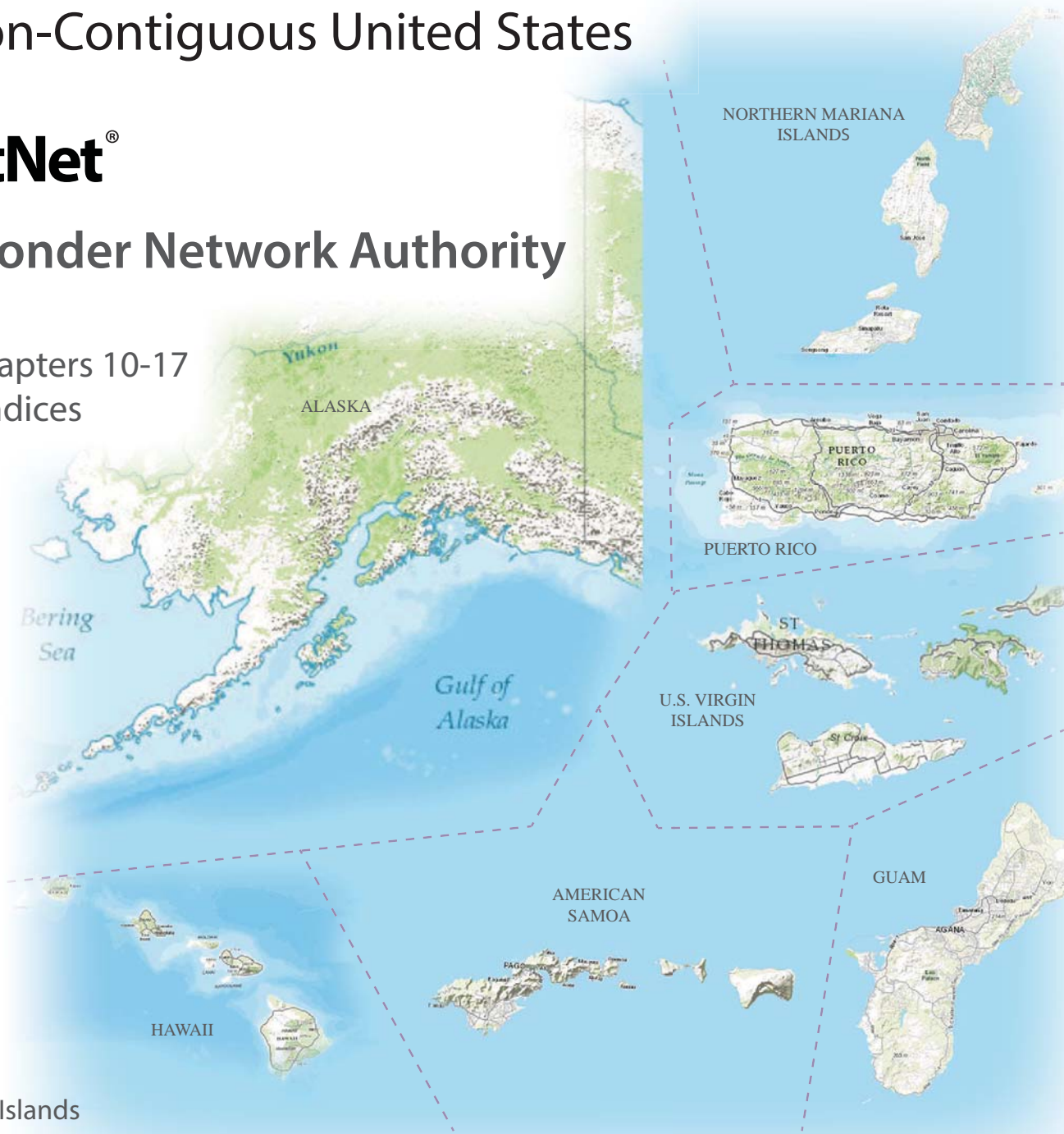


Nationwide Public Safety Broadband Network Draft Programmatic Environmental Impact Statement for the Non-Contiguous United States

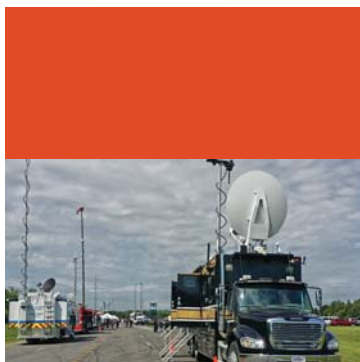
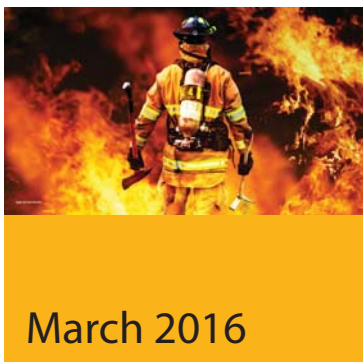


First Responder Network Authority

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& 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 Draft 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—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

March 2016

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	ATWC	Alaska Tsunami Warning Center
°N	degrees north	AURORA	Alaska Uniform Response Online Reporting Access
µg/m ³	microgram(s) per cubic meter	BACT	best available control technology
µPa	micro Pascal	BCE	before Common Era
%	percent	BCR	Bird Conservation Regions
A	attained	BGEPA	Bald and Golden Eagle Protection Act
AAC	Alaska Administrative Code	BLM	Bureau of Land Management
AAFIS	Alaska Public Safety Identification System	BLS	U.S. Bureau of Labor Statistics
AAQS	Ambient Air Quality Standards	BMP	best management practice
ACHP	Advisory Council on Historic Preservation	BRFSS	Behavioral Risk Factor Surveillance System
ACS	American Community Survey (U.S. Census Bureau)	BSAI	Bering Sea/Aleutian Island
ADEC	Alaska Department of Environmental Conservation	BWG	BioInitiative Working Group
ADFG	Alaska Department of Fish and Game	CAA	Clean Air Act
AGL	above ground level	CAB	Clean Air Branch
AIRFA	American Indian Religious Freedom Act	CARB	California Air Resources Board
AJRCCM	American Journal of Respiratory and Critical Care Medicine	CBIA	Coastal Barrier Improvement Act of 1990
AKNHP	Alaska National Heritage Program	CBRA	Coastal Barrier Resources Act of 1982
AKOSH	Alaska Occupational Safety and Health	CCP	Comprehensive Conservation Plan
AKWAS	Alaska Warning System	CDC	Center for Disease Control
ALMR	Alaska Land Mobile Radio	CDLNR	Commonwealth Department of Lands and Natural Resources
ANFIRS	Alaska Fire Incident Reporting System	CE	Common Era
ANSCA	Alaska Native Claims Settlement Act	CELCP	Coastal and Estuarine Land Conservation Program
ANSI	American National Standards Institute	CEPD	Caribbean Environmental Protection Division
APE	Area of Potential Effect	CEQ	Council on Environmental Quality
APLIC	Avian Power Line Interaction Committee	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
APSIN	Alaska Public Safety Information Network	CFMC	Caribbean Fisheries Management Council
AQCR	air quality control region	CFR	Code of Federal Regulations
ARFF	Aircraft Rescue and Firefighting	cfs	cubic feet per second
ARMS	Alaska Records Management System	CH ₄	methane
ARPA	Archaeological Resources Protection Act of 1979	CHC	Commonwealth Health Center
AS	Alaska Statute	CIA	Central Intelligence Agency
A.S.A.C.	American Samoa Administrative Code	CMIP3	Coupled Model Intercomparison Project phase 3
ASCA	American Samoa Code Annotated	CNMI	Commonwealth of Northern Mariana Islands
ASCMP	American Samoa Coastal Management Program	CNMIAC	Commonwealth of Northern Mariana Islands Administrative Code
ASDMWR	American Samoa Department of Marine and Wildlife Resources	CO	carbon monoxide
ASEPA	American Samoa Environmental Protection Agency	CO ₂	carbon dioxide
ASHPO	American Samoa Historic Preservation Office	CO _{2e}	carbon dioxide equivalents
ASPA	American Samoa Power Authority	COMAR	Committee on Man and Radiation
ATO	Air Traffic Organization	CPA	Commonwealth Ports 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 ₂ 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	HIANG	Hawaii Air National Guard
DOE	U.S. Department of Energy	HIARNG	Hawaii Army National Guard
DOH	Department of Health	HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
DOH-CAB	Hawaii Department of Health, Clean Air Branch	HIOSH	Hawaii Occupational Safety and Health Division
DOT	U.S. Department of Transportation	hp	horsepower
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)	HRD	(Guam) Historic Resources Division
DPS	Department of Public Safety	HRHP	Hawaii Register of Historic Places
EA	Environmental Assessment	HRS	Hawaii Administrative Rules, Revised Statute
EAS	Emergency Alert System	HTA	Hawai'i Tourism Authority
EBS	Emergency Broadcast System	HUC	hydrologic unit code
EDB	ethylene dibromide	I/M	Inspection/Maintenance
EFH	essential fish habitat	IARC	International Agency for Research on Cancer
EMS	emergency medical services	IBA	Important Bird Area
ENSO	El Niño/Southern Oscillation	IEEE	Institute of Electrical and Electronics Engineers
EO	Executive Order	IFC	International Finance Corporation
EPCRA	Emergency Planning and Community Right-to-Know Act	in	inches
ERP	effective radiated power	IPCC	Intergovernmental Panel on Climate Change
ESA	Endangered Species Act	IR	ionizing radiation
ESI	Environmental Sensitivity Index	ITCZ	Intertropical Convergence Zone
FAA	Federal Aviation Administration	IUCN	International Union for Conservation of Nature
FAD	Fish Aggregating Device	kg/gal	kilograms per gallon
FCC	Federal Communications Commission	KIRC	Kaho'olawe Island Reserve Commission
FEMA	Federal Emergency Management Agency	LAER	lowest achievable emission rate
FirstNet	First Responder Network Authority	lb/day	pounds per day
		lb/hp-hr	pounds per horsepower-hour

LBJ	Lyndon B. Johnson	NP	National Park
Ldn	day-night average sound level	NPDES	National Pollutant Discharge Elimination System
Leq	equivalent noise levels	NPL	National Priorities List
LNG	liquefied natural gas	NPS	National Park Service
LTE	Long Term Evolution	NPSBN	nationwide public safety broadband network
µg/m ³	microgram(s) per cubic meter	NRCS	Natural Resources Conservation Service
µPa	micro Pascal	NRHP	National Register of Historic Places
m/s	meter per second	NSPS	New Source Performance Standards
MBTA	Migratory Bird Treaty Act	NTIA	National Telecommunications and Information Administration
mg/m ³	Milligram(s) per cubic meter	NVSR	National Vital Statistics Report
mgd	million gallons per day	NWI	National Wetland Inventory
MHz	megahertz	NWR	National Wildlife Refuge
MLRA	Major Land Resource Area	NWWS	National Weather Wire Satellite System
mm/s	millimeters per second	OHA	Office of History and Archaeology
MMPA	Marine Mammal Protection Act	OIA	Office of Insular Affairs (USDI)
MOA	Memorandum of Agreement	OSHA	Occupational Safety and Health Administration
MPA	Marine Protected Area	PA	Programmatic Agreement
mph	miles per hour	PAG	Port Authority of Guam
MSA	Magnuson-Stevens Fishery Conservation and Management Act	PAHO	Pan American Health Organization
MTR	Military Training Route	PCB	polychlorinated biphenyl
MUID	Map Unit Identification Data	PCP	pentachlorophenol
MW	megawatt	PDO	Pacific Decadal Oscillation
mW/cm ²	milliwatts per centimeter squared	PEIS	Programmatic Environmental Impact Statement
N	north; not attained	PL	Public Law
N ₂ O	nitrous oxide	PM	particulate matter
NA	not applicable; not assessed	PM ₁₀	particulate matter up to 10 micrometers in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	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	PV	photovoltaic
NESHAP	National Emission Standards for Hazardous Air Pollutants	RAN	radio access network
NFIP	National Flood Insurance Program	RCP	Representative Concentration Pathway
NFIRS	National Fire Incident Reporting System	RCRA	Resource Conservation and Recovery Act
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		
NOAA	National Oceanic and Atmospheric Administration		
NOx	nitrogen oxides		

RF	radio frequency	vog	volcanic smog
RIN	Regulation Identification Number	VRM	Visual Resource Management
rms	root mean square	W	watt(s)
ROW	right-of-way	W/m ²	watts per meters squared
SAAQS	State Air Quality Standards	WAPA	Water and Power Authority
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	WHO	World Health Organization
SARA	Superfund Amendments and Reauthorization Act of 1986	WIMARCS	West Indies Marine Animal Research and Conservation Science
SCD	State Civil Defense	WNP	Western North Pacific
SE	Standard of Error	WNW	west-northwest
SHPO	State Historic Preservation Office	WPC	watts per channel
SIP	State Implementation Plan	WPRFMC	Western Pacific Regional Fishery Management Council
SLR	sea level rise		
SMA	Special Management Area		
SMS	Scenery Management System		
SO ₂	sulfur dioxide		
SO _x	sulfur oxides		
SPCZ	South Pacific Convergence Zone		
SPOC	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		
UVA	University of Virginia		
VIC	Virgin Islands Code		
VIPA	Virgin Islands Port Authority		
VISHPO	Virgin Islands State Historic Preservation Office		
VOC	volatile organic compound		

10. CUMULATIVE EFFECTS

National Environmental Policy Act (NEPA) regulations (*40 Code of Federal Regulations [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 Draft Programmatic Environmental Impact Statement (Draft 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 Draft 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 actions. Cumulative impacts involve the combined, incremental effects of human activity (*USEPA 1999*). In accordance with NEPA and to the extent reasonable and practical, this Draft PEIS considers the combined effects of the No Action Alternative, Preferred Alternative, and Deployable Technologies Alternative with other past, present, and reasonably foreseeable actions that may affect the resources identified.

The geographic extent of the Proposed Action as 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 Draft PEIS. The timeframe considered for this analysis is 50 years.

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 km inter-island submarine cable network connecting Fogagogo, Tu'tuila, Ofu, Luma, Ta'u and Aunu'uland. (<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. To the extent necessary, 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.

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. 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. 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 to further reduce the already limited potential impacts. Similarly, effects associated with project operations are not expected to be significant. Taken together, these projects are not expected to result in significant cumulative impacts to either human health or the environment.

