitioned the Commission. [Watch the Video of his powerful testimony here.](#)

**2010 California, San Francisco:** [Cell Phone Radiation \(How to Reduce Exposures\)](#) Webpage launched. Answers on [how to reduce exposures](#) to cell phone radiation. The City developed a poster, factsheets and display stickers with public health information.

**2010 California: Burlingame California City Council** voted to include cell phone safety [guidelines](#) in their Healthy Living in Burlingame initiative (WHO classification and consumer precautions).

**2010 Maine, Portland :** Mayor Mavodenes, Jr. declared October "Cell Phone Awareness Month"

**Colorado 2009** The Governor of Colorado issued a Proclamation on Electrical Hypersensitivity.

*"Electromagnetic Sensitivity is a painful chronic illness of hypersensitive reactions to electromagnetic radiations.*

*WHEREAS, the symptoms of EMS include, dermal changes, acute numbness and tingling, dermatitis, flashing, headaches, arrhythmia, muscular weakness, tinnitus, malaise, gastric problems, nausea, visual disturbances, severe neurological, respiratory, speech problems, and numerous other physiological symptoms.*

*WHEREAS, Electromagnetic Sensitivity is recognized by the Americans with Disabilities Act, the US Access Board and numerous commissions;" [Read the Proclamation HERE.](#)*

**May 2009** The Governor of Connecticut issued a Proclamation on Electrical Hypersensitivity.

*"WHEREAS, the health of the general population is at risk from electromagnetic exposures that can lead to illness indicted by electromagnetic radiations; and, WHEREAS, this illness may be preventable through*

*the reduction or avoidance of electromagnetic radiations, in both outdoor and indoor environments and by conducting further scientific research; and, " [Read the Proclamation HERE.](#)*

**Broward County Florida May 2009, The Mayor issued a Proclamation on Electrical Hypersensitivity.**

*"WHEREAS, as a result of global electromagnetic pollution, people of all ages in Broward County and throughout the world have developed an illness known as Electromagnetic Sensitivity; and, "*

[Read it all HERE.](#)

## US Proposed Legislation

**2012 National Law** [The Cell Phone Right to Know Act H.R. 6358](#) was introduced receiving strong support from many organizations including the American Academy of Pediatrics. (AAP Letter [here.](#)) This legislation called for labels on mobile devices at point of sale, a comprehensive national research program to study whether exposure to wireless devices causes adverse biological effects directed by NIEHS and the EPA and exposure level regulation.

HR 6358 received strong support from the American Academy of Pediatrics Read the AAP Letter [here.](#)

Congressional hearings in 2009 provided expert testimony to Congress. [Watch CSPAN VIDEO.](#)

**Library of Congress Summary:** Written by the Congressional Research Service

Cell Phone Right to Know Act - Requires the Director of the National Institute of Environmental Health Sciences and the Administrator of the Environmental Protection Agency (EPA) to:

1. conduct or support a comprehensive research program to determine whether exposure to electromagnetic fields from mobile communication devices causes adverse biological effects in humans, including vulnerable subpopulations such as children, pregnant women, those with compromised immune systems and hypersensitivity reactions, men and women of reproductive age, and the elderly;
2. disseminate research results to the general public; and
3. report findings and conclusions to Congress.

Directives:

- Directs the Federal Communications Commission (FCC) to promulgate regulations to allow a subscriber to access personally or to give consent to allow researchers with institutional review board approval to access specific usage data required to investigate the link between electromagnetic radiation exposure and potential adverse biological effects in humans.
- Directs the EPA to promulgate regulations establishing maximum exposure level goals and maximum exposure levels for exposure to electromagnetic fields generated by mobile communication devices.
- Directs the Commissioner of Food and Drugs (FDA) to promulgate regulations to provide for labeling (including exposure ratings and the maximum allowable exposure levels and goals) on mobile communication devices, packaging, instruction manuals, and at points of sale in stores and on websites.

- Requires the Secretary of Health and Human Services (HHS) to increase: (1) the number and size of grants to institutions for training scientists in the field of examining the relationship between electromagnetic fields and human health; and (2) the number of career development awards for such training for health professionals pursuing careers in pediatric basic and clinical research, including pediatric pharmacological research.

Amends the Public Health Service Act to establish a graduate educational loan repayment program and authorize national awards for researchers in such fields.

