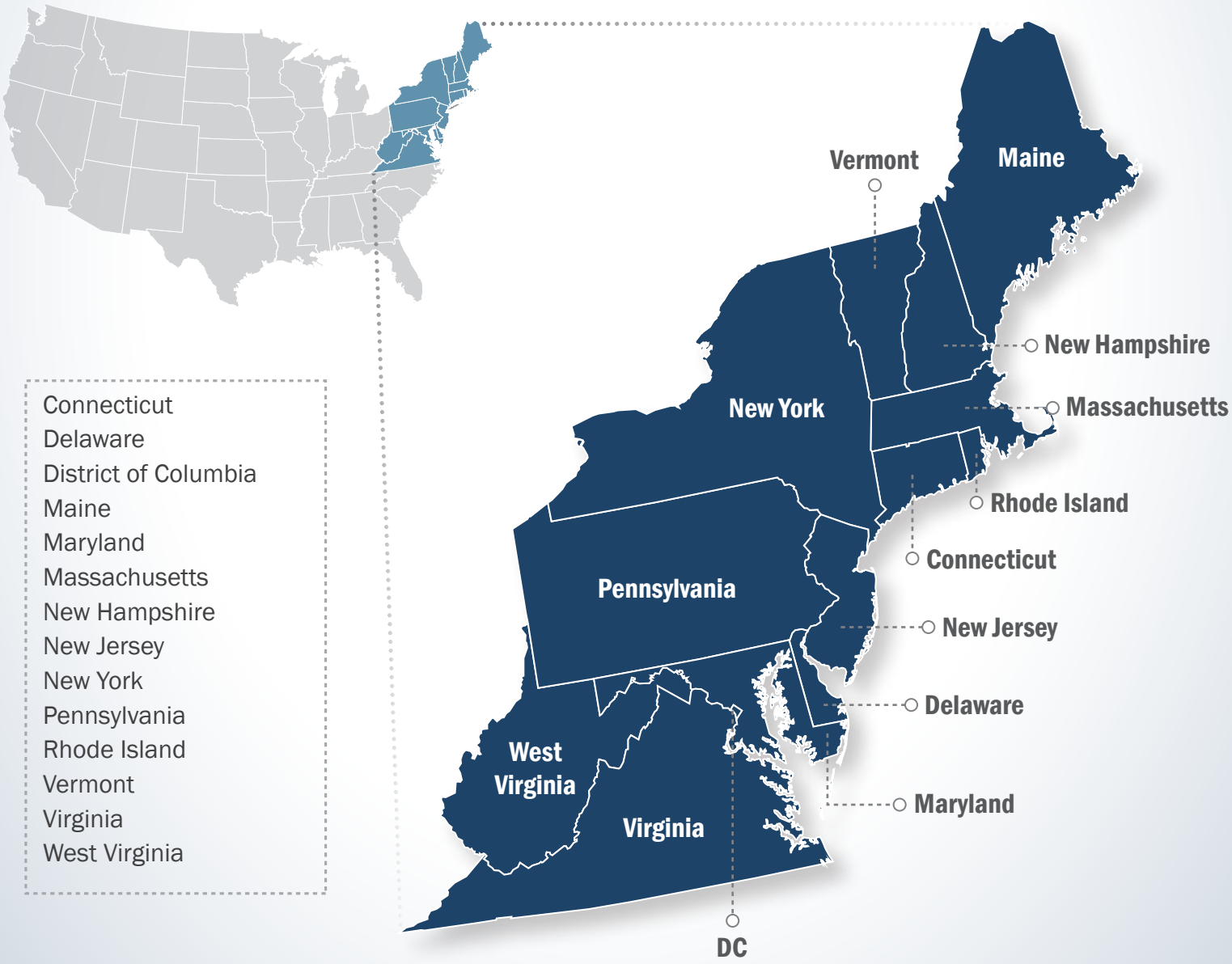
FirstNet®

Nationwide Public Safety Broadband Network

Final Programmatic Environmental Impact Statement for the Eastern United States

EXECUTIVE SUMMARY



Connecticut
Delaware
District of Columbia
Maine
Maryland
Massachusetts
New Hampshire
New Jersey
New York
Pennsylvania
Rhode Island
Vermont
Virginia
West Virginia

SEPTEMBER 2017

First Responder Network Authority

FirstNet®

Nationwide Public Safety Broadband Network

Final Programmatic Environmental Impact Statement for the Eastern United States

EXECUTIVE SUMMARY

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

September 2017

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ES-1. INTRODUCTION

Title VI of the Middle Class Tax Relief and Job Creation Act of 2012 (Public Law [Pub. L.] No. 112-96, Title VI, 126 Statute [Stat.] 156 (codified at 47 United States Code [U.S.C.] § 1401 et seq.)) (the Act) created and authorized the First Responder Network Authority (FirstNet) to ensure the establishment of a nationwide public safety broadband network (NPSBN) based on a single, national network architecture (47 U.S.C. § 1422(b)). FirstNet is an independent authority within the United States (U.S.) Department of Commerce's National Telecommunications and Information Administration (NTIA).