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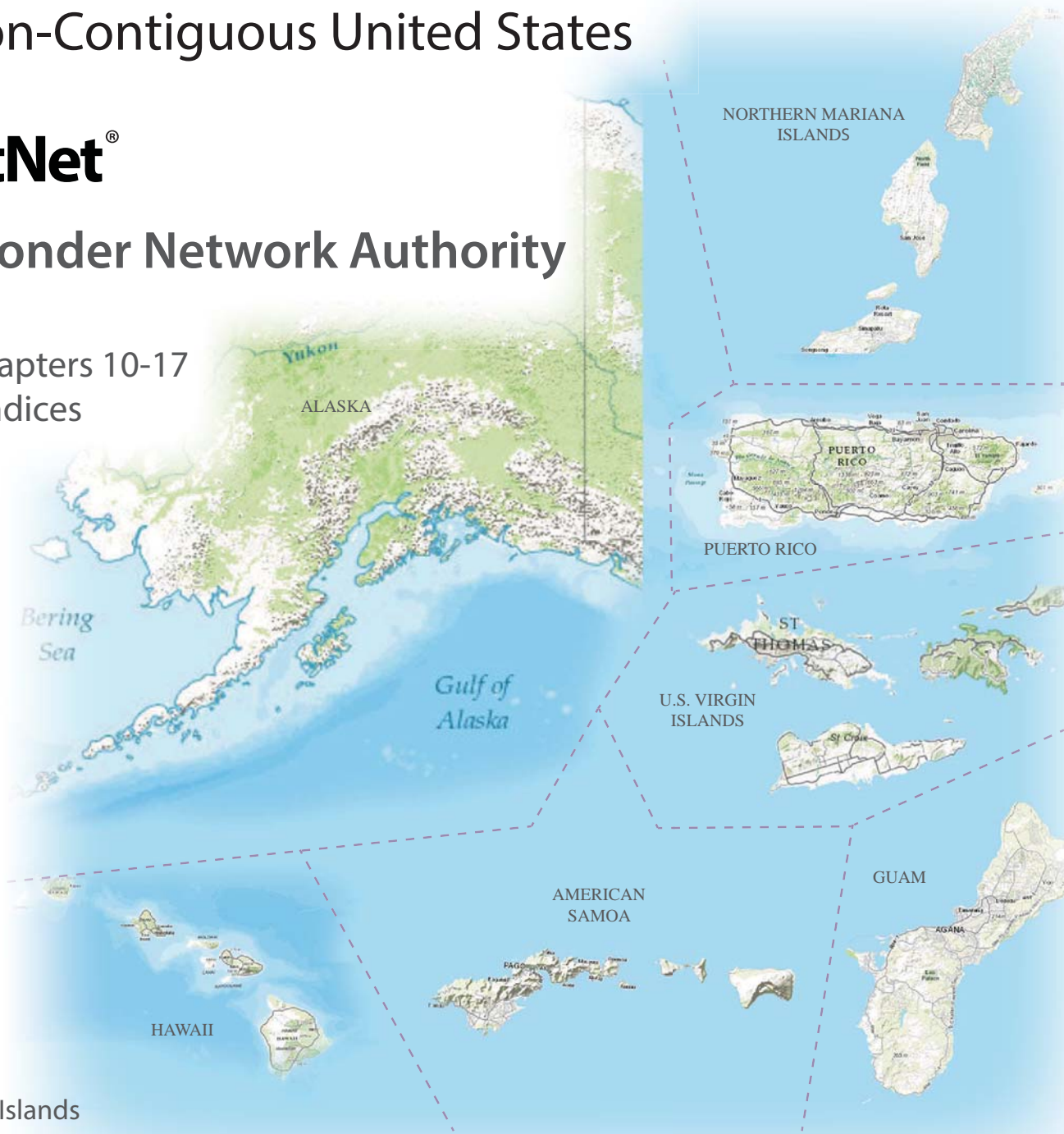
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Nationwide Public Safety Broadband Network Draft Programmatic Environmental Impact Statement for the Non-Contiguous United States

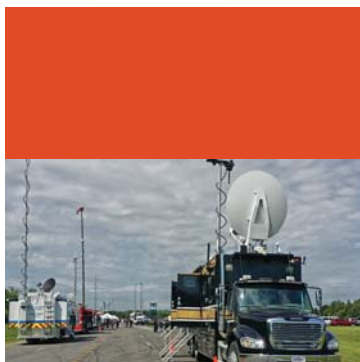


First Responder Network Authority

Volume 8 - Chapters 10-17
& Appendices



Alaska
Hawaii
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Guam
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Puerto Rico
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First Responder Network Authority



Nationwide Public Safety Broadband Network Draft 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—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

March 2016

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	ATWC	Alaska Tsunami Warning Center
°N	degrees north	AURORA	Alaska Uniform Response Online Reporting Access
µg/m ³	microgram(s) per cubic meter	BACT	best available control technology
µPa	micro Pascal	BCE	before Common Era
%	percent	BCR	Bird Conservation Regions
A	attained	BGEPA	Bald and Golden Eagle Protection Act
AAC	Alaska Administrative Code	BLM	Bureau of Land Management
AAFIS	Alaska Public Safety Identification System	BLS	U.S. Bureau of Labor Statistics
AAQS	Ambient Air Quality Standards	BMP	best management practice
ACHP	Advisory Council on Historic Preservation	BRFSS	Behavioral Risk Factor Surveillance System
ACS	American Community Survey (U.S. Census Bureau)	BSAI	Bering Sea/Aleutian Island
ADEC	Alaska Department of Environmental Conservation	BWG	BioInitiative Working Group
ADFG	Alaska Department of Fish and Game	CAA	Clean Air Act
AGL	above ground level	CAB	Clean Air Branch
AIRFA	American Indian Religious Freedom Act	CARB	California Air Resources Board
AJRCCM	American Journal of Respiratory and Critical Care Medicine	CBIA	Coastal Barrier Improvement Act of 1990
AKNHP	Alaska National Heritage Program	CBRA	Coastal Barrier Resources Act of 1982
AKOSH	Alaska Occupational Safety and Health	CCP	Comprehensive Conservation Plan
AKWAS	Alaska Warning System	CDC	Center for Disease Control
ALMR	Alaska Land Mobile Radio	CDLNR	Commonwealth Department of Lands and Natural Resources
ANFIRS	Alaska Fire Incident Reporting System	CE	Common Era
ANSCA	Alaska Native Claims Settlement Act	CELCP	Coastal and Estuarine Land Conservation Program
ANSI	American National Standards Institute	CEPD	Caribbean Environmental Protection Division
APE	Area of Potential Effect	CEQ	Council on Environmental Quality
APLIC	Avian Power Line Interaction Committee	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
APSIN	Alaska Public Safety Information Network	CFMC	Caribbean Fisheries Management Council
AQCR	air quality control region	CFR	Code of Federal Regulations
ARFF	Aircraft Rescue and Firefighting	cfs	cubic feet per second
ARMS	Alaska Records Management System	CH ₄	methane
ARPA	Archaeological Resources Protection Act of 1979	CHC	Commonwealth Health Center
AS	Alaska Statute	CIA	Central Intelligence Agency
A.S.A.C.	American Samoa Administrative Code	CMIP3	Coupled Model Intercomparison Project phase 3
ASCA	American Samoa Code Annotated	CNMI	Commonwealth of Northern Mariana Islands
ASCMP	American Samoa Coastal Management Program	CNMIAC	Commonwealth of Northern Mariana Islands Administrative Code
ASDMWR	American Samoa Department of Marine and Wildlife Resources	CO	carbon monoxide
ASEPA	American Samoa Environmental Protection Agency	CO ₂	carbon dioxide
ASHPO	American Samoa Historic Preservation Office	CO _{2e}	carbon dioxide equivalents
ASPA	American Samoa Power Authority	COMAR	Committee on Man and Radiation
ATO	Air Traffic Organization	CPA	Commonwealth Ports 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 ₂ 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	HIANG	Hawaii Air National Guard
DOE	U.S. Department of Energy	HIARNG	Hawaii Army National Guard
DOH	Department of Health	HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
DOH-CAB	Hawaii Department of Health, Clean Air Branch	HIOSH	Hawaii Occupational Safety and Health Division
DOT	U.S. Department of Transportation	hp	horsepower
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)	HRD	(Guam) Historic Resources Division
DPS	Department of Public Safety	HRHP	Hawaii Register of Historic Places
EA	Environmental Assessment	HRS	Hawaii Administrative Rules, Revised Statute
EAS	Emergency Alert System	HTA	Hawai'i Tourism Authority
EBS	Emergency Broadcast System	HUC	hydrologic unit code
EDB	ethylene dibromide	I/M	Inspection/Maintenance
EFH	essential fish habitat	IARC	International Agency for Research on Cancer
EMS	emergency medical services	IBA	Important Bird Area
ENSO	El Niño/Southern Oscillation	IEEE	Institute of Electrical and Electronics Engineers
EO	Executive Order	IFC	International Finance Corporation
EPCRA	Emergency Planning and Community Right-to-Know Act	in	inches
ERP	effective radiated power	IPCC	Intergovernmental Panel on Climate Change
ESA	Endangered Species Act	IR	ionizing radiation
ESI	Environmental Sensitivity Index	ITCZ	Intertropical Convergence Zone
FAA	Federal Aviation Administration	IUCN	International Union for Conservation of Nature
FAD	Fish Aggregating Device	kg/gal	kilograms per gallon
FCC	Federal Communications Commission	KIRC	Kaho'olawe Island Reserve Commission
FEMA	Federal Emergency Management Agency	LAER	lowest achievable emission rate
FirstNet	First Responder Network Authority	lb/day	pounds per day
		lb/hp-hr	pounds per horsepower-hour

LBJ	Lyndon B. Johnson	NP	National Park
Ldn	day-night average sound level	NPDES	National Pollutant Discharge Elimination System
Leq	equivalent noise levels	NPL	National Priorities List
LNG	liquefied natural gas	NPS	National Park Service
LTE	Long Term Evolution	NPSBN	nationwide public safety broadband network
µg/m ³	microgram(s) per cubic meter	NRCS	Natural Resources Conservation Service
µPa	micro Pascal	NRHP	National Register of Historic Places
m/s	meter per second	NSPS	New Source Performance Standards
MBTA	Migratory Bird Treaty Act	NTIA	National Telecommunications and Information Administration
mg/m ³	Milligram(s) per cubic meter	NVSR	National Vital Statistics Report
mgd	million gallons per day	NWI	National Wetland Inventory
MHz	megahertz	NWR	National Wildlife Refuge
MLRA	Major Land Resource Area	NWWS	National Weather Wire Satellite System
mm/s	millimeters per second	OHA	Office of History and Archaeology
MMPA	Marine Mammal Protection Act	OIA	Office of Insular Affairs (USDI)
MOA	Memorandum of Agreement	OSHA	Occupational Safety and Health Administration
MPA	Marine Protected Area	PA	Programmatic Agreement
mph	miles per hour	PAG	Port Authority of Guam
MSA	Magnuson-Stevens Fishery Conservation and Management Act	PAHO	Pan American Health Organization
MTR	Military Training Route	PCB	polychlorinated biphenyl
MUID	Map Unit Identification Data	PCP	pentachlorophenol
MW	megawatt	PDO	Pacific Decadal Oscillation
mW/cm ²	milliwatts per centimeter squared	PEIS	Programmatic Environmental Impact Statement
N	north; not attained	PL	Public Law
N ₂ O	nitrous oxide	PM	particulate matter
NA	not applicable; not assessed	PM ₁₀	particulate matter up to 10 micrometers in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	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	PV	photovoltaic
NESHAP	National Emission Standards for Hazardous Air Pollutants	RAN	radio access network
NFIP	National Flood Insurance Program	RCP	Representative Concentration Pathway
NFIRS	National Fire Incident Reporting System	RCRA	Resource Conservation and Recovery Act
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		
NOAA	National Oceanic and Atmospheric Administration		
NOx	nitrogen oxides		

RF	radio frequency	vog	volcanic smog
RIN	Regulation Identification Number	VRM	Visual Resource Management
rms	root mean square	W	watt(s)
ROW	right-of-way	W/m ²	watts per meters squared
SAAQS	State Air Quality Standards	WAPA	Water and Power Authority
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	WHO	World Health Organization
SARA	Superfund Amendments and Reauthorization Act of 1986	WIMARCS	West Indies Marine Animal Research and Conservation Science
SCD	State Civil Defense	WNP	Western North Pacific
SE	Standard of Error	WNW	west-northwest
SHPO	State Historic Preservation Office	WPC	watts per channel
SIP	State Implementation Plan	WPRFMC	Western Pacific Regional Fishery Management Council
SLR	sea level rise		
SMA	Special Management Area		
SMS	Scenery Management System		
SO ₂	sulfur dioxide		
SO _x	sulfur oxides		
SPCZ	South Pacific Convergence Zone		
SPOC	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		
UVA	University of Virginia		
VIC	Virgin Islands Code		
VIPA	Virgin Islands Port Authority		
VISHPO	Virgin Islands State Historic Preservation Office		
VOC	volatile organic compound		

11. BMPS AND MITIGATION MEASURES

This chapter outlines the best management practices (BMPs) and mitigation measures that FirstNet and/or their partners would require, as practicable or feasible, during deployment and operation of the Proposed Action to avoid or minimize potential impacts to various resources, or potential impacts to deployed infrastructure from various hazards. The BMPs and mitigation measures are outlined in this chapter by resource area and, where applicable, each of the following project types:¹

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

¹ 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.

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 closely with public safety officials, emergency and medical facilities, and existing telecommunications providers so that each is aware of the deployment activities and accompanying schedule, and can confirm whether access is being maintained;
- 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) to minimize the potential for impact associated with unforeseen service disruptions during deployment activities;
- 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; and
- 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 (greater than 20 percent) or unstable slopes, 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 implement BMPs and mitigation measures including the use of silt fences, erosion control blankets,² and 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;³
- Avoid construction activities immediately following heavy precipitation events or cover exposed areas with tarps or similar materials to prevent exposure to the extent possible;
- Minimize the area of bare soil exposed at any one time as much as possible by constructing in stages;
- Revegetate disturbed areas as progressively and quickly as practicable to achieve stabilization;⁴
- Minimize soil disturbance to the extent practicable, especially in wetland and designated natural resource areas;

² 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. They are often 2- to 3-feet tall and are buried 8 to 12 inches into the soil with stakes. 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.

³ See Affected Environment Climate Change sections for an explanation of seasonal climate and weather patterns.

⁴ 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.

- Segregate topsoil or surface soil from subsurface layers during construction;⁵
- Implement temporary topsoil storage areas;
- Identify and maintain topsoil;
- 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 requiring plowing;
- 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;
- Segregate topsoil to avoid topsoil compaction; and
- Use timber mats or similar infrastructure as deemed necessary to distribute vehicle and heavy equipment weight.

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;
- 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;

⁵ 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 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 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; and
- 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.

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;
- 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,⁶ and infiltration (or recharge) basins⁷);
- Direct water to storm water drains for large-scale construction activities, or to constructed bioretention,⁸ rain garden, 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;
- Place materials storage and staging areas outside of waterways and floodplains, as practicable;
- 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 above ground structures outside of the 100-year floodplain, to the extent practicable; if deployables or above ground structures must be placed in 100-year 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;

⁶ Storm water filtration structures use a filtering media (sand, soil, gravel, peat, or compost) to remove pollutants from storm water runoff.

⁷ 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.

⁸ 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.

- Restore native vegetation/wetlands to stabilize streambanks and stop erosion;
- 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, and other controls as needed to reduce soil erosion, storm water runoff, and sedimentation;
- 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, 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;⁹
- 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;
- Minimize in-stream work to the extent practicable;
- 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 of 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 and response 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;

⁹ 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.

- Park vehicles at least 50 feet from any stream or wetland unless authorized by a permit or on an existing roadway, as practicable;
- Place materials storage and staging areas outside of waterways and floodplains, 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;
- Avoid construction of roads and other impervious surfaces in floodplain areas to the extent practicable, and 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 above ground structures outside of the 100-year floodplain, to the extent practicable; if deployables or above ground structures must be placed in 100-year 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;
- 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;
- Deposit and stabilize all excavated material not reused in an upland area outside of floodplains and streams; and
- Conduct in-stream construction (trenching or roads if necessary) during times that streams have flow, maintain adequate waterbody flow rates to protect aquatic life and prevent the interruption of existing downstream users, as practicable.

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 water body.

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.
- 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.
- Consider spanning a wetland by locating telecommunication poles on either side of the wetland instead of disturbing the interior.
- 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, 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 removed during installation 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; and
 - 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
 - Install overhead transmission lines along existing road ROWs wherever possible to minimize vegetation clearing and other potential impacts to 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; and
 - 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 United States (U.S.) Fish and Wildlife Service (USFWS) and state/territory agencies;
- Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce vegetation loss;
- Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss and habitat fragmentation;
- Limit construction equipment and vehicles to approved roads or ROWs;
- Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practical;
- 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 and vegetation cover using appropriate and certified seed mixes and seed dispersal, management, and maintenance processes, as applicable;
- 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;

- 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; and
- 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.

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 agencies;
- 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, cays¹⁰, and stream sites) for amphibians and reptiles;
- 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);

¹⁰ Cays are small, low-elevation, sandy islands on the surface of a coral reef.

- 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;
- Assess critical life stages of marine mammals hauled out near locations (1 mile) selected for deployment and associated activities;
- 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;
- Turn off all unnecessary lighting at night; and
- 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.

The following BMPs and mitigation measures are required by *USFWS (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* [¹¹]) 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.

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,

¹¹ Current FAA guidance (*FAA 2015*) requires lighting for towers greater than 200 feet.

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.^[12] 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-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

¹² This guidance (*USFWS 2013b*) was based on earlier FAA guidance that has since been updated. Current FAA guidance (*FAA 2015*) now requires lighting for towers greater than 200 feet.