Amends the Communications Act of 1934 with respect to the prohibition on state or local government zoning regulation of personal wireless service facilities on the basis of the environmental effects of radiofrequency emissions. Excludes from such prohibition state or local regulation based on the adverse human health effects of emissions of radiofrequency electromagnetic fields.

**2015 NEW Massachusetts** proposed MA [Senate Bill 1222](#): An Act creating a special commission to study the health impacts of electromagnetic fields and [Bill H2007](#): An Act relative to a special commission to study electric and magnetic fields. *Bills Still in Process as of August, 2015.* [Watch a view of the statehouse briefing on RF here.](#)

**2015 Nassau County will have a proposed Wireless Router Labeling Act** that would place visible warning signs in all county buildings and facilities where a wireless router is located.. [Please read recent coverage of the initiative here.](#)

2014 [The Maine LD 1013 "The Wireless Information Act"](#) passed the State Senate and House but then failed to pass the second vote. The Bill requires manufacturer's information on radio-frequency exposure be visible on the outside of the cell phone's product packaging.

- [Please a video of State Representative Andrea Boland on how the legislation was thwarted.](#)
- [Read Maine's "Cellular Telephone Labeling Act" -April 17, 2015](#)
- [Read Cell Phone Radiation Label Bill Passes Maine Legislature Before Dying](#)

The [San Francisco Cell Phone Right to Know Ordinance](#) was signed in 2011 requiring cell phone retailers to distribute an educational sheet created by the San Francisco Department of Environment that explains radiofrequency emissions from cell phones and how consumers can minimize their exposure. The CTIA sued the city and settled with the City to block implementation of the Ordinance in exchange for a waiver of attorneys' fees. The City [Cell Phone Radiation Webpage](#) remains online.

**2015 Oregon HB 3350: This proposed legislation** directs the Department of Education to prepare statement that discloses potential health risks of wireless technology and requires public and private schools to distribute statement to employees and parents of students. It declares an emergency effective July 1, 2015. [Read the Bill here.](#)

**2015 Oregon HB 3351:** This proposed legislation states that cell phones must have a visible written label that advises consumers of possible risks and steps that consumers can take to reduce the risk of radio-frequency radiation exposure from cellular telephone use. [Read it here.](#)

**2014 [Hawaii Senate Bill SB 2571](#)** was introduced calling for a warning label encouraging consumers to follow the enclosed product safety guidelines to reduce exposure to radiation that may be hazardous to their health.

**[SB 932 California](#):** This 2011 legislation would have required retailers to include notices on product packaging that cell phones emit radio frequency (RF) energy. A second notice would be posted at the point of sale when purchasing online or in a physical store.

**[HM 32, New Mexico](#):** This 2011 proposed law request the Department of Health and the Department of Environment to study and review all available literature and reports on the effects of cell phone radiation on human health.

**[HB 1408 Pennsylvania](#):** This 2011 proposed law would require warning labels on cell phones “to inform all citizens about possible health dangers that have been linked to microwave radiation that is emitted by cellular telephones and the steps that can be taken to mitigate those dangers, especially as they relate to children and pregnant women.”

- Dr. Ronald B. Herberman, former director of the University of Pittsburgh Cancer Institute (UPCI) and the UPMC Cancer Center offered testimony at a PA House Democratic Policy Committee hearing. CBS Local coverage of hearing [HERE](#). Philadelphia Tribune News coverage [Here](#).

**[SB 679 Oregon](#):** This 2011 proposed law would require warning labels for all new cell phones and cell phone packaging. [Watch a news video about the law here](#).

**[H.R. 2835](#)** In 1999 Congressman Bernie Sanders sponsored [H.R. 2835 \(106th\): To require an assessment of research on effects of radio frequency emissions on human health](#).

(Note: This document does not cover ALL EMF policy but is simply a sampling. Please feel free to contact EHT to send documentation of other policy actions. )

## Schools Worldwide Removing the WiFi/Taking Action

**2016: Haifa, Israel:** Haifa Mayor Yona Yahav( of Israel’s 3rd largest city) ordered all schools to have wireless removed and replaced with wired connections. [Read Krayot article](#). [Hamodia article](#). Related [Reshet TV Report](#) [Watch News Report with unofficial English translation](#) [Watch News Report on Supreme Court Case in Israel](#)

**2016 Lowell School, Washington DC:** In the kindergarten wing, the Wi-Fi hotspots were removed and the teachers are given ethernet and adapters so that computers and class technology can be ethernet connected (corded) to reduce RF-EMF exposure.