The NPSBN (i.e., the Proposed Action) is intended to cover all 50 states, 5 territories, and the District of Columbia. FirstNet has developed a series of five Final Programmatic Environmental Impact Statement (PEIS) documents, one for each of five geographic regions across the U.S. This Final PEIS fulfills some of FirstNet's responsibilities under the National Environmental Policy Act (NEPA) for the NPSBN for the East region, which includes the District of Columbia and the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia.

ES-1.1 FIRSTNET AND THE NEPA PROCESS

The design, deployment (e.g., construction), and operation of the NPSBN is a broad action with nationwide implications. As a result, FirstNet has assessed potential impacts expected from the Proposed Action from the program as a whole. As part of a tiered approach to NEPA (see 40 CFR § 1502.20), this Final PEIS also supports any subsequent site-specific environmental analyses that may be required for individual actions for specific projects at specific locations, once they are identified. Site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work.

ES-1.2 FEDERAL AGENCY PARTICIPATION

FirstNet is the lead agency for the environmental review consistent with NEPA, and the consultation requirements of the National Historic Preservation Act (NHPA) Section 106 and the Endangered Species Act Section 7. As the lead agency, FirstNet coordinates with cooperating agencies to ensure compliance with the laws, regulations, and Executive Orders (EOs) discussed in Section 1.8, Overview of Relevant Laws and Executive Orders.

In letters dated January 16, 2015, FirstNet invited 37 federal agencies to participate in the development of the PEIS as cooperating agencies. Nine agencies accepted the invitation: the NTIA; the Federal Communications Commission; the General Services Administration; the U.S. Department of Agriculture's (USDA) Rural Utilities Service; the USDA's U.S. Forest Service; the USDA's Natural Resources Conservation Service; the U.S. Air Force; the U.S. Department of Energy; and the U.S. Department of Homeland Security, which includes the Federal Emergency Management Agency, the U.S. Coast Guard, and the U.S. Customs and Border

Protection. Appendix A, Invited Cooperating Agencies, contains a complete list of those agencies invited to become cooperating agencies.

In a letter dated April 29, 2015, FirstNet invited all 56 state-level Single Points of Contact (SPOCs) to be consulting parties on the development of the PEISs to promote transparency and partnership. Fifteen SPOCs accepted the invitation, which afforded them the opportunity to review and comment on draft documents prior to public release.

ES-1.3 PUBLIC ENGAGEMENT AND TRIBAL CONSULTATION

Public comments on the Proposed Action have been and are being solicited as part of the NEPA process. In addition, in response to its obligations under the NHPA, FirstNet has initiated consultations with the Advisory Council on Historic Preservation, State Historic Preservation Offices, federally recognized American Indian tribes, and Native Hawaiian organizations. FirstNet anticipates consulting with Pacific Islanders on American Samoa, Guam, and the Northern Marina Islands as well as communities in Puerto Rico and the U.S. Virgin Islands with consultation continuing throughout the NEPA and Section 106 processes.

In a letter dated January 30, 2015, FirstNet contacted tribal leaders and Tribal Historic Preservation Officers, where applicable, to initiate formal, government-to-government consultation with all 567 federally recognized American Indian tribes. In a subsequent letter dated May 15, 2015, FirstNet initiated consultation with 17 Native Hawaiian Organizations.

The process for soliciting public comments on the Proposed Action initiated with the NEPA-mandated scoping processes (as described in Section 1.7.2, Scoping and Section 1.7.3, Draft PEIS Comment Period). Public engagement via the scoping process began with publication of a Notice of Intent (NOI) in the Federal Register (FR) to prepare five coordinated PEISs (79 FR § 67156 [November 12, 2014]). The NOI kicked off a 45-day public comment period, during which FirstNet received input from interested parties.

Following the publication of the NOI, FirstNet held a series of public scoping meetings where participants had the opportunity to learn about the Proposed Action, talk directly with FirstNet environmental staff, and provide input regarding the scope and analysis of the Proposed Action. The public scoping meetings were held in the following locations:

- Washington, D.C.: Tuesday, November 25, 2014 (4:00 – 8:00 p.m.)
- Honolulu, HI: Tuesday, December 2, 2014 (4:00 – 8:00 p.m.)
- San Francisco, CA: Thursday, December 4, 2014 (4:00 – 8:00 p.m.)
- Tucson, AZ: Thursday, December 4, 2014 (4:00 – 8:00 p.m.)
- Kansas City, MO: Tuesday, December 9, 2014 (4:00 – 8:00 p.m.)
- New Orleans, LA: Thursday, December 11, 2014 (5:00 – 9:00 p.m.)
- New York, NY