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, 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, 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.”

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;
 - 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 calving/lambing areas during critical life stages, with the exception only for severe weather conditions; and
 - 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 standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC and USFWS 2005; APLIC 2012*) for any above-ground lines or cables (e.g., use of diverters and anti-perching and anti-nesting devices); and
 - Install bat exclusions on existing and new structures.
 - Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable
 - Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC and USFWS 2005; APLIC 2012*) for any above-ground lines or cables (e.g., use of diverters).

- Wireless Projects
 - New Wireless Communication Towers
 - Follow USFWS Guidelines For Recommendations On Communications Tower Siting, Construction, Operation, and Decommissioning (*USFWS 2012a*); and
 - Insert anti-perching or anti-nesting devices on existing or new structures.

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 or pelagic¹³) 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;
- 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 curtains¹⁴, 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; 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;

¹³ Inhabiting the water column as opposed to being associated with the sea floor; generally occurring anywhere from the surface to 1,000 meters (*NOAA 2006*)

¹⁴ Silt curtains are floating barriers used in marine construction and remediation to control silt and sediment in a body of water.

- Perform regular maintenance checks of equipment near protected areas to minimize detachment of components reaching critical habitat by tidal flow;
- 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; and
- Follow all applicable federal and state/territory requirements for construction activities near/in 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.
- New Build – Aerial Fiber Optic Plant
 - Keep poles or lines clear of excess vegetation growth during equipment operation and non-operation periods.
- Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable
 - Keep poles or lines clear of excess vegetation growth during equipment operation and non-operation periods.

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:

- 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;¹⁵
- Avoid activities within seagrass beds and control turbidity to minimize potential indirect impacts on seagrass;
- Avoid potential impacts to known grouper spawning sites;

¹⁵ Hibernacula are the habitats within which animals hibernate or otherwise seek refuge for extended periods.

- 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;
- 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/in 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; and
- Develop and implement operational monitoring and adaptive management procedures.

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 standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC 2012*) for any above-ground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).
 - **Collocation on Existing Aerial Fiber Optic Plant**
 - Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC 2012*) for any above-ground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).
- **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; and
 - Implement a marine observer program during construction and operation to avoid and minimize boat strikes to whales, sea turtles, seals, and dugongs.
- **Wireless Projects**
 - **Collocation on Existing Wireless Tower, Structure, or Building**
 - Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (*APLIC 2012*) for any above-ground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).
- **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; and**
 - **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 (i.e., 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;
- Select infrastructure locations that are as far from recreation lands as possible; and
- Give preference to infrastructure locations that are compatible with existing park or recreation planning documents.

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 2015*); and
 - Avoid placing new infrastructure within Military Operations Areas or under Military Training Routes.

- 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;
- Retain existing vegetation wherever possible to provide visual screening of new infrastructure;

- Select infrastructure designs that minimize contrast with the surrounding landscape; and
- 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 to Deployable Technologies in addition to those listed above for all project types:

- 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; and
- 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); and
 - 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 designs that minimize construction footprints.
- 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:

- 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 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;
- Avoid constructing and operating sources in extreme or severe nonattainment areas to the extent practicable;
- 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;
- 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 above ground 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;¹⁶
- 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;

¹⁶ 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.

- Ensure all equipment are 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;¹⁷
- 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; and
- Ensure all fuel-burning equipment including, but not limited to, heavy construction equipment and power generators, are 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

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 impacts. The following BMPs and mitigation measures would apply to all project types:

- Use noise mufflers on heavy equipment to limit noise exposure on noise-sensitive receptors for construction and grading activities near populated areas; limit the use of such equipment to operation during daytime hours only.
- Use noise mufflers on heavy equipment to limit noise exposure during construction and grading activities near other noise sensitive receptors, including parks or other protected areas; limit the use of such equipment to operation during daytime hours only.
- Follow all state/territory and federal guidelines for limiting aircraft noise 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 (e.g., use of noise barriers such as walls, shrubbery).
- 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,

¹⁷ Permits for stationary sources (diesel generators) should be obtained in advance of future deployment.

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 control to avoid or minimize increased noise levels.
- 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 water body.
 - New Build – Submarine Fiber Optic Plant
 - Do not permit underwater blasting and pile driving activities in any water body.

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;
- 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;
- 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 more fuel-efficient diesel-power generation units or low-emission units such as gasoline- or hydrogen-fueled power generators; and
- 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 above ground 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;
- Reinforce structures to include allowances for extreme weather events and flooding; and
- 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:

- 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 description of work practice controls and administrative control.
- Ensure workers wear proper safety equipment, 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 or mine lands.
- Follow all applicable federal, state/territory, and local requirements for hazardous materials and hazardous waste management.
- 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 11.2, Soils, for potential impacts from soil erosion.
- 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 federal and state/territory Superfund sites prior to site section in the area where the Proposed Action site is being considered, for new or existing infrastructure projects. If a Superfund site is located at or immediately adjacent to the Proposed Action activities, site-specific worker health and safety protection measures may be required, or an alternative site may need to be considered.
- Ensure that appropriate measures are taken in compliance with applicable regulations (including Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act¹⁸) if construction occurs in an area where there is the potential for legacy soil 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.

¹⁸ 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*).

- 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.¹⁹
- 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.
- Incorporate all BMPs and mitigation measures listed in Section 11.1, Infrastructure, on potential impacts to transportation system capacity and safety.
- 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 to avoid potential cold stress impacts such as hypothermia and frostbite.
- Incorporate all BMPs and mitigation measures listed in Section 11.13, Noise.
- 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.
- 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.

¹⁹ 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*).

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

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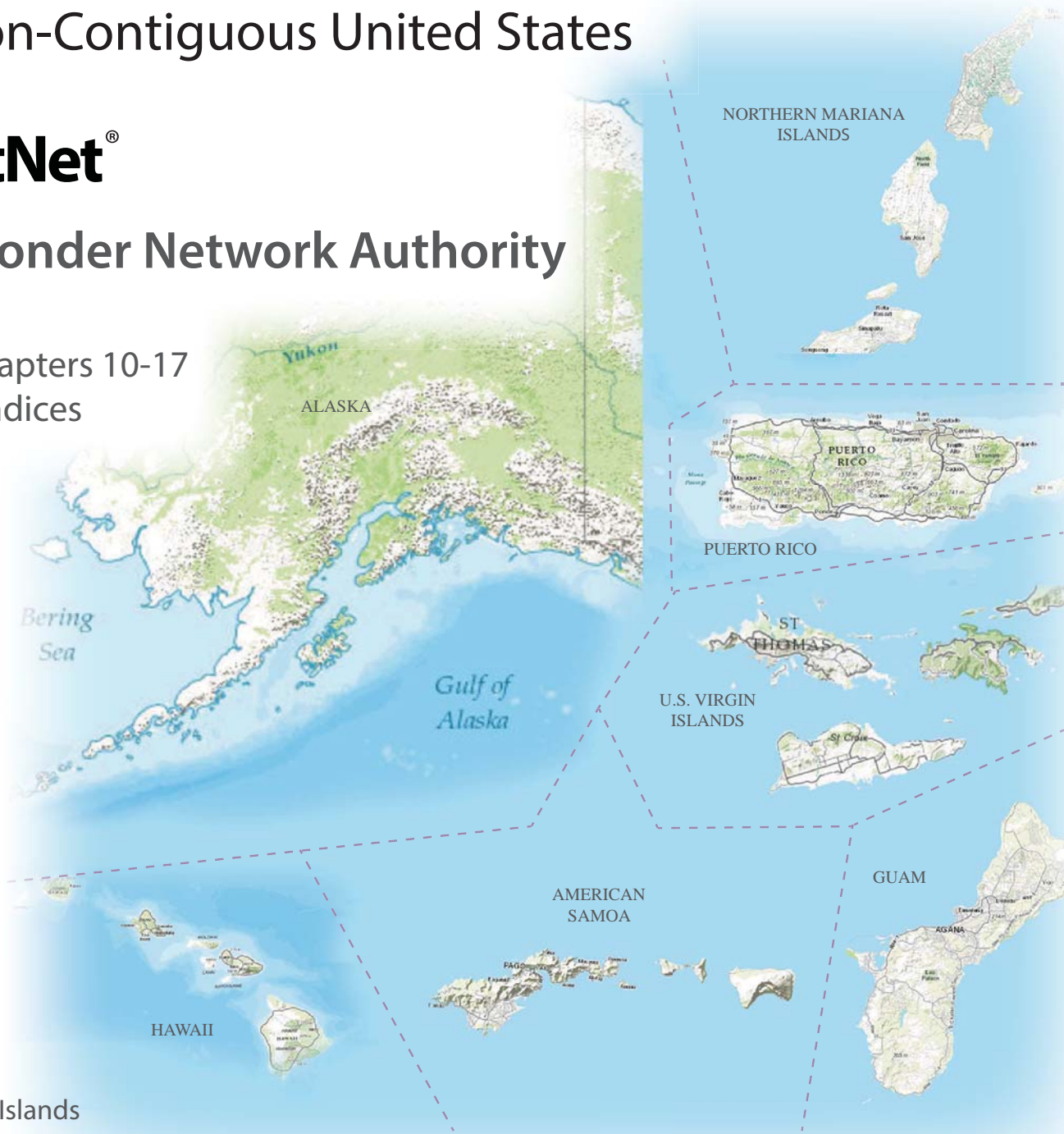
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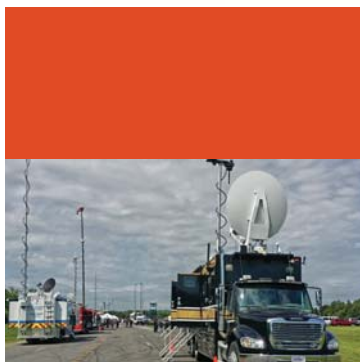
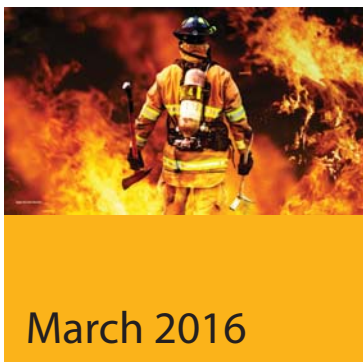
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Nationwide Public Safety Broadband Network Draft Programmatic Environmental Impact Statement for the Non-Contiguous United States

Volume 8

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U.S. Department of Agriculture—U.S. Forest Service
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U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
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March 2016

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	ATWC	Alaska Tsunami Warning Center
°N	degrees north	AURORA	Alaska Uniform Response Online Reporting Access
µg/m ³	microgram(s) per cubic meter	BACT	best available control technology
µPa	micro Pascal	BCE	before Common Era
%	percent	BCR	Bird Conservation Regions
A	attained	BGEPA	Bald and Golden Eagle Protection Act
AAC	Alaska Administrative Code	BLM	Bureau of Land Management
AAFIS	Alaska Public Safety Identification System	BLS	U.S. Bureau of Labor Statistics
AAQS	Ambient Air Quality Standards	BMP	best management practice
ACHP	Advisory Council on Historic Preservation	BRFSS	Behavioral Risk Factor Surveillance System
ACS	American Community Survey (U.S. Census Bureau)	BSAI	Bering Sea/Aleutian Island
ADEC	Alaska Department of Environmental Conservation	BWG	BioInitiative Working Group
ADFG	Alaska Department of Fish and Game	CAA	Clean Air Act
AGL	above ground level	CAB	Clean Air Branch
AIRFA	American Indian Religious Freedom Act	CARB	California Air Resources Board
AJRCCM	American Journal of Respiratory and Critical Care Medicine	CBIA	Coastal Barrier Improvement Act of 1990
AKNHP	Alaska National Heritage Program	CBRA	Coastal Barrier Resources Act of 1982
AKOSH	Alaska Occupational Safety and Health	CCP	Comprehensive Conservation Plan
AKWAS	Alaska Warning System	CDC	Center for Disease Control
ALMR	Alaska Land Mobile Radio	CDLNR	Commonwealth Department of Lands and Natural Resources
ANFIRS	Alaska Fire Incident Reporting System	CE	Common Era
ANSCA	Alaska Native Claims Settlement Act	CELCP	Coastal and Estuarine Land Conservation Program
ANSI	American National Standards Institute	CEPD	Caribbean Environmental Protection Division
APE	Area of Potential Effect	CEQ	Council on Environmental Quality
APLIC	Avian Power Line Interaction Committee	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
APSIN	Alaska Public Safety Information Network	CFMC	Caribbean Fisheries Management Council
AQCR	air quality control region	CFR	Code of Federal Regulations
ARFF	Aircraft Rescue and Firefighting	cfs	cubic feet per second
ARMS	Alaska Records Management System	CH ₄	methane
ARPA	Archaeological Resources Protection Act of 1979	CHC	Commonwealth Health Center
AS	Alaska Statute	CIA	Central Intelligence Agency
A.S.A.C.	American Samoa Administrative Code	CMIP3	Coupled Model Intercomparison Project phase 3
ASCA	American Samoa Code Annotated	CNMI	Commonwealth of Northern Mariana Islands
ASCMP	American Samoa Coastal Management Program	CNMIAC	Commonwealth of Northern Mariana Islands Administrative Code
ASDMWR	American Samoa Department of Marine and Wildlife Resources	CO	carbon monoxide
ASEPA	American Samoa Environmental Protection Agency	CO ₂	carbon dioxide
ASHPO	American Samoa Historic Preservation Office	CO _{2e}	carbon dioxide equivalents
ASPA	American Samoa Power Authority	COMAR	Committee on Man and Radiation
ATO	Air Traffic Organization	CPA	Commonwealth Ports 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 ₂ 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	HIANG	Hawaii Air National Guard
DOE	U.S. Department of Energy	HIARNG	Hawaii Army National Guard
DOH	Department of Health	HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
DOH-CAB	Hawaii Department of Health, Clean Air Branch	HIOSH	Hawaii Occupational Safety and Health Division
DOT	U.S. Department of Transportation	hp	horsepower
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)	HRD	(Guam) Historic Resources Division
DPS	Department of Public Safety	HRHP	Hawaii Register of Historic Places
EA	Environmental Assessment	HRS	Hawaii Administrative Rules, Revised Statute
EAS	Emergency Alert System	HTA	Hawai'i Tourism Authority
EBS	Emergency Broadcast System	HUC	hydrologic unit code
EDB	ethylene dibromide	I/M	Inspection/Maintenance
EFH	essential fish habitat	IARC	International Agency for Research on Cancer
EMS	emergency medical services	IBA	Important Bird Area
ENSO	El Niño/Southern Oscillation	IEEE	Institute of Electrical and Electronics Engineers
EO	Executive Order	IFC	International Finance Corporation
EPCRA	Emergency Planning and Community Right-to-Know Act	in	inches
ERP	effective radiated power	IPCC	Intergovernmental Panel on Climate Change
ESA	Endangered Species Act	IR	ionizing radiation
ESI	Environmental Sensitivity Index	ITCZ	Intertropical Convergence Zone
FAA	Federal Aviation Administration	IUCN	International Union for Conservation of Nature
FAD	Fish Aggregating Device	kg/gal	kilograms per gallon
FCC	Federal Communications Commission	KIRC	Kaho'olawe Island Reserve Commission
FEMA	Federal Emergency Management Agency	LAER	lowest achievable emission rate
FirstNet	First Responder Network Authority	lb/day	pounds per day
		lb/hp-hr	pounds per horsepower-hour