**2016 Italy:** Turin Mayor Chiara Appendino laid out plans “to cut back on Wi-Fi in state schools and government buildings over concerns that radiation might damage people's health”.

Read 7/2016 News Report [Turin could slash Wi-Fi over 'radiation' concerns](#)

**2016: Onteora School District in New York State USA:** District adopts "Best Practices with Wi-Fi [Read the April 20, 2016 Meeting Minutes Page 2.](#) "Turn off the device when not in use and at the end of each day. If device is to stay on, turn Wi-Fi off when not in use. Always place device on a solid surface. Viewing distance should be a minimum of 12 inches from the screen. Staff was asked by the Principals to post this in areas that contain computers and devices. They are reminding staff to follow it."

**2016 Italy:** [Mayor of Borgofranco d'Ivrea \(Italy\) orders Wi-Fi to be turned off in schools.](#) "Mayor Livio Tola told the town's high school and elementary school to return to using cables to connect to the internet after reading that the electromagnetic waves given off by wireless routers were especially harmful to young children." [Read the newspaper article here.](#) [Read the News article here "Ivrea, The Mayor Removes WiFi as it Could Be Dangerous".](#)

**2016: Rotokawa School New Zealand, implemented steps to minimize RF Exposure** Children use ipads in flight mode on desk and parents may request that their child use an Ethernet cord. Children are taught about the health precautions as part of their cyber citizenship.

**2016: Istituto Comprensivo Alighieri- Diaz in Lecce Italy** has banned wifi. Their two resolutions decided: a) to ban wifi in school and install a wired system for the use of internet and b) Reject the request of the local government (Municipality) to install an antenna on the school roof for the wireless signal providing for the "Wireless city" program. The resolution also asks the Municipality to install the antenna at a reasonable distance from school. [Read the official resolutions number 1 here](#) and [Resolution 2 Here.](#)

**2016: The Piemonte Region has adopted a resolution to limit EMF exposure, to limit the use of wifi in schools** and be considerate to the problem of EHS people. [Read about it here.](#)

2015: [Ashland Public Schools, Mass \(USA\):](#) "Best Practices" to turn the WiFi off when not in use, [Download Slides.](#) [Video of parent who initiated this.](#) [Video of school board member](#) discussing the process. [Read Magazine article on Ashland's Decision Here.](#)

2016: [Shearwater The Mullumbimby Steiner School](#), Australia, 100% Wi-Fi Free School

2016: [Yallingup Steiner School](#) Australia , WiFi Free Classrooms

2016: Linuwel School , Australia ,WiFi in some classrooms, Can accommodate children with EHS.

2016: Cairns Hinterland Steiner School , Australia, WiFi Free Classrooms (may be available in other areas)

2016: Wild Cherry School, Australia , 100% Wi-Fi Free

2015: St. Cajetan School, Belgium: Wired Internet installed and wireless removed.

2015: Washington Waldorf School, Maryland, USA: Removed Wi-Fi Routers from Buildings, Ethernet installed.

2015: Freshwater Creek School, Australia, 100% Wi-Fi Free

2015: Lorien Novalis School, Australia, 100% Wi-Fi Free School Preschool to 12th grade.

2015: Cairns Hinterland School, Australia, WiFi Free Classrooms for EHS

2014: Acorn Hill School, Maryland: Wi-Fi Networks removed.

2014: Friends Community School: Wi-Fi turned off in wing for lower elementary school students. WiFi routers moved OUT of classrooms into hallways for older grades to reduce EMF exposure. Ethernet wires made available in classrooms for families who want children on corded (not wireless) computers.

2014: [DearCroft Montessori](#): Hardwired internet to younger grades, limited Wi-Fi Router exposure to older grades.

2014: [Portland Waldorf School](#), Portland Oregon, USA, WiFi removed.

2014: [Meeting House Montessori](#), Braintree Massachusetts, USA, WiFi replaced with ethernet.

2014: Ghent, Finland, [Wi-fi banned from pre-schools and day care](#).

2014: [UPPER Sturt Primary School](#), Australia. [Read article](#). [Read "No WIFI" LOW EMF School Policy](#).

2014: The [St. Augustine School](#) in Italy turned off Wifi and goes back to Wires.

2013 [Winlaw Elementary School](#), B.C. Canada turned off WiFi.

2013 [Te Horo Primary School](#) New Zealand Replaced WIFI with cable-based internet.

2013 [Kootenay Lakes District](#) School Board BC (One school without Wi-Fi)

2013 [Blaise-Cendrars High School](#), Switzerland. Teachers vote to remove WiFi.

2012 [Kivioja primary school](#) in Ylivieska Finland bans phones and minimizes Wireless.

2012: [Halton Waldorf, in Burlington](#) Vermont: Remaining free of Wireless Radiation

2011 [City of Lakes Waldorf School](#), WiFi taken out. Minneapolis, Minnesota USA

2011 Aurora School in Ontario removed Wifi and replaced with hardwired.

2011 [North Cariboo Christian School](#) in Quesnel, B.C., removed Wi-fi .

2011 [Pretty River Academy](#) in Ontario no WiFi.

2011 Wayside Academy, Peterborough, Ontario no Wi Fi.

2010 Surrey, [BC Roots and Wings Montessori](#) removed Wi-Fi.

2010 Ontario St. Vincent Euphrasia elementary school: Parents voted to turn off Wi-Fi.

2009 HEROUVILLE-SAINT-CLAIR wi-fi networks removed.

## Teacher Unions and Parent Teacher Organizations

**2016:** [New Jersey Education Association \(NJEA\)](#) publishes [“Minimize health risks from electronic devices”](#) in the September 2016 NJEA Review. *Adrienne Markowitz and Eileen Senn detail how to reduce physical health risks from devices including risks from radiation exposure*

- *“Keep devices away from the body and bedroom.*
- *Carry phones in briefcases, etc., not on the body.*
- *Put devices on desks, not laps.*
- *Hard wire all devices that connect to the internet.*
- *Hard wire all fixed devices such as printers, projectors and boards.*
- *Use hard-wired phones instead of cell or cordless phones.*
- *Text rather than call.*
- *Keep conversations short or talk in person.*
- *Put devices in airplane mode, which suspends EMF transmission by the device, thereby disabling Bluetooth, GPS, phone calls, and WiFi.*
- *Use speaker phone or ear buds instead of holding the phone next your head.*
- *Take off Bluetooth devices when not using them.”*

### **2016: Phoenicia Elementary School Onteora School District, New York State**

- The PTA wrote a letter to the Onteora School District calling for the Wi-Fi to be turned off as a precautionary action . [Watch a video of the School Board Meetings where letter is read here.](#) [Watch videos of parents and students calling for Wi-Fi removal here.](#)
- Read News Report: [Some Onteora parents fear Wi-Fi signals in schools are harming their children.](#)

### **2016: Ontario Secondary School Teachers Federation**

- A new call for a moratorium on WIFI and in the Limestone School District and they have taken the issue to the school trustees in that District. “The Teacher Union’s president says there is a growing mountain of evidence that WIFI can pose health risks.” Andrea Loken/OSSTF District President stated in a 3/2016 news interview that, “There are thousands of published peer reviewed papers that are indicating adverse health effects from WIFI and we are seeing an increased awareness around this issue worldwide.” Watch [the video of the news piece with Union members here](#) . [Read the National Post article here.](#) [Radio Canada International article here.](#)

### **2016: Elementary Teachers Federation of Ontario**

- A 3/2016 News Report states that they are calling for a “WIFI moratorium until further health studies are done, and lawmakers can catch up with new regulations.” Watch [the video of the news piece with Union members here](#) . [Read the National Post article here.](#) [Radio Canada International article here.](#)

### **2014 United Federation of Teachers (Teachers, nurses and professionals working in New York City).**

- In 2014 their [Wireless Radiation Webpage stated](#) “Wireless radiation is emitted by the myriad of wireless devices we encounter every day. It was once thought to be relatively harmless.



However, we now know that wireless radiation can cause non-thermal biological effects as well, including damage to cells and DNA, even at low levels. Curiously in March of 2016, this statement was removed and replaced with new text mimicking FCC verbiage. However the site *still posts* how to reduce exposure.

- Resources posted on their site include Dr. Moskowitz' [Reducing Your Exposure to Wireless Radiation](#) and the BabySafe Project brochure [What You Need to Know About Wireless Radiation and Your Baby](#). "Taking certain precautions around wireless radiation is appropriate for our most vulnerable populations, including pregnant women."