LBJ	Lyndon B. Johnson	NP	National Park
Ldn	day-night average sound level	NPDES	National Pollutant Discharge Elimination System
Leq	equivalent noise levels	NPL	National Priorities List
LNG	liquefied natural gas	NPS	National Park Service
LTE	Long Term Evolution	NPSBN	nationwide public safety broadband network
µg/m ³	microgram(s) per cubic meter	NRCS	Natural Resources Conservation Service
µPa	micro Pascal	NRHP	National Register of Historic Places
m/s	meter per second	NSPS	New Source Performance Standards
MBTA	Migratory Bird Treaty Act	NTIA	National Telecommunications and Information Administration
mg/m ³	Milligram(s) per cubic meter	NVSR	National Vital Statistics Report
mgd	million gallons per day	NWI	National Wetland Inventory
MHz	megahertz	NWR	National Wildlife Refuge
MLRA	Major Land Resource Area	NWWS	National Weather Wire Satellite System
mm/s	millimeters per second	OHA	Office of History and Archaeology
MMPA	Marine Mammal Protection Act	OIA	Office of Insular Affairs (USDI)
MOA	Memorandum of Agreement	OSHA	Occupational Safety and Health Administration
MPA	Marine Protected Area	PA	Programmatic Agreement
mph	miles per hour	PAG	Port Authority of Guam
MSA	Magnuson-Stevens Fishery Conservation and Management Act	PAHO	Pan American Health Organization
MTR	Military Training Route	PCB	polychlorinated biphenyl
MUID	Map Unit Identification Data	PCP	pentachlorophenol
MW	megawatt	PDO	Pacific Decadal Oscillation
mW/cm ²	milliwatts per centimeter squared	PEIS	Programmatic Environmental Impact Statement
N	north; not attained	PL	Public Law
N ₂ O	nitrous oxide	PM	particulate matter
NA	not applicable; not assessed	PM ₁₀	particulate matter up to 10 micrometers in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	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	PV	photovoltaic
NESHAP	National Emission Standards for Hazardous Air Pollutants	RAN	radio access network
NFIP	National Flood Insurance Program	RCP	Representative Concentration Pathway
NFIRS	National Fire Incident Reporting System	RCRA	Resource Conservation and Recovery Act
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		
NOAA	National Oceanic and Atmospheric Administration		
NOx	nitrogen oxides		

RF	radio frequency	vog	volcanic smog
RIN	Regulation Identification Number	VRM	Visual Resource Management
rms	root mean square	W	watt(s)
ROW	right-of-way	W/m ²	watts per meters squared
SAAQS	State Air Quality Standards	WAPA	Water and Power Authority
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	WHO	World Health Organization
SARA	Superfund Amendments and Reauthorization Act of 1986	WIMARCS	West Indies Marine Animal Research and Conservation Science
SCD	State Civil Defense	WNP	Western North Pacific
SE	Standard of Error	WNW	west-northwest
SHPO	State Historic Preservation Office	WPC	watts per channel
SIP	State Implementation Plan	WPRFMC	Western Pacific Regional Fishery Management Council
SLR	sea level rise		
SMA	Special Management Area		
SMS	Scenery Management System		
SO ₂	sulfur dioxide		
SO _x	sulfur oxides		
SPCZ	South Pacific Convergence Zone		
SPOC	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		
UVA	University of Virginia		
VIC	Virgin Islands Code		
VIPA	Virgin Islands Port Authority		
VISHPO	Virgin Islands State Historic Preservation Office		
VOC	volatile organic compound		

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 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 as there would be no collocation of equipment or 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 Draft Programmatic Environmental Impact Statement contains seven stand-alone chapters, each of which is devoted to one of the seven states or territories in the Non-Contiguous U.S. region. Each of these chapters discusses fifteen separate resource areas, such as biological resources, land use, air quality, etc. and discusses the potential impacts of the Proposed Action in an Environmental Consequences section.

Through the programmatic approach, FirstNet has identified four categories of potential impacts on 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*¹
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 Code of Federal Regulations (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*

¹ For all impact ratings where potential affect is found, full and effective implementation of mitigation is assumed.

12.2. COMPARISON OF ALTERNATIVES

The table below presents impact ratings 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.

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. Both alternatives have potential impacts whose significance ranges from *no impacts* to *potentially significant*. For most resources, impact ratings are identical, although some differences exist for some resource areas.

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 Project's stated purpose or meet the project need as required by Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (*Pub. L. No. 112-96, Title VI, 126 Stat. 156 (codified at 47 U.S.C. 1401 et seq.)*), and as such it would require an act of Congress in order for the No Action Alternative to take place.

Table 12.2-1: Comparison of Alternatives by Resource Area and Type of Effect²

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					
<i>Potential Impacts of the Project</i>					
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

² 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 potential impacts would be evaluated by FirstNet once the specific deployment locations are identified.

Resource Area/Type of Effect	Preferred Alternative		Deployable Technologies Alternative		No Action Alternative
	Deployment	Operations	Deployment	Operations	
<i>Potential Impacts to the Project</i>					
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 ^a	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					
Direct wetland loss (fill or conversion to non-wetland), other direct and indirect effects	3	3	3	3	4
Biological Resources					
<i>Vegetation</i>					
Vegetation and habitat loss, alteration, or fragmentation	3	3	3	3	4
Invasive species effects	3	3	3	3	4
<i>Wildlife</i>					
Amphibians and reptiles	3	3	3	3	4
Terrestrial mammals	3	3	3	3	4
Marine mammals	3	3	3	3	4
Birds	3	3 ⁽³⁾	3	3	4
Terrestrial invertebrates	3	3	3	3	4
<i>Fisheries</i>					
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

³ Additional BMPs and mitigation measures may be required to further reduce potential impacts to migratory birds.

Resource Area/Type of Effect	Preferred Alternative		Deployable Technologies Alternative		No Action Alternative
	Deployment	Operations	Deployment	Operations	
Effects of invasive species	3	3	3	3	4
Threatened and Endangered Species and Species of Conservation Concern⁴					
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
Visual Resources					
Adverse change in aesthetic character	3	3 ⁽⁵⁾	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

⁴ 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)*.

⁵ Additional BMPs and mitigation measures may be implemented for towers.

Resource Area/Type of Effect	Preferred Alternative		Deployable Technologies Alternative		No Action Alternative
	Deployment	Operations	Deployment	Operations	
Socioeconomics					
Potential impacts to real estate	3	3	4	4	4
Potential economic benefits or adverse impacts related to changes in tax revenues, wages, or direct spending (could be positive or negative)	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 ⁽⁶⁾	3	3	3	4
Cultural Resources ⁷					
Physical damage to and/or destruction of historic properties ^d	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					
Increased noise levels	3	3	3	3	4

⁶ Since environmental justice impacts occur at the site-specific level, analyses of individual proposed projects would be required to determine potential impacts to specific environmental justice communities. BMPs and mitigation measures may be required to address potential impacts to environmental justice communities at the site-specific level.

⁷ 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 Code of Federal Regulations (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).

Resource Area/Type of Effect	Preferred Alternative		Deployable Technologies Alternative		No Action Alternative
	Deployment	Operations	Deployment	Operations	
Climate Change					
Contribution to climate change through GHG emissions	3	3	3	1-2	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*

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*

^a 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*).

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

^c Wetland functions include hydrologic, ecological, geomorphic, and social functions typically assessed for wetlands as part of U.S. Army Corps of Engineers compensatory mitigation planning. Typical functions assessed may include flood attenuation, bank stabilization, water quality, organic matter input/transport, nutrient processing, wildlife habitat, and threatened and endangered.

^d Per the National Historic Preservation Act, a 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)*). Cultural resources present within a project’s Area of Potential Effect are not historic properties if they do not meet the eligibility requirements for listing in the National Register of Historic Places (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(ies), may or may not be eligible for listing in the NRHP. These sites may also be considered traditional cultural properties (TCPs). 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.

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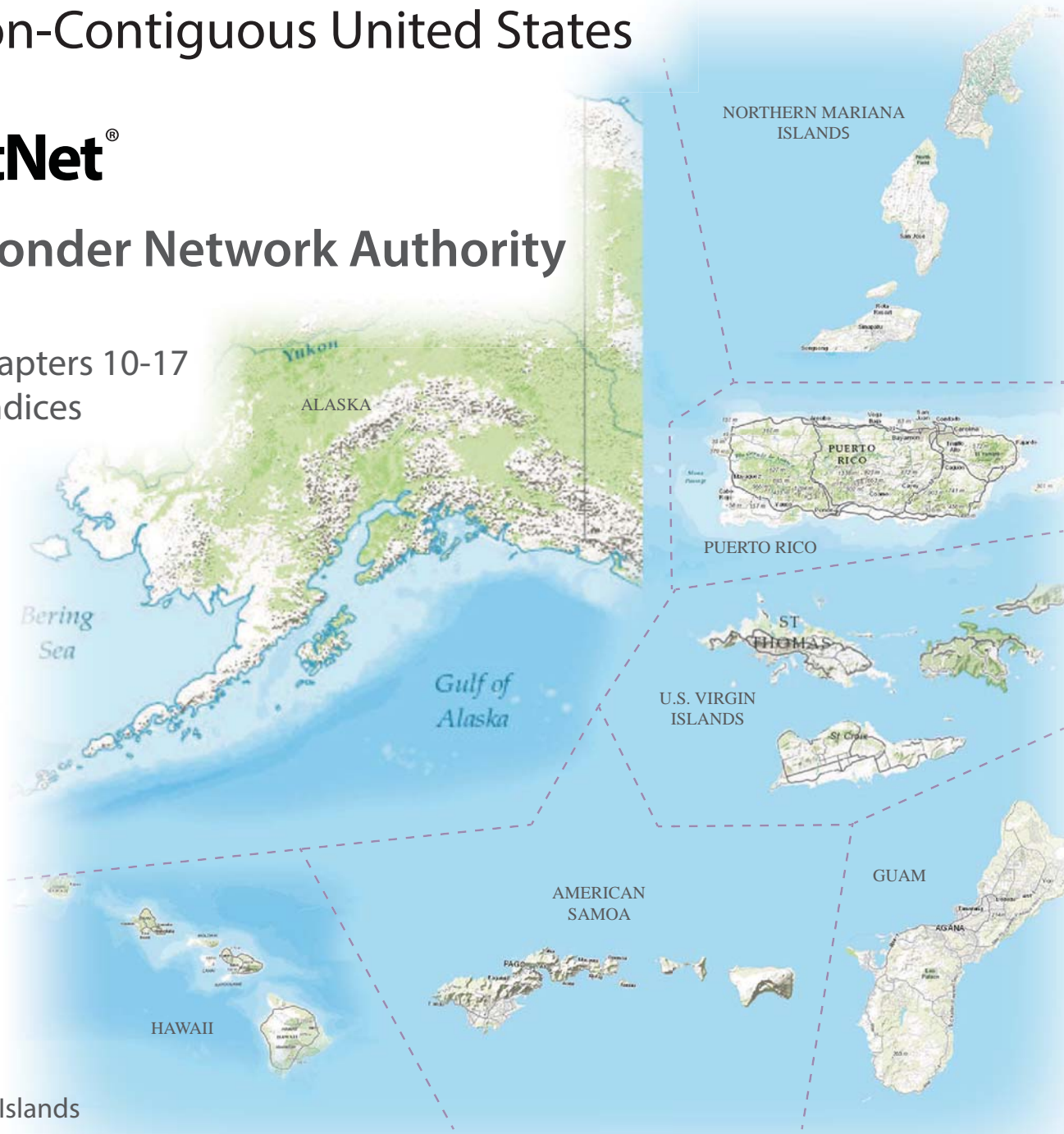
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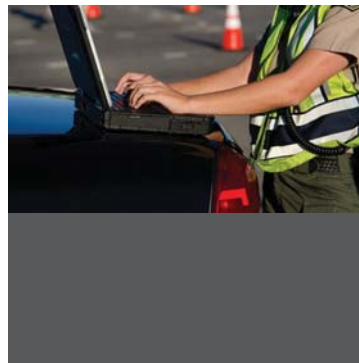
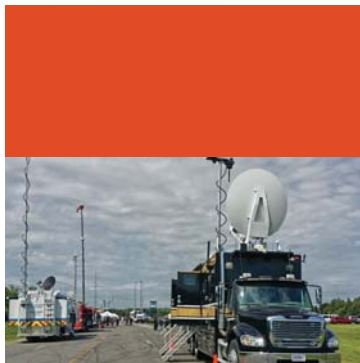
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First Responder Network Authority



Nationwide Public Safety Broadband Network Draft 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—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
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March 2016

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	ATWC	Alaska Tsunami Warning Center
°N	degrees north	AURORA	Alaska Uniform Response Online Reporting Access
µg/m ³	microgram(s) per cubic meter	BACT	best available control technology
µPa	micro Pascal	BCE	before Common Era
%	percent	BCR	Bird Conservation Regions
A	attained	BGEPA	Bald and Golden Eagle Protection Act
AAC	Alaska Administrative Code	BLM	Bureau of Land Management
AAFIS	Alaska Public Safety Identification System	BLS	U.S. Bureau of Labor Statistics
AAQS	Ambient Air Quality Standards	BMP	best management practice
ACHP	Advisory Council on Historic Preservation	BRFSS	Behavioral Risk Factor Surveillance System
ACS	American Community Survey (U.S. Census Bureau)	BSAI	Bering Sea/Aleutian Island
ADEC	Alaska Department of Environmental Conservation	BWG	BioInitiative Working Group
ADFG	Alaska Department of Fish and Game	CAA	Clean Air Act
AGL	above ground level	CAB	Clean Air Branch
AIRFA	American Indian Religious Freedom Act	CARB	California Air Resources Board
AJRCCM	American Journal of Respiratory and Critical Care Medicine	CBIA	Coastal Barrier Improvement Act of 1990
AKNHP	Alaska National Heritage Program	CBRA	Coastal Barrier Resources Act of 1982
AKOSH	Alaska Occupational Safety and Health	CCP	Comprehensive Conservation Plan
AKWAS	Alaska Warning System	CDC	Center for Disease Control
ALMR	Alaska Land Mobile Radio	CDLNR	Commonwealth Department of Lands and Natural Resources
ANFIRS	Alaska Fire Incident Reporting System	CE	Common Era
ANSCA	Alaska Native Claims Settlement Act	CELCP	Coastal and Estuarine Land Conservation Program
ANSI	American National Standards Institute	CEPD	Caribbean Environmental Protection Division
APE	Area of Potential Effect	CEQ	Council on Environmental Quality
APLIC	Avian Power Line Interaction Committee	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
APSIN	Alaska Public Safety Information Network	CFMC	Caribbean Fisheries Management Council
AQCR	air quality control region	CFR	Code of Federal Regulations
ARFF	Aircraft Rescue and Firefighting	cfs	cubic feet per second
ARMS	Alaska Records Management System	CH ₄	methane
ARPA	Archaeological Resources Protection Act of 1979	CHC	Commonwealth Health Center
AS	Alaska Statute	CIA	Central Intelligence Agency
A.S.A.C.	American Samoa Administrative Code	CMIP3	Coupled Model Intercomparison Project phase 3
ASCA	American Samoa Code Annotated	CNMI	Commonwealth of Northern Mariana Islands
ASCMP	American Samoa Coastal Management Program	CNMIAC	Commonwealth of Northern Mariana Islands Administrative Code
ASDMWR	American Samoa Department of Marine and Wildlife Resources	CO	carbon monoxide
ASEPA	American Samoa Environmental Protection Agency	CO ₂	carbon dioxide
ASHPO	American Samoa Historic Preservation Office	CO _{2e}	carbon dioxide equivalents
ASPA	American Samoa Power Authority	COMAR	Committee on Man and Radiation
ATO	Air Traffic Organization	CPA	Commonwealth Ports 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 ₂ 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	HIANG	Hawaii Air National Guard
DOE	U.S. Department of Energy	HIARNG	Hawaii Army National Guard
DOH	Department of Health	HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
DOH-CAB	Hawaii Department of Health, Clean Air Branch	HIOSH	Hawaii Occupational Safety and Health Division
DOT	U.S. Department of Transportation	hp	horsepower
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)	HRD	(Guam) Historic Resources Division
DPS	Department of Public Safety	HRHP	Hawaii Register of Historic Places
EA	Environmental Assessment	HRS	Hawaii Administrative Rules, Revised Statute
EAS	Emergency Alert System	HTA	Hawai'i Tourism Authority
EBS	Emergency Broadcast System	HUC	hydrologic unit code
EDB	ethylene dibromide	I/M	Inspection/Maintenance
EFH	essential fish habitat	IARC	International Agency for Research on Cancer
EMS	emergency medical services	IBA	Important Bird Area
ENSO	El Niño/Southern Oscillation	IEEE	Institute of Electrical and Electronics Engineers
EO	Executive Order	IFC	International Finance Corporation
EPCRA	Emergency Planning and Community Right-to-Know Act	in	inches
ERP	effective radiated power	IPCC	Intergovernmental Panel on Climate Change
ESA	Endangered Species Act	IR	ionizing radiation
ESI	Environmental Sensitivity Index	ITCZ	Intertropical Convergence Zone
FAA	Federal Aviation Administration	IUCN	International Union for Conservation of Nature
FAD	Fish Aggregating Device	kg/gal	kilograms per gallon
FCC	Federal Communications Commission	KIRC	Kaho'olawe Island Reserve Commission
FEMA	Federal Emergency Management Agency	LAER	lowest achievable emission rate
FirstNet	First Responder Network Authority	lb/day	pounds per day
		lb/hp-hr	pounds per horsepower-hour

LBJ	Lyndon B. Johnson	NP	National Park
Ldn	day-night average sound level	NPDES	National Pollutant Discharge Elimination System
Leq	equivalent noise levels	NPL	National Priorities List
LNG	liquefied natural gas	NPS	National Park Service
LTE	Long Term Evolution	NPSBN	nationwide public safety broadband network
µg/m ³	microgram(s) per cubic meter	NRCS	Natural Resources Conservation Service
µPa	micro Pascal	NRHP	National Register of Historic Places
m/s	meter per second	NSPS	New Source Performance Standards
MBTA	Migratory Bird Treaty Act	NTIA	National Telecommunications and Information Administration
mg/m ³	Milligram(s) per cubic meter	NVSR	National Vital Statistics Report
mgd	million gallons per day	NWI	National Wetland Inventory
MHz	megahertz	NWR	National Wildlife Refuge
MLRA	Major Land Resource Area	NWWS	National Weather Wire Satellite System
mm/s	millimeters per second	OHA	Office of History and Archaeology
MMPA	Marine Mammal Protection Act	OIA	Office of Insular Affairs (USDI)
MOA	Memorandum of Agreement	OSHA	Occupational Safety and Health Administration
MPA	Marine Protected Area	PA	Programmatic Agreement
mph	miles per hour	PAG	Port Authority of Guam
MSA	Magnuson-Stevens Fishery Conservation and Management Act	PAHO	Pan American Health Organization
MTR	Military Training Route	PCB	polychlorinated biphenyl
MUID	Map Unit Identification Data	PCP	pentachlorophenol
MW	megawatt	PDO	Pacific Decadal Oscillation
mW/cm ²	milliwatts per centimeter squared	PEIS	Programmatic Environmental Impact Statement
N	north; not attained	PL	Public Law
N ₂ O	nitrous oxide	PM	particulate matter
NA	not applicable; not assessed	PM ₁₀	particulate matter up to 10 micrometers in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	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	PV	photovoltaic
NESHAP	National Emission Standards for Hazardous Air Pollutants	RAN	radio access network
NFIP	National Flood Insurance Program	RCP	Representative Concentration Pathway
NFIRS	National Fire Incident Reporting System	RCRA	Resource Conservation and Recovery Act
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		
NOAA	National Oceanic and Atmospheric Administration		
NOx	nitrogen oxides		

RF	radio frequency	vog	volcanic smog
RIN	Regulation Identification Number	VRM	Visual Resource Management
rms	root mean square	W	watt(s)
ROW	right-of-way	W/m ²	watts per meters squared
SAAQS	State Air Quality Standards	WAPA	Water and Power Authority
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	WHO	World Health Organization
SARA	Superfund Amendments and Reauthorization Act of 1986	WIMARCS	West Indies Marine Animal Research and Conservation Science
SCD	State Civil Defense	WNP	Western North Pacific
SE	Standard of Error	WNW	west-northwest
SHPO	State Historic Preservation Office	WPC	watts per channel
SIP	State Implementation Plan	WPRFMC	Western Pacific Regional Fishery Management Council
SLR	sea level rise		
SMA	Special Management Area		
SMS	Scenery Management System		
SO ₂	sulfur dioxide		
SO _x	sulfur oxides		
SPCZ	South Pacific Convergence Zone		
SPOC	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		
UVA	University of Virginia		
VIC	Virgin Islands Code		
VIPA	Virgin Islands Port Authority		
VISHPO	Virgin Islands State Historic Preservation Office		
VOC	volatile organic compound		

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 Code of Federal Regulations [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. Once site-specific project information is known, the potential for adverse impacts would be analyzed, as appropriate, in NEPA documentation tiered from this Draft Programmatic EIS (PEIS).

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, 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 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 ratings¹ of the specific types of effects analyzed in this Draft 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 resources commitments that would be 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.

¹ 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* based on the characteristics of the potential effects. BMPs are best management practices.

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	No	Land use required for the deployment activities could potentially be a minor irreversible impact.
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.
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	No	No	Potential short-term, temporary noise impacts may result during construction activities for deployment. There would be no long-term impacts to noise.
Climate Change	No	No	Greenhouse gas emissions are not expected to increase.
Human Health and Safety	No	No	Construction activities during deployment may increase 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.

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. 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. Deployment activities would follow, where practicable and feasible, the BMPs and mitigation measures outlined in this Draft PEIS, as appropriate.

FirstNet does not intend to alter the current uses of the environment. Project-specific environmental compliance reviews would be conducted to ensure all environmental laws are met. During those reviews, each project element and activity would be evaluated, and the potential long-term effects on productivity of each environmental resource area would be disclosed and discussed relative to potential trade-offs.

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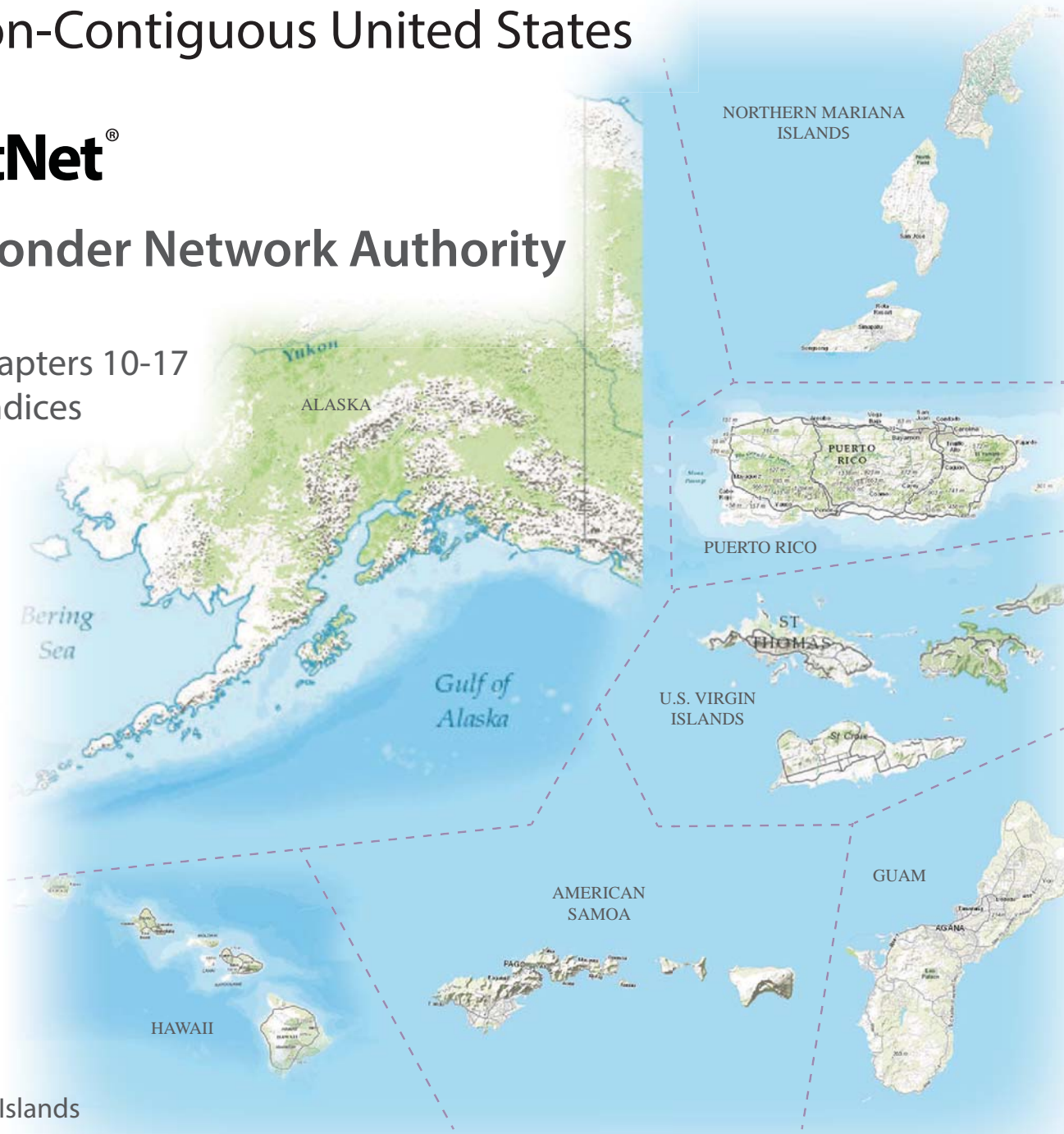
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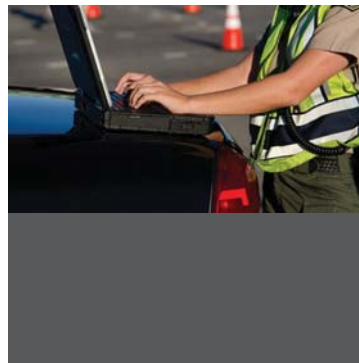
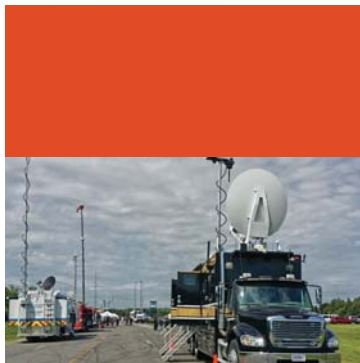
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First Responder Network Authority



Nationwide Public Safety Broadband Network Draft 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—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

March 2016

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	ATWC	Alaska Tsunami Warning Center
°N	degrees north	AURORA	Alaska Uniform Response Online Reporting Access
µg/m ³	microgram(s) per cubic meter	BACT	best available control technology
µPa	micro Pascal	BCE	before Common Era
%	percent	BCR	Bird Conservation Regions
A	attained	BGEPA	Bald and Golden Eagle Protection Act
AAC	Alaska Administrative Code	BLM	Bureau of Land Management
AAFIS	Alaska Public Safety Identification System	BLS	U.S. Bureau of Labor Statistics
AAQS	Ambient Air Quality Standards	BMP	best management practice
ACHP	Advisory Council on Historic Preservation	BRFSS	Behavioral Risk Factor Surveillance System
ACS	American Community Survey (U.S. Census Bureau)	BSAI	Bering Sea/Aleutian Island
ADEC	Alaska Department of Environmental Conservation	BWG	BioInitiative Working Group
ADFG	Alaska Department of Fish and Game	CAA	Clean Air Act
AGL	above ground level	CAB	Clean Air Branch
AIRFA	American Indian Religious Freedom Act	CARB	California Air Resources Board
AJRCCM	American Journal of Respiratory and Critical Care Medicine	CBIA	Coastal Barrier Improvement Act of 1990
AKNHP	Alaska National Heritage Program	CBRA	Coastal Barrier Resources Act of 1982
AKOSH	Alaska Occupational Safety and Health	CCP	Comprehensive Conservation Plan
AKWAS	Alaska Warning System	CDC	Center for Disease Control
ALMR	Alaska Land Mobile Radio	CDLNR	Commonwealth Department of Lands and Natural Resources
ANFIRS	Alaska Fire Incident Reporting System	CE	Common Era
ANSCA	Alaska Native Claims Settlement Act	CELCP	Coastal and Estuarine Land Conservation Program
ANSI	American National Standards Institute	CEPD	Caribbean Environmental Protection Division
APE	Area of Potential Effect	CEQ	Council on Environmental Quality
APLIC	Avian Power Line Interaction Committee	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
APSIN	Alaska Public Safety Information Network	CFMC	Caribbean Fisheries Management Council
AQCR	air quality control region	CFR	Code of Federal Regulations
ARFF	Aircraft Rescue and Firefighting	cfs	cubic feet per second
ARMS	Alaska Records Management System	CH ₄	methane
ARPA	Archaeological Resources Protection Act of 1979	CHC	Commonwealth Health Center
AS	Alaska Statute	CIA	Central Intelligence Agency
A.S.A.C.	American Samoa Administrative Code	CMIP3	Coupled Model Intercomparison Project phase 3
ASCA	American Samoa Code Annotated	CNMI	Commonwealth of Northern Mariana Islands
ASCMP	American Samoa Coastal Management Program	CNMIAC	Commonwealth of Northern Mariana Islands Administrative Code
ASDMWR	American Samoa Department of Marine and Wildlife Resources	CO	carbon monoxide
ASEPA	American Samoa Environmental Protection Agency	CO ₂	carbon dioxide
ASHPO	American Samoa Historic Preservation Office	CO _{2e}	carbon dioxide equivalents
ASPA	American Samoa Power Authority	COMAR	Committee on Man and Radiation
ATO	Air Traffic Organization	CPA	Commonwealth Ports 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 ₂ 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	HIANG	Hawaii Air National Guard
DOE	U.S. Department of Energy	HIARNG	Hawaii Army National Guard
DOH	Department of Health	HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
DOH-CAB	Hawaii Department of Health, Clean Air Branch	HIOSH	Hawaii Occupational Safety and Health Division
DOT	U.S. Department of Transportation	hp	horsepower
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)	HRD	(Guam) Historic Resources Division
DPS	Department of Public Safety	HRHP	Hawaii Register of Historic Places
EA	Environmental Assessment	HRS	Hawaii Administrative Rules, Revised Statute
EAS	Emergency Alert System	HTA	Hawai'i Tourism Authority
EBS	Emergency Broadcast System	HUC	hydrologic unit code
EDB	ethylene dibromide	I/M	Inspection/Maintenance
EFH	essential fish habitat	IARC	International Agency for Research on Cancer
EMS	emergency medical services	IBA	Important Bird Area
ENSO	El Niño/Southern Oscillation	IEEE	Institute of Electrical and Electronics Engineers
EO	Executive Order	IFC	International Finance Corporation
EPCRA	Emergency Planning and Community Right-to-Know Act	in	inches
ERP	effective radiated power	IPCC	Intergovernmental Panel on Climate Change
ESA	Endangered Species Act	IR	ionizing radiation
ESI	Environmental Sensitivity Index	ITCZ	Intertropical Convergence Zone
FAA	Federal Aviation Administration	IUCN	International Union for Conservation of Nature
FAD	Fish Aggregating Device	kg/gal	kilograms per gallon
FCC	Federal Communications Commission	KIRC	Kaho'olawe Island Reserve Commission
FEMA	Federal Emergency Management Agency	LAER	lowest achievable emission rate
FirstNet	First Responder Network Authority	lb/day	pounds per day
		lb/hp-hr	pounds per horsepower-hour