**2014 New York State Teachers Union NYSUT:** A federation of more than 1,200 local unions.

- "We have enough evidence to justify taking action and we are not willing to wait until our members, their children and the students suffer health consequences from not doing anything," - Paul Pecorale, Vice President of the New York State United Teachers Union.
- [Read the Press Release on Best Practices For Schools prepared for NYSUT](#)
- Download the [Guidelines for Safer Use of Wireless Technology in Classrooms](#) Published for NYSUT
- NYSUT hosted a [Webinar: Risks of wireless technologies and protecting children and staff in schools](#).

**2014 National Education Association**

"The National Education Association believes that all educational facilities must have healthy indoor air quality, be smoke-free, be safe from environmental and chemical hazards, *and be safe from hazardous electromagnetic fields*."

"Students and/or their parents/guardians, education employees, and the public should be notified of actual *and potential hazards*."

"School districts should conduct periodic testing for harmful water *and airborne particles/agents* that are detrimental to the health of students and education employees and shall report the results publicly."

"The Association also believes in the development and enforcement of health and safety standards specifically for children." [Read Section C-19 of the NEA 2013-2014 Resolutions](#)

**[2013 Canadian Teacher Federation's Brief](#) (200,000 elementary and secondary school teachers)**

- "CTF is concerned about the lack of definitive research regarding the adverse health effects of Wi-Fi.
- "We propose a prudent approach to the use of Wi-Fi, especially where children are present."
- "We recommend an education program regarding the relative safety of Wi-Fi exposure and that appropriate resources be developed to educate the public regarding ways to avoid potential exposure risks of Wi-Fi access points and devices."
- "Pedagogical needs could be met in schools with an approach that limits exposure to Wi-Fi."
- Read the Briefing [The Use of Wi-Fi in Schools - Briefing Document](#)

2015: Canadian Teacher's Magazine published [CTF Sounds the Alarm on Wi-Fi](#)

**2013 [United Teachers of Los Angeles](#), representing 40,000 teachers and staff**



- Resolution passed: "I move that UTLA will abide by current National NEA Policy for Environmentally Safe Schools which states that all employees and stakeholders should be informed when there are changes in their exposure to environmental hazards including electromagnetic radiation and that all stakeholders and the public should be notified of any actual and potential hazards. UTLA will advocate for technological solutions that maintain technology upgrades while not increasing employees exposure to electromagnetic radiation."
  - Health and Human Services Committee 3-6-13 #1: Moved by Kevin Mottus, seconded by John Cabrera.
- See UTLA Newsletter [editorial by social worker Kevin Mottus](#).

### **2013 [Elementary Teacher's Federation of Ontario](#) - over 76,000 teachers**

"There is cause for concern for members' health and safety, especially women," said Sandra Wash, a teacher representing the Peel district when the Federation issued [a 2014 position statement](#) supporting an Expert Panel recommendation that Health Canada provide the public with more information about radiofrequency energy, and the safe use of wireless technology. [ETFO voted](#) to:

- Turn cell phones off in classrooms
- Label the location Of Wi-Fi access points.
- Research Radio Frequency radiation.
- Develop a hazard control program related to wireless microwave radiation through JHSC.

### **2012 [The Ontario English Catholic Teachers Association](#) (45,000 Ontario teachers)**

- Recommends a wired infrastructure as WIFI "may present a potential Health and Safety risk or hazard in the workplace...The safety of this technology has not thoroughly been researched and therefore the precautionary principle and prudent avoidance of exposure should be practiced."
- [Read the Position Statement here](#). "Controls for WiFi would best be guided by the ALARA principle (As Low As Reasonably Achievable), as well as by applying the concept of prudent avoidance (of non-ionizing radiation)."
- [Read CBC News article](#)

### **2013 [BC Teachers Federation adopted Wireless Resolutions and Proposed Resolutions](#)**

- ["The BCTF supports members who are suffering from Electromagnetic Hypersensitivity by ensuring their medical needs are accommodated in the workplace."](#)
- Proposed Resolutions "the World Health Organization's classification of radiofrequency/electromagnetic fields emitted by wireless devices as a 2B possible cancer risk to humans; that the BCTF ensures all teachers have the right to work in a safe environment, including the right to work in a Wi-Fi/ wireless-free environment."
- Recommendation to the Ministry of Education that school boards "begin immediate installation of on/off switches for Wi-Fi routers in schools, thereby reducing microwave radiation exposure and reducing health risks to members, and/or provide safer Ethernet cables or fibre optics".  
Read the [Wireless Resolutions and Proposed Resolutions](#)
- Read Daily News Coverage: [Merritt teachers demand protection from wi-fi radiation 'Evidence is piling up that wi-fi radiation may in fact be harmful'](#)
- Read the Vancouver Sun News [Report Here](#).