LBJ	Lyndon B. Johnson	NP	National Park
Ldn	day-night average sound level	NPDES	National Pollutant Discharge Elimination System
Leq	equivalent noise levels	NPL	National Priorities List
LNG	liquefied natural gas	NPS	National Park Service
LTE	Long Term Evolution	NPSBN	nationwide public safety broadband network
µg/m ³	microgram(s) per cubic meter	NRCS	Natural Resources Conservation Service
µPa	micro Pascal	NRHP	National Register of Historic Places
m/s	meter per second	NSPS	New Source Performance Standards
MBTA	Migratory Bird Treaty Act	NTIA	National Telecommunications and Information Administration
mg/m ³	Milligram(s) per cubic meter	NVSR	National Vital Statistics Report
mgd	million gallons per day	NWI	National Wetland Inventory
MHz	megahertz	NWR	National Wildlife Refuge
MLRA	Major Land Resource Area	NWWS	National Weather Wire Satellite System
mm/s	millimeters per second	OHA	Office of History and Archaeology
MMPA	Marine Mammal Protection Act	OIA	Office of Insular Affairs (USDI)
MOA	Memorandum of Agreement	OSHA	Occupational Safety and Health Administration
MPA	Marine Protected Area	PA	Programmatic Agreement
mph	miles per hour	PAG	Port Authority of Guam
MSA	Magnuson-Stevens Fishery Conservation and Management Act	PAHO	Pan American Health Organization
MTR	Military Training Route	PCB	polychlorinated biphenyl
MUID	Map Unit Identification Data	PCP	pentachlorophenol
MW	megawatt	PDO	Pacific Decadal Oscillation
mW/cm ²	milliwatts per centimeter squared	PEIS	Programmatic Environmental Impact Statement
N	north; not attained	PL	Public Law
N ₂ O	nitrous oxide	PM	particulate matter
NA	not applicable; not assessed	PM ₁₀	particulate matter up to 10 micrometers in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	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	PV	photovoltaic
NESHAP	National Emission Standards for Hazardous Air Pollutants	RAN	radio access network
NFIP	National Flood Insurance Program	RCP	Representative Concentration Pathway
NFIRS	National Fire Incident Reporting System	RCRA	Resource Conservation and Recovery Act
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		
NOAA	National Oceanic and Atmospheric Administration		
NOx	nitrogen oxides		

RF	radio frequency	vog	volcanic smog
RIN	Regulation Identification Number	VRM	Visual Resource Management
rms	root mean square	W	watt(s)
ROW	right-of-way	W/m ²	watts per meters squared
SAAQS	State Air Quality Standards	WAPA	Water and Power Authority
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	WHO	World Health Organization
SARA	Superfund Amendments and Reauthorization Act of 1986	WIMARCS	West Indies Marine Animal Research and Conservation Science
SCD	State Civil Defense	WNP	Western North Pacific
SE	Standard of Error	WNW	west-northwest
SHPO	State Historic Preservation Office	WPC	watts per channel
SIP	State Implementation Plan	WPRFMC	Western Pacific Regional Fishery Management Council
SLR	sea level rise		
SMA	Special Management Area		
SMS	Scenery Management System		
SO ₂	sulfur dioxide		
SO _x	sulfur oxides		
SPCZ	South Pacific Convergence Zone		
SPOC	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		
UVA	University of Virginia		
VIC	Virgin Islands Code		
VIPA	Virgin Islands Port Authority		
VISHPO	Virgin Islands State Historic Preservation Office		
VOC	volatile organic compound		

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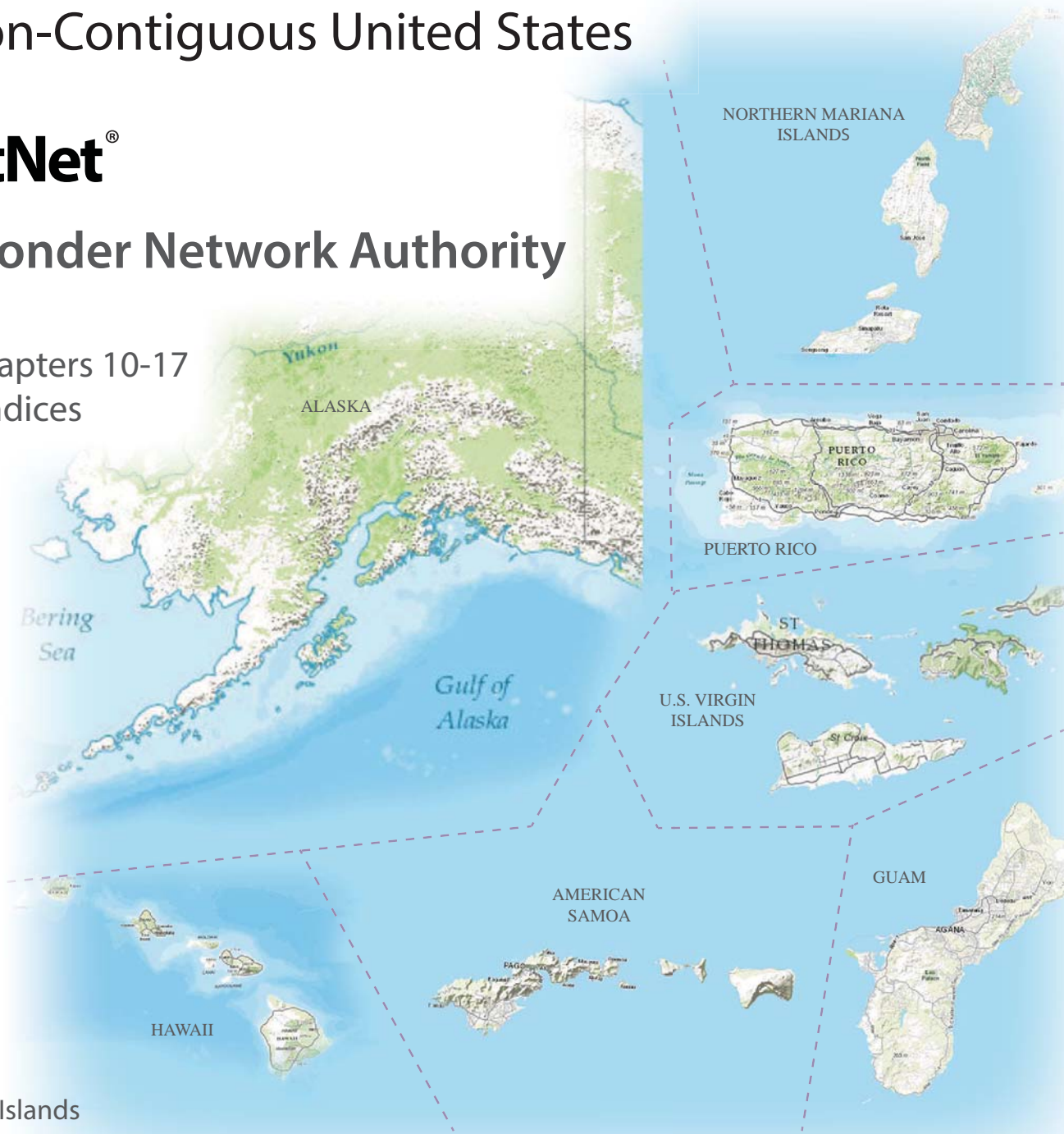
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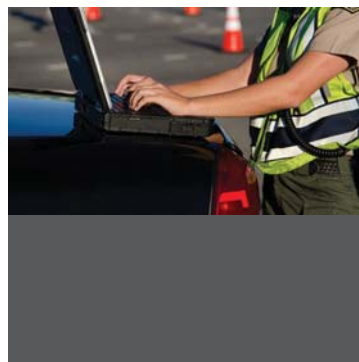
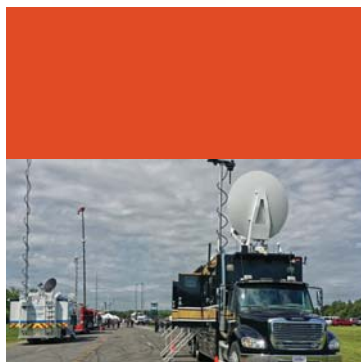
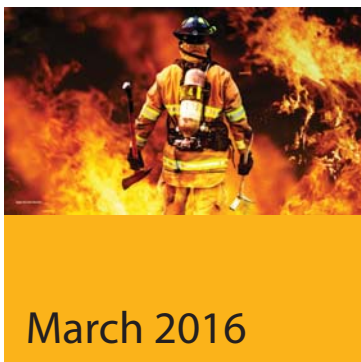
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Nationwide Public Safety Broadband Network Draft Programmatic Environmental Impact Statement for the Non-Contiguous United States

Volume 8

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U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

March 2016

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	ATWC	Alaska Tsunami Warning Center
°N	degrees north	AURORA	Alaska Uniform Response Online Reporting Access
µg/m ³	microgram(s) per cubic meter	BACT	best available control technology
µPa	micro Pascal	BCE	before Common Era
%	percent	BCR	Bird Conservation Regions
A	attained	BGEPA	Bald and Golden Eagle Protection Act
AAC	Alaska Administrative Code	BLM	Bureau of Land Management
AAFIS	Alaska Public Safety Identification System	BLS	U.S. Bureau of Labor Statistics
AAQS	Ambient Air Quality Standards	BMP	best management practice
ACHP	Advisory Council on Historic Preservation	BRFSS	Behavioral Risk Factor Surveillance System
ACS	American Community Survey (U.S. Census Bureau)	BSAI	Bering Sea/Aleutian Island
ADEC	Alaska Department of Environmental Conservation	BWG	BioInitiative Working Group
ADFG	Alaska Department of Fish and Game	CAA	Clean Air Act
AGL	above ground level	CAB	Clean Air Branch
AIRFA	American Indian Religious Freedom Act	CARB	California Air Resources Board
AJRCCM	American Journal of Respiratory and Critical Care Medicine	CBIA	Coastal Barrier Improvement Act of 1990
AKNHP	Alaska National Heritage Program	CBRA	Coastal Barrier Resources Act of 1982
AKOSH	Alaska Occupational Safety and Health	CCP	Comprehensive Conservation Plan
AKWAS	Alaska Warning System	CDC	Center for Disease Control
ALMR	Alaska Land Mobile Radio	CDLNR	Commonwealth Department of Lands and Natural Resources
ANFIRS	Alaska Fire Incident Reporting System	CE	Common Era
ANSCA	Alaska Native Claims Settlement Act	CELCP	Coastal and Estuarine Land Conservation Program
ANSI	American National Standards Institute	CEPD	Caribbean Environmental Protection Division
APE	Area of Potential Effect	CEQ	Council on Environmental Quality
APLIC	Avian Power Line Interaction Committee	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
APSIN	Alaska Public Safety Information Network	CFMC	Caribbean Fisheries Management Council
AQCR	air quality control region	CFR	Code of Federal Regulations
ARFF	Aircraft Rescue and Firefighting	cfs	cubic feet per second
ARMS	Alaska Records Management System	CH ₄	methane
ARPA	Archaeological Resources Protection Act of 1979	CHC	Commonwealth Health Center
AS	Alaska Statute	CIA	Central Intelligence Agency
A.S.A.C.	American Samoa Administrative Code	CMIP3	Coupled Model Intercomparison Project phase 3
ASCA	American Samoa Code Annotated	CNMI	Commonwealth of Northern Mariana Islands
ASCMP	American Samoa Coastal Management Program	CNMIAC	Commonwealth of Northern Mariana Islands Administrative Code
ASDMWR	American Samoa Department of Marine and Wildlife Resources	CO	carbon monoxide
ASEPA	American Samoa Environmental Protection Agency	CO ₂	carbon dioxide
ASHPO	American Samoa Historic Preservation Office	CO _{2e}	carbon dioxide equivalents
ASPA	American Samoa Power Authority	COMAR	Committee on Man and Radiation
ATO	Air Traffic Organization	CPA	Commonwealth Ports 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 ₂ 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	HIANG	Hawaii Air National Guard
DOE	U.S. Department of Energy	HIARNG	Hawaii Army National Guard
DOH	Department of Health	HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
DOH-CAB	Hawaii Department of Health, Clean Air Branch	HIOSH	Hawaii Occupational Safety and Health Division
DOT	U.S. Department of Transportation	hp	horsepower
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)	HRD	(Guam) Historic Resources Division
DPS	Department of Public Safety	HRHP	Hawaii Register of Historic Places
EA	Environmental Assessment	HRS	Hawaii Administrative Rules, Revised Statute
EAS	Emergency Alert System	HTA	Hawai'i Tourism Authority
EBS	Emergency Broadcast System	HUC	hydrologic unit code
EDB	ethylene dibromide	I/M	Inspection/Maintenance
EFH	essential fish habitat	IARC	International Agency for Research on Cancer
EMS	emergency medical services	IBA	Important Bird Area
ENSO	El Niño/Southern Oscillation	IEEE	Institute of Electrical and Electronics Engineers
EO	Executive Order	IFC	International Finance Corporation
EPCRA	Emergency Planning and Community Right-to-Know Act	in	inches
ERP	effective radiated power	IPCC	Intergovernmental Panel on Climate Change
ESA	Endangered Species Act	IR	ionizing radiation
ESI	Environmental Sensitivity Index	ITCZ	Intertropical Convergence Zone
FAA	Federal Aviation Administration	IUCN	International Union for Conservation of Nature
FAD	Fish Aggregating Device	kg/gal	kilograms per gallon
FCC	Federal Communications Commission	KIRC	Kaho'olawe Island Reserve Commission
FEMA	Federal Emergency Management Agency	LAER	lowest achievable emission rate
FirstNet	First Responder Network Authority	lb/day	pounds per day
		lb/hp-hr	pounds per horsepower-hour

LBJ	Lyndon B. Johnson	NP	National Park
Ldn	day-night average sound level	NPDES	National Pollutant Discharge Elimination System
Leq	equivalent noise levels	NPL	National Priorities List
LNG	liquefied natural gas	NPS	National Park Service
LTE	Long Term Evolution	NPSBN	nationwide public safety broadband network
µg/m ³	microgram(s) per cubic meter	NRCS	Natural Resources Conservation Service
µPa	micro Pascal	NRHP	National Register of Historic Places
m/s	meter per second	NSPS	New Source Performance Standards
MBTA	Migratory Bird Treaty Act	NTIA	National Telecommunications and Information Administration
mg/m ³	Milligram(s) per cubic meter	NVSR	National Vital Statistics Report
mgd	million gallons per day	NWI	National Wetland Inventory
MHz	megahertz	NWR	National Wildlife Refuge
MLRA	Major Land Resource Area	NWWS	National Weather Wire Satellite System
mm/s	millimeters per second	OHA	Office of History and Archaeology
MMPA	Marine Mammal Protection Act	OIA	Office of Insular Affairs (USDI)
MOA	Memorandum of Agreement	OSHA	Occupational Safety and Health Administration
MPA	Marine Protected Area	PA	Programmatic Agreement
mph	miles per hour	PAG	Port Authority of Guam
MSA	Magnuson-Stevens Fishery Conservation and Management Act	PAHO	Pan American Health Organization
MTR	Military Training Route	PCB	polychlorinated biphenyl
MUID	Map Unit Identification Data	PCP	pentachlorophenol
MW	megawatt	PDO	Pacific Decadal Oscillation
mW/cm ²	milliwatts per centimeter squared	PEIS	Programmatic Environmental Impact Statement
N	north; not attained	PL	Public Law
N ₂ O	nitrous oxide	PM	particulate matter
NA	not applicable; not assessed	PM ₁₀	particulate matter up to 10 micrometers in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	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	PV	photovoltaic
NESHAP	National Emission Standards for Hazardous Air Pollutants	RAN	radio access network
NFIP	National Flood Insurance Program	RCP	Representative Concentration Pathway
NFIRS	National Fire Incident Reporting System	RCRA	Resource Conservation and Recovery Act
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		
NOAA	National Oceanic and Atmospheric Administration		
NOx	nitrogen oxides		

RF	radio frequency	vog	volcanic smog
RIN	Regulation Identification Number	VRM	Visual Resource Management
rms	root mean square	W	watt(s)
ROW	right-of-way	W/m ²	watts per meters squared
SAAQS	State Air Quality Standards	WAPA	Water and Power Authority
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	WHO	World Health Organization
SARA	Superfund Amendments and Reauthorization Act of 1986	WIMARCS	West Indies Marine Animal Research and Conservation Science
SCD	State Civil Defense	WNP	Western North Pacific
SE	Standard of Error	WNW	west-northwest
SHPO	State Historic Preservation Office	WPC	watts per channel
SIP	State Implementation Plan	WPRFMC	Western Pacific Regional Fishery Management Council
SLR	sea level rise		
SMA	Special Management Area		
SMS	Scenery Management System		
SO ₂	sulfur dioxide		
SO _x	sulfur oxides		
SPCZ	South Pacific Convergence Zone		
SPOC	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		
UVA	University of Virginia		
VIC	Virgin Islands Code		
VIPA	Virgin Islands Port Authority		
VISHPO	Virgin Islands State Historic Preservation Office		
VOC	volatile organic compound		

15. DISTRIBUTION LIST

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Alaska Department of Fish and Game, Juneau, AK
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American Samoa Environmental Protection Agency, Pago Pago, AS
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Department of Community and Cultural Affairs, Division of Historic Preservation, Saipan, MP
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Puerto Rico Emergency Management Agency, San Juan, PR
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Division of Fish and Wildlife, St. Thomas, VI
U.S. Virgin Islands Department of Planning and Natural Resources, St. Thomas, VI, and Frederiksted, VI
U.S. Virgin Islands State Historic Preservation Office, Kongens Quarter, Charlotte Amalie, St. Thomas, VI

TRIBES AND NATIVE ORGANIZATIONS

Alaska

Agdaagux Tribe of King Cove
Akiachak Native Community
Akiak Native Community
Alatna Village
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 Diomedea (a.k.a. Inalik)
Native Village of Eagle
Native Village of Eek
Native Village of Ekuk, Dillingham, AK
Native Village of Ekwok
Native Village of Elim
Native Village of Eyak, Cordova, AK
Native Village of False Pass
Native Village of Fort Yukon
Native Village of Gakona
Native Village of Gambell
Native Village of Georgetown,
Anchorage, AK
Native Village of Goodnews Bay
Native Village of Hamilton, Kotlik, AK
Native Village of Hooper Bay
Native Village of Kanatak, Wasilla, AK
Native Village of Karluk
Native Village of Kiana
Native Village of Kipnuk
Native Village of Kivalina
Native Village of Kluti Kaah, Copper
Center, AK
Native Village of Kobuk
Native Village of Kongiganak
Native Village of Kotzebue
Native Village of Koyuk
Native Village of Kwigillingok
Native Village of Kwinhagak,
Quinhagak, AK
Native Village of Larsen Bay
Native Village of Marshall
(a.k.a. Fortuna Ledge), Marshall, AK
Native Village of Mary's Igloo,
Teller, AK
Native Village of Mekoryuk
Native Village of Minto
Native Village of Nanwalek
(a.k.a. English Bay)
Native Village of Napaimute,
Anchorage, AK
Native Village of Napakiak
Native Village of Napaskiak
Native Village of Nelson Lagoon
Native Village of Nightmute

Native Village of Nikolski
Native Village of Noatak
Native Village of Nuiqsut
(a.k.a. Nooiksut)
Native Village of Nunam Iqua, Sheldon's
Point, AK
Native Village of Nunapitchuk
Native Village of Old Harbor
Native Village of Ouzinkie
Native Village of Paimiut,
Hooper Bay, AK
Native Village of Perryville
Native Village of Pilot Point
Native Village of Pitka's Point, St.
Mary's, AK
Native Village of Point Hope
Native Village of Point Lay
Native Village of Port Graham
Native Village of Port Heiden
Native Village of Port Lions
Native Village of Ruby
Native Village of Saint Michael
Native Village of Savoonga
Native Village of Scammon Bay
Native Village of Selawik
Native Village of Shaktoolik
Native Village of Shishmaref
Native Village of Shungnak
Native Village of Stevens, Stevens
Village, AK
Native Village of Tanacross
Native Village of Tanana
Native Village of Tatitlek
Native Village of Tazlina, Glenallen, AK
Native Village of Teller
Native Village of Tetlin, Tok, AK
Native Village of Tuntutuliak
Native Village of Tununak
Native Village of Tyonek
Native Village of Unalakleet
Native Village of Unga, Sand Point, AK
Native Village of Venetie Tribal
Government
Native Village of Wales
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 (a.k.a. Holikachuk)	Ugashik Village, Anchorage, AK
Organized Village of Kake	Umkumiut Native Village, Nightmute, AK
Organized Village of Kasaan	Village of Alakanuk
Organized Village of Kwethluk	Village of Anaktuvuk Pass
Organized Village of Saxman, Ketchikan, AK	Village of Aniak
Orutsararmiut Traditional Native Council, Bethel, AK	Village of Atmautluak
Oscarville Traditional Village, Napaskiak, AK	Village of Bill Moore's Slough, Kotlik, AK
Pauloff Harbor Village, Sand Point, AK	Village of Chefornak
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. Ohgsenakale), Anchorage, AK	Village of Kalskag
Qagan Tayagungin Tribe of Sand Point 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 Aleut Communities of St. Paul and St. George Island)	Village of Ohogamiut, Marshall, AK
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Shageluk Native Village	Village of Sleetmute
	Village of Solomon, Nome, AK
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	Village of Venetie
	Village of Wainwright
	Wrangell Cooperative Association
	Yakutat Tlingit Tribe
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Hawaii

Association of Hawaiian Civic Clubs,
Honolulu, HI
Bernice Pauahi Bishop Museum,
Honolulu, HI
Historic Hawaii Foundation,
Honolulu, HI
Hui Malama I Na Kupuna 'O Hawai'i
Nei, Hilo, HI
Molokai Museum and Cultural Center,
Kala'e, Kaunakakai, HI
Office of Hawaiian Affairs, Honolulu, HI
State of Hawaii, Department of Hawaiian
Home Lands, Hawaiian Homes
Commission, Kapolei, HI

State of Hawaii, Department of Land and
Natural Resources, Aha Moku
Advisory Committee, Honolulu, HI
State of Hawaii, Department of Land and
Natural Resources, State Historic
Preservation Division, Kapolei, HI

- 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

LIBRARIES

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Anchorage Public Library,
Anchorage, AK
Aniak Public Library, Aniak, AK
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,
Juneau, AK
Seldovia Public Library, Seldovia, AK
Seward Community Library Museum,
Seward, AK
Skagway Public Library, Skagway, AK
Soldotna Public Library, Soldotna, AK
Sutton Public Library/Community
Resource Center, Sutton, AK
Talkeetna Public Library, Talkeetna, AK
Tanana Community/School Library,
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Tuzzy Consortium Library, Barrow, AK
Public Library, Unalaska, AK
Valdez Consortium Library, Valdez, AK

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Hawaii State Library, Honolulu, HI
Hilo Public Library, Hilo, HI
Kailua-Kona Public Library, Kailua-
Kona, HI
Lanai Public Library, Lanai City, HI
Lihue Public Library, Lihue, HI
Molokai Public Library, Kaunakakai, HI
Wailuku Public Library, Wailuku, HI

American Samoa

Feleti Barstow Public Library, Pago
Pago, AS

Guam

Guam Public Library System, Hagatna,
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Northern Mariana Islands

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Alaska

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Anchorage Press, Anchorage, AK
Bristol Bay Times, Anchorage, AK
Capital City Weekly, Juneau, AK
Chilkat Valley News, Haines, AK
Clarion Dispatch, Kenai, AK
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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

Samoan 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

Caribbean News Now, Dallas, TX
Virgin Islands Daily News,
St. Thomas, VI
Virgin Islands Daily News, St. Croix, VI

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



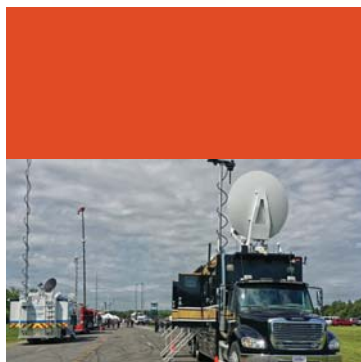
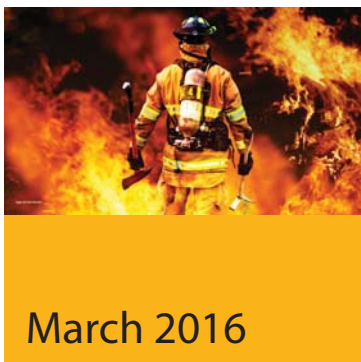
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Volume 8 - Chapters 10-17
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Alaska
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First Responder Network Authority



Nationwide Public Safety Broadband Network Draft 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 Agriculture—Natural Resource Conservation Service
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
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March 2016

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	ATWC	Alaska Tsunami Warning Center
°N	degrees north	AURORA	Alaska Uniform Response Online Reporting Access
µg/m ³	microgram(s) per cubic meter	BACT	best available control technology
µPa	micro Pascal	BCE	before Common Era
%	percent	BCR	Bird Conservation Regions
A	attained	BGEPA	Bald and Golden Eagle Protection Act
AAC	Alaska Administrative Code	BLM	Bureau of Land Management
AAFIS	Alaska Public Safety Identification System	BLS	U.S. Bureau of Labor Statistics
AAQS	Ambient Air Quality Standards	BMP	best management practice
ACHP	Advisory Council on Historic Preservation	BRFSS	Behavioral Risk Factor Surveillance System
ACS	American Community Survey (U.S. Census Bureau)	BSAI	Bering Sea/Aleutian Island
ADEC	Alaska Department of Environmental Conservation	BWG	BioInitiative Working Group
ADFG	Alaska Department of Fish and Game	CAA	Clean Air Act
AGL	above ground level	CAB	Clean Air Branch
AIRFA	American Indian Religious Freedom Act	CARB	California Air Resources Board
AJRCCM	American Journal of Respiratory and Critical Care Medicine	CBIA	Coastal Barrier Improvement Act of 1990
AKNHP	Alaska National Heritage Program	CBRA	Coastal Barrier Resources Act of 1982
AKOSH	Alaska Occupational Safety and Health	CCP	Comprehensive Conservation Plan
AKWAS	Alaska Warning System	CDC	Center for Disease Control
ALMR	Alaska Land Mobile Radio	CDLNR	Commonwealth Department of Lands and Natural Resources
ANFIRS	Alaska Fire Incident Reporting System	CE	Common Era
ANSCA	Alaska Native Claims Settlement Act	CELCP	Coastal and Estuarine Land Conservation Program
ANSI	American National Standards Institute	CEPD	Caribbean Environmental Protection Division
APE	Area of Potential Effect	CEQ	Council on Environmental Quality
APLIC	Avian Power Line Interaction Committee	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
APSIN	Alaska Public Safety Information Network	CFMC	Caribbean Fisheries Management Council
AQCR	air quality control region	CFR	Code of Federal Regulations
ARFF	Aircraft Rescue and Firefighting	cfs	cubic feet per second
ARMS	Alaska Records Management System	CH ₄	methane
ARPA	Archaeological Resources Protection Act of 1979	CHC	Commonwealth Health Center
AS	Alaska Statute	CIA	Central Intelligence Agency
A.S.A.C.	American Samoa Administrative Code	CMIP3	Coupled Model Intercomparison Project phase 3
ASCA	American Samoa Code Annotated	CNMI	Commonwealth of Northern Mariana Islands
ASCMP	American Samoa Coastal Management Program	CNMIAC	Commonwealth of Northern Mariana Islands Administrative Code
ASDMWR	American Samoa Department of Marine and Wildlife Resources	CO	carbon monoxide
ASEPA	American Samoa Environmental Protection Agency	CO ₂	carbon dioxide
ASHPO	American Samoa Historic Preservation Office	CO _{2e}	carbon dioxide equivalents
ASPA	American Samoa Power Authority	COMAR	Committee on Man and Radiation
ATO	Air Traffic Organization	CPA	Commonwealth Ports 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 ₂ 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	HIANG	Hawaii Air National Guard
DOE	U.S. Department of Energy	HIARNG	Hawaii Army National Guard
DOH	Department of Health	HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
DOH-CAB	Hawaii Department of Health, Clean Air Branch	HIOSH	Hawaii Occupational Safety and Health Division
DOT	U.S. Department of Transportation	hp	horsepower
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)	HRD	(Guam) Historic Resources Division
DPS	Department of Public Safety	HRHP	Hawaii Register of Historic Places
EA	Environmental Assessment	HRS	Hawaii Administrative Rules, Revised Statute
EAS	Emergency Alert System	HTA	Hawai'i Tourism Authority
EBS	Emergency Broadcast System	HUC	hydrologic unit code
EDB	ethylene dibromide	I/M	Inspection/Maintenance
EFH	essential fish habitat	IARC	International Agency for Research on Cancer
EMS	emergency medical services	IBA	Important Bird Area
ENSO	El Niño/Southern Oscillation	IEEE	Institute of Electrical and Electronics Engineers
EO	Executive Order	IFC	International Finance Corporation
EPCRA	Emergency Planning and Community Right-to-Know Act	in	inches
ERP	effective radiated power	IPCC	Intergovernmental Panel on Climate Change
ESA	Endangered Species Act	IR	ionizing radiation
ESI	Environmental Sensitivity Index	ITCZ	Intertropical Convergence Zone
FAA	Federal Aviation Administration	IUCN	International Union for Conservation of Nature
FAD	Fish Aggregating Device	kg/gal	kilograms per gallon
FCC	Federal Communications Commission	KIRC	Kaho'olawe Island Reserve Commission
FEMA	Federal Emergency Management Agency	LAER	lowest achievable emission rate
FirstNet	First Responder Network Authority	lb/day	pounds per day
		lb/hp-hr	pounds per horsepower-hour

LBJ	Lyndon B. Johnson	NP	National Park
Ldn	day-night average sound level	NPDES	National Pollutant Discharge Elimination System
Leq	equivalent noise levels	NPL	National Priorities List
LNG	liquefied natural gas	NPS	National Park Service
LTE	Long Term Evolution	NPSBN	nationwide public safety broadband network
µg/m ³	microgram(s) per cubic meter	NRCS	Natural Resources Conservation Service
µPa	micro Pascal	NRHP	National Register of Historic Places
m/s	meter per second	NSPS	New Source Performance Standards
MBTA	Migratory Bird Treaty Act	NTIA	National Telecommunications and Information Administration
mg/m ³	Milligram(s) per cubic meter	NVSR	National Vital Statistics Report
mgd	million gallons per day	NWI	National Wetland Inventory
MHz	megahertz	NWR	National Wildlife Refuge
MLRA	Major Land Resource Area	NWWS	National Weather Wire Satellite System
mm/s	millimeters per second	OHA	Office of History and Archaeology
MMPA	Marine Mammal Protection Act	OIA	Office of Insular Affairs (USDI)
MOA	Memorandum of Agreement	OSHA	Occupational Safety and Health Administration
MPA	Marine Protected Area	PA	Programmatic Agreement
mph	miles per hour	PAG	Port Authority of Guam
MSA	Magnuson-Stevens Fishery Conservation and Management Act	PAHO	Pan American Health Organization
MTR	Military Training Route	PCB	polychlorinated biphenyl
MUID	Map Unit Identification Data	PCP	pentachlorophenol
MW	megawatt	PDO	Pacific Decadal Oscillation
mW/cm ²	milliwatts per centimeter squared	PEIS	Programmatic Environmental Impact Statement
N	north; not attained	PL	Public Law
N ₂ O	nitrous oxide	PM	particulate matter
NA	not applicable; not assessed	PM ₁₀	particulate matter up to 10 micrometers in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	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	PV	photovoltaic
NESHAP	National Emission Standards for Hazardous Air Pollutants	RAN	radio access network
NFIP	National Flood Insurance Program	RCP	Representative Concentration Pathway
NFIRS	National Fire Incident Reporting System	RCRA	Resource Conservation and Recovery Act
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		
NOAA	National Oceanic and Atmospheric Administration		
NOx	nitrogen oxides		

RF	radio frequency	vog	volcanic smog
RIN	Regulation Identification Number	VRM	Visual Resource Management
rms	root mean square	W	watt(s)
ROW	right-of-way	W/m ²	watts per meters squared
SAAQS	State Air Quality Standards	WAPA	Water and Power Authority
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	WHO	World Health Organization
SARA	Superfund Amendments and Reauthorization Act of 1986	WIMARCS	West Indies Marine Animal Research and Conservation Science
SCD	State Civil Defense	WNP	Western North Pacific
SE	Standard of Error	WNW	west-northwest
SHPO	State Historic Preservation Office	WPC	watts per channel
SIP	State Implementation Plan	WPRFMC	Western Pacific Regional Fishery Management Council
SLR	sea level rise		
SMA	Special Management Area		
SMS	Scenery Management System		
SO ₂	sulfur dioxide		
SO _x	sulfur oxides		
SPCZ	South Pacific Convergence Zone		
SPOC	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		
UVA	University of Virginia		
VIC	Virgin Islands Code		
VIPA	Virgin Islands Port Authority		
VISHPO	Virgin Islands State Historic Preservation Office		
VOC	volatile organic compound		