### **2013 [The BC Confederation of Parent Advisory Councils](#) (BCCPAC) of 821 Advisory Councils representing over 500,000 parents in British Columbia passed two resolutions.**

- Resolution 17 "calls on each Board of Education to have one public school at each education level that is free of Wi-Fi, cordless phones and cell phones. This school will only be equipped with wired computers and wired telephones for personal, educational and administrative purposes."
- Resolution 18 calls on Boards of Education to "cease to install Wi-Fi and other wireless networks in schools where other networking technology is feasible." passed with a clear majority.
- Read Resolution [On/Off switches for WiFi Routers and Protocol for the Use of Wireless Devices](#)

#### **2010 UK VOICE ;The Union for Education Professionals- 20,000 members**

- ["Voice has advocated that new Wi-Fi systems should not be installed in schools, that existing systems should be turned off when not required and that schools should consider whether they really need to use Wi-Fi, which was developed to facilitate Internet access on the move rather than to be used as a convenient alternative to cables in dedicated IT facilities."](#)
- " In the light of what has happened to one of our members [*who has developed sensitivity to electro-magnetic radiation*], I am concerned that so many wireless networks are being installed in school and colleges without any real understanding of the possible long-term consequences."- Voice General Secretary Philip Parkin
- Read their [Position Statement read their Blog post.](#)

#### **Los Angeles California Public Schools**

- The LA School District Uses a RF-EMF Exposure Threshold 10,000 Less Than the FCC Limits: The OEHS supported a precautionary threshold level that is 10,000 times lower than the current Federal Communications Commission standard. Read the RF Report the LA School District Used to recommend a cautionary exposure level. [RADIOFREQUENCY \(RF\) EVALUATION REPORT Use of Wireless Devices in Educational Settings](#)
- 2009 LA School Board Resolution Banning Cell Towers from schools and recommending against Wi-Fi.
  - "The Board supports responsible deployment of fiberoptic broadband technology which is superior to wireless in speed, reliability, security, durability and protections it affords people and the environment from the potential hazards of exposure to radio frequency radiation."
  - Read the adopted resolution [HERE.](#)
  - [Read the Press Release here LOS ANGELES BOARD OF EDUCATION MEMBERS VOTE TO PROHIBIT CELL PHONE TOWERS NEAR SCHOOLS](#)
- 2009 December Resolution *Condemning Cell towers NEAR Schools* as was this T-Mobile Cell Tower across the street from an elementary school. [Read it here.](#)

["As long as questions exist as to the adequacy of these federal regulations, local governments should have the ability to include consideration of health and environmental effects of these facilities."](#) (referring to cell towers) [Read the motion by Supervisors Zev Yaroslavsky and Michael Antonovich](#)

**2000 LA School Board Resolution Opposing Cell Tower Placement on Schools** and calling for precautions with wireless. 'Whereas, Recent studies suggest there is evidence that radio-frequency radiation may produce "health effects" at "very low field" intensities' [Read it here.](#)

#### **2010 Greater Victoria Teachers' Association**

"The GVTA recommends a precautionary approach to the School District with regard to provision of wireless internet in schools. The precautionary approach comes from the environmental movement and

has been adopted as common practice in areas regarding potential environmental, ecological or biodiversity damage. It suggests that the lack of significant evidence is not enough of a reason to be unconcerned. The fact that many other countries have instituted regulations to protect children, seniors, pregnant women and other susceptible populations should be the guide for a District policy on WiFi installation and use in the worksites."

The [GVTA Wireless in Schools Webpage](#) states now that:

- Wi-Fi free zones should be available.
- On/Off routers recommended and record any adverse Wi-Fi health effects.
- Minimal or non-use within elementary schools.