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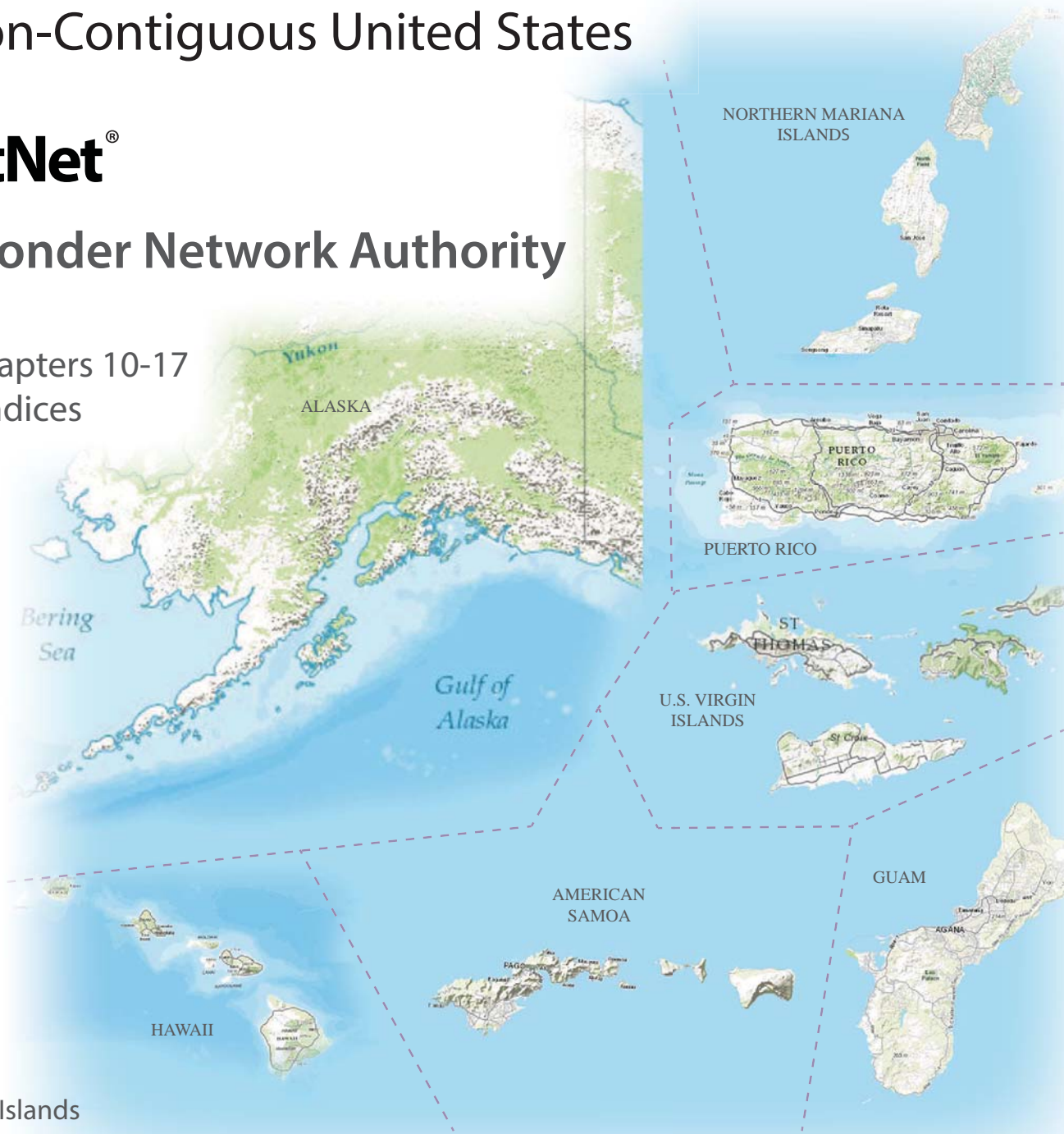
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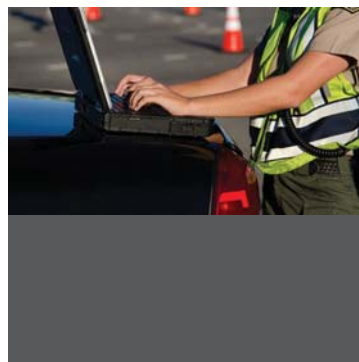
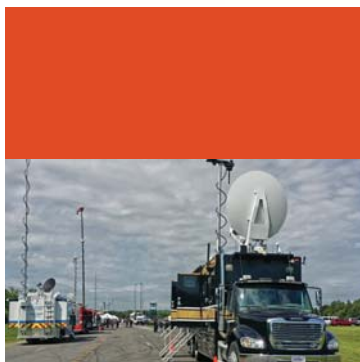
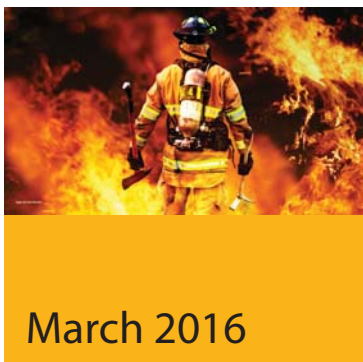
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First Responder Network Authority



Nationwide Public Safety Broadband Network Draft 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—Rural Utilities Service
U.S. Department of Agriculture—U.S. Forest Service
U.S. Department of Agriculture—Natural Resource Conservation Service
U.S. Department of Defense—Department of the Air Force
U.S. Department of Energy
U.S. Department of Homeland Security

March 2016

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit	ATWC	Alaska Tsunami Warning Center
°N	degrees north	AURORA	Alaska Uniform Response Online Reporting Access
µg/m ³	microgram(s) per cubic meter	BACT	best available control technology
µPa	micro Pascal	BCE	before Common Era
%	percent	BCR	Bird Conservation Regions
A	attained	BGEPA	Bald and Golden Eagle Protection Act
AAC	Alaska Administrative Code	BLM	Bureau of Land Management
AAFIS	Alaska Public Safety Identification System	BLS	U.S. Bureau of Labor Statistics
AAQS	Ambient Air Quality Standards	BMP	best management practice
ACHP	Advisory Council on Historic Preservation	BRFSS	Behavioral Risk Factor Surveillance System
ACS	American Community Survey (U.S. Census Bureau)	BSAI	Bering Sea/Aleutian Island
ADEC	Alaska Department of Environmental Conservation	BWG	BioInitiative Working Group
ADFG	Alaska Department of Fish and Game	CAA	Clean Air Act
AGL	above ground level	CAB	Clean Air Branch
AIRFA	American Indian Religious Freedom Act	CARB	California Air Resources Board
AJRCCM	American Journal of Respiratory and Critical Care Medicine	CBIA	Coastal Barrier Improvement Act of 1990
AKNHP	Alaska National Heritage Program	CBRA	Coastal Barrier Resources Act of 1982
AKOSH	Alaska Occupational Safety and Health	CCP	Comprehensive Conservation Plan
AKWAS	Alaska Warning System	CDC	Center for Disease Control
ALMR	Alaska Land Mobile Radio	CDLNR	Commonwealth Department of Lands and Natural Resources
ANFIRS	Alaska Fire Incident Reporting System	CE	Common Era
ANSCA	Alaska Native Claims Settlement Act	CELCP	Coastal and Estuarine Land Conservation Program
ANSI	American National Standards Institute	CEPD	Caribbean Environmental Protection Division
APE	Area of Potential Effect	CEQ	Council on Environmental Quality
APLIC	Avian Power Line Interaction Committee	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
APSIN	Alaska Public Safety Information Network	CFMC	Caribbean Fisheries Management Council
AQCR	air quality control region	CFR	Code of Federal Regulations
ARFF	Aircraft Rescue and Firefighting	cfs	cubic feet per second
ARMS	Alaska Records Management System	CH ₄	methane
ARPA	Archaeological Resources Protection Act of 1979	CHC	Commonwealth Health Center
AS	Alaska Statute	CIA	Central Intelligence Agency
A.S.A.C.	American Samoa Administrative Code	CMIP3	Coupled Model Intercomparison Project phase 3
ASCA	American Samoa Code Annotated	CNMI	Commonwealth of Northern Mariana Islands
ASCMP	American Samoa Coastal Management Program	CNMIAC	Commonwealth of Northern Mariana Islands Administrative Code
ASDMWR	American Samoa Department of Marine and Wildlife Resources	CO	carbon monoxide
ASEPA	American Samoa Environmental Protection Agency	CO ₂	carbon dioxide
ASHPO	American Samoa Historic Preservation Office	CO _{2e}	carbon dioxide equivalents
ASPA	American Samoa Power Authority	COMAR	Committee on Man and Radiation
ATO	Air Traffic Organization	CPA	Commonwealth Ports 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 ₂ 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	HIANG	Hawaii Air National Guard
DOE	U.S. Department of Energy	HIARNG	Hawaii Army National Guard
DOH	Department of Health	HIHWNMS	Hawaiian Islands Humpback Whale National Marine Sanctuary
DOH-CAB	Hawaii Department of Health, Clean Air Branch	HIOSH	Hawaii Occupational Safety and Health Division
DOT	U.S. Department of Transportation	hp	horsepower
DPNR	Department of Planning and Natural Resources (U.S. Virgin Islands)	HRD	(Guam) Historic Resources Division
DPS	Department of Public Safety	HRHP	Hawaii Register of Historic Places
EA	Environmental Assessment	HRS	Hawaii Administrative Rules, Revised Statute
EAS	Emergency Alert System	HTA	Hawai'i Tourism Authority
EBS	Emergency Broadcast System	HUC	hydrologic unit code
EDB	ethylene dibromide	I/M	Inspection/Maintenance
EFH	essential fish habitat	IARC	International Agency for Research on Cancer
EMS	emergency medical services	IBA	Important Bird Area
ENSO	El Niño/Southern Oscillation	IEEE	Institute of Electrical and Electronics Engineers
EO	Executive Order	IFC	International Finance Corporation
EPCRA	Emergency Planning and Community Right-to-Know Act	in	inches
ERP	effective radiated power	IPCC	Intergovernmental Panel on Climate Change
ESA	Endangered Species Act	IR	ionizing radiation
ESI	Environmental Sensitivity Index	ITCZ	Intertropical Convergence Zone
FAA	Federal Aviation Administration	IUCN	International Union for Conservation of Nature
FAD	Fish Aggregating Device	kg/gal	kilograms per gallon
FCC	Federal Communications Commission	KIRC	Kaho'olawe Island Reserve Commission
FEMA	Federal Emergency Management Agency	LAER	lowest achievable emission rate
FirstNet	First Responder Network Authority	lb/day	pounds per day
		lb/hp-hr	pounds per horsepower-hour

LBJ	Lyndon B. Johnson	NP	National Park
Ldn	day-night average sound level	NPDES	National Pollutant Discharge Elimination System
Leq	equivalent noise levels	NPL	National Priorities List
LNG	liquefied natural gas	NPS	National Park Service
LTE	Long Term Evolution	NPSBN	nationwide public safety broadband network
µg/m ³	microgram(s) per cubic meter	NRCS	Natural Resources Conservation Service
µPa	micro Pascal	NRHP	National Register of Historic Places
m/s	meter per second	NSPS	New Source Performance Standards
MBTA	Migratory Bird Treaty Act	NTIA	National Telecommunications and Information Administration
mg/m ³	Milligram(s) per cubic meter	NVSR	National Vital Statistics Report
mgd	million gallons per day	NWI	National Wetland Inventory
MHz	megahertz	NWR	National Wildlife Refuge
MLRA	Major Land Resource Area	NWWS	National Weather Wire Satellite System
mm/s	millimeters per second	OHA	Office of History and Archaeology
MMPA	Marine Mammal Protection Act	OIA	Office of Insular Affairs (USDI)
MOA	Memorandum of Agreement	OSHA	Occupational Safety and Health Administration
MPA	Marine Protected Area	PA	Programmatic Agreement
mph	miles per hour	PAG	Port Authority of Guam
MSA	Magnuson-Stevens Fishery Conservation and Management Act	PAHO	Pan American Health Organization
MTR	Military Training Route	PCB	polychlorinated biphenyl
MUID	Map Unit Identification Data	PCP	pentachlorophenol
MW	megawatt	PDO	Pacific Decadal Oscillation
mW/cm ²	milliwatts per centimeter squared	PEIS	Programmatic Environmental Impact Statement
N	north; not attained	PL	Public Law
N ₂ O	nitrous oxide	PM	particulate matter
NA	not applicable; not assessed	PM ₁₀	particulate matter up to 10 micrometers in diameter
NAAQS	National Ambient Air Quality Standards	PM _{2.5}	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	PV	photovoltaic
NESHAP	National Emission Standards for Hazardous Air Pollutants	RAN	radio access network
NFIP	National Flood Insurance Program	RCP	Representative Concentration Pathway
NFIRS	National Fire Incident Reporting System	RCRA	Resource Conservation and Recovery Act
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		
NOAA	National Oceanic and Atmospheric Administration		
NOx	nitrogen oxides		

RF	radio frequency	vog	volcanic smog
RIN	Regulation Identification Number	VRM	Visual Resource Management
rms	root mean square	W	watt(s)
ROW	right-of-way	W/m ²	watts per meters squared
SAAQS	State Air Quality Standards	WAPA	Water and Power Authority
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users	WHO	World Health Organization
SARA	Superfund Amendments and Reauthorization Act of 1986	WIMARCS	West Indies Marine Animal Research and Conservation Science
SCD	State Civil Defense	WNP	Western North Pacific
SE	Standard of Error	WNW	west-northwest
SHPO	State Historic Preservation Office	WPC	watts per channel
SIP	State Implementation Plan	WPRFMC	Western Pacific Regional Fishery Management Council
SLR	sea level rise		
SMA	Special Management Area		
SMS	Scenery Management System		
SO ₂	sulfur dioxide		
SO _x	sulfur oxides		
SPCZ	South Pacific Convergence Zone		
SPOC	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		
UVA	University of Virginia		
VIC	Virgin Islands Code		
VIPA	Virgin Islands Port Authority		
VISHPO	Virgin Islands State Historic Preservation Office		
VOC	volatile organic compound		

17. GLOSSARY

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 valleys: Valleys formed by rivers.

alluvium: A 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.

anchialine pools: Enclosed, landlocked waterbodies or ponds with an underground connection to both fresh and salt water.

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.

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.

binge drinking: More than five drinks on one occasion for adult men and more than four drinks on one occasion for adult women.

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.

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.

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. However, hot temperatures evaporate moisture, which also facilitates chemical reactions within soils. The highest degree of reaction within soils occurs in temperate, moist climates.

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.

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).

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.

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.

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

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.

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.

guts: Narrow coastal water channels usually subject to strong tidal currents flowing back and forth.

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.).¹

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

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.

heavy drinking: More than two drinks per day for adult men and more than one drink per day for adult women.

herbaceous: Plants that do not have woody stems.

¹ 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>

herbivorous: Animals that eat primarily plants.

herpetofauna: Reptiles and amphibians of a particular region, habitat, or geological period.

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

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 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.

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.²

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.

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

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

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.³

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

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

² 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>

³ 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

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.

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.⁴

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.

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)).

⁴ 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.

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 human 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.

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 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: Inhabiting the water column as opposed to being associated with the sea floor; generally occurring anywhere from the surface to 1,000 meters.

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

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

perennial streams: 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.

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.

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.

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

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.

Procellariiforms: 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 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.

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

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.

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.

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.

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 from reaching 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-foot tall, buried 8 to 12 inches into the soil, and secured with stakes.

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.

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”; consist of alternate layers of lava and other volcanic material such as ash.

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.

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.

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.

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.

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 amounts 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.”⁵

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

trophic structure: The way organisms utilize food resources leading to energy transfer within an ecosystem.

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.

⁵ NPS (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/>

ungulates: Classification of mammals having hooves.

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.”⁶

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

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: Seasonal depressional wetlands that are ponded only during the wetter part of the year, also known as “ephemeral pools.”

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.

⁶ 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>

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