**2008** Lucerne Elementary Secondary Arrow Lakes District SD 10 New Denver BC, Canada Opts for "No WIFI

#### **2001 Fletcher Hills PTA Resolution submitted to the California State PTA**

- "RESOLVED, that the California PTA supports local municipal zoning setback rules of at 1000 feet or more from an operating wireless transmitter and a school or residential area; and be it further
- RESOLVED that the California PTA supports encouraging schools to use cable lines for all communications services on campus and to avoid the endorsement, purchase or use of wireless local area network systems on campus; and be it further
- RESOLVED that the California PTA recommend that teachers and students should limit use of cellular phones or other mobile devices on school property to emergencies and that cellular phones, pagers and other mobile phones be turned off and placed out of sight while the individual is on school property"
- Resolution on Wireless Equipment/Cellular Phones and Antennas [Read it here.](#)

## **DOCTORS AND SCIENTISTS APPEAL FOR STRICTER WIRELESS TECHNOLOGY REGULATION**

|                                            |                                                  |                                                                    |
|--------------------------------------------|--------------------------------------------------|--------------------------------------------------------------------|
| <a href="#">Vienna Resolution</a> 1998     | <a href="#">Helsinki Appeal</a> 2005             | <a href="#">Potenza Picena Resolution</a> 2011                     |
| <a href="#">Salzburg Resolution</a> 2000   | Parish Kirchner Appeal 2005                      | <a href="#">World Health Organization</a> 2011                     |
| <a href="#">Stewart Report, UK</a> 2000    | Saarlander Appeal 2005                           | <a href="#">Austrian Medical Association</a> 2012                  |
| <a href="#">Declaration of Alcalá</a> 2002 | <a href="#">Stockacher Appeal</a> 2005           | <a href="#">Resolution on Electromagnetic Health</a> 2012          |
| <a href="#">Catania Resolution</a> 2002    | <a href="#">Vancouver School Resolution</a> 2005 | <a href="#">British Doctor Initiative</a> 2013                     |
| <a href="#">Freiburger Appeal</a> 2002     | <a href="#">Benevento Resolution</a> 2006        | <a href="#">BabySafe Project: Joint Statement on Pregnancy and</a> |
| <a href="#">Bamberger Appeal</a> 2004      | <a href="#">Allgäuer Appeal</a> 2006             |                                                                    |
| <a href="#">Maintaler Appeal</a> 2004      | WiMax Appeal 2006                                |                                                                    |

|                                                                                           |                                                                                      |                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <a href="#">International Association of Fire Fighters Resolution on Cell Towers</a> 2004 | Schlüchterner appeal                                                                 | <a href="#">Wireless Radiation</a> 2014                                                                                                                             |
| <a href="#">Coburger Appeal</a> 2005                                                      | Brussels Appeal 2007                                                                 | <a href="#">Canadian Doctors Declaration to Health Canada</a> 2014                                                                                                  |
| <a href="#">Oberammergauer Appeal</a> 2005                                                | <a href="#">Venice Resolution</a> 2008                                               | <a href="#">Scientific Declaration to Health Canada</a> (International Doctors) 2014                                                                                |
| <a href="#">Haibacher Appeal</a> 2005                                                     | <a href="#">Porto Alegre Resolution</a> 2009                                         | <a href="#">International Scientists Appeal to U.N. to Protect Humans and Wildlife from Electromagnetic Fields and Wireless Technology</a> 2015 Over 200 Scientists |
| <a href="#">Pfarrkirchener Appeal</a> 2005                                                | <a href="#">European Parliament EMF Resolution</a> 2009                              |                                                                                                                                                                     |
| <a href="#">Freienbacher Appeal</a> 2005                                                  | Dutch Appeal 2009                                                                    |                                                                                                                                                                     |
| <a href="#">Lichtenfelser Appeal</a> 2005                                                 | <a href="#">Int'l Appeal of Würzburg</a> 2010                                        |                                                                                                                                                                     |
| <a href="#">Hofer Appeal</a> 2005                                                         | <a href="#">Copenhagen Resolution</a> 2010                                           |                                                                                                                                                                     |
|                                                                                           | <a href="#">Seletun Consensus Statement</a> 2010                                     |                                                                                                                                                                     |
|                                                                                           | <a href="#">Russian National Committee on Non-Ionizing Radiation Protection</a> 2011 |                                                                                                                                                                     |

## INTERNATIONAL ASSOCIATION OF FIRE FIGHTERS

### DIVISION OF OCCUPATIONAL HEALTH, SAFETY AND MEDICINE

*"The IAFF opposes the use of fire stations as base stations for towers and/or antennas for the conduction of cell phone transmissions until a study with the highest scientific merit and integrity on health effects of exposure to low-intensity RF/MW radiation is conducted and it is proven that such sitings are not hazardous to the health of our members."* \_

The IAFF Official Position Against Cell Towers on Fire stations passed in 2004 [iaff.org/HSFacts/CellTowerFinal.asp](http://iaff.org/HSFacts/CellTowerFinal.asp).

- This Position was initiated after increasing complaints among firefighters with cellular antennas on their stations coupled with the California study showing neurological damage in California firefighters conducted by Dr. Gunnar Heuser. [Read the Press Release on the Resolution and Research Study here](#)

### L.A. County Firefighters Local 1014

- Local 1014 has a webpage dedicated to stopping towers because of a plan to install them on over 200 of their stations. <http://www.stopcellphonetowers.com/index.html>
- "As firefighters and paramedics, we live in these firehouses. What effect will these towers have on us? What are the risks to our neighbors? It's a no-brainer that LA County should at least have

done a proper study before before putting 200-foot high-power microwave antennas on top of our heads."

**- Dave Gillotte, Active Duty Fire Captain**

*President, LA County Firefighters Local 1014*

[Watch him testify on this issue here.](#)

- *The Firefighter's Website in 2015* <http://www.stopcellphonetowers.com/index.html>

**United Firefighters of Los Angeles City Local 112 IAFF-CIO-CLC**

#### **Opposes Cell Towers on Their Stations.**

- "It is inexcusable that once again our firefighters in the field were the last to know about a massive 150 million dollar project that could jeopardize their health and safety. ... nobody talked to us and we have not heard from one single expert who has told us that this project will be safe."
- "UFLAC will strongly oppose the use of Fire Stations as base locations for cell towers and/or antennas"

Download the letter from this [LA Firefighters Union Local 112 asking for an immediate halt to cell towers](#) on fire stations.

[Watch videos the these Firefighter Union Presidents testifying to the LA Board of Supervisors on the Issue here.](#)

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**Rebecca Smith**

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**From:** Rebecca Smith  
**Sent:** Thursday, December 15, 2016 3:06:52 PM  
**To:** Genevieve Walker  
**Subject:** A New Paradigm in EMF Science

Please see attached document file.

I am a descendant of an atomic US veteran, former US Army Reserve Combat Electrician and for many more years was a US Navy air traffic controller, and then an FAA air traffic controller, I assure you I am quite sane and recently completed four graduate degrees in aeronautical science including Space Studies, I am an electromagnetic hypersensitive female, diagnosed at age 55 by functional MRI imaging. This condition is a global problem. I have quite a voluminous assortment of supportive documents. Attached is a most recent article written for the engineering sector.

Sincerely,

Rebecca Smith

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**From:** Rebecca Smith  
**Sent:** Wednesday, December 21, 2016 6:31 PM  
**To:** Genevieve Walker  
**Cc:** Andrew Bielakowski; Amanda Pereira; Salerno, Jennifer [USA]; Claudia Wayne  
**Subject:** Re: A New Paradigm in EMF Science

Please see also attached documents.

On Thu, Dec 15, 2016 at 6:49 PM, Genevieve Walker <[Genevieve.Walker@firstnet.gov](mailto:Genevieve.Walker@firstnet.gov)> wrote:

Ms. Smith- thank you for taking the time to write. I look forward to reading your attachment.

Thank you for the information.

Genevieve Walker  
FirstNet  
Director of Environmental Compliance  
12201 Sunrise Valley Drive M/S 243  
Reston, VA 20192  
[\(571\) 665-6134](tel:(571)665-6134)

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Sincerely,

Rebecca Smith

### **Additional References Provided**

- Adams, Ronald L. and R.A. Williams. 1976. *Biological Effects of Electromagnetic Radiation (Radiowaves and Microwaves)—Eurasian Communist Countries*. Department of Defense, Defense Intelligence Agency. Prepared by U.S. Army Medical Intelligence and Information Agency.
- Johnson, Jeromy C. 2016. “Wireless Wake-Up Call: A New Paradigm in EMF Science.” *The Bent*, Summer 2016: 15-19.
- Unknown Author. 1998. *Bioeffects of Selected Nonlethal Weapons(fnl )*. Addendum to the Nonlethal Technologies—Worldwide (NGIC-11 47-101-98) Study. 17 February 1998.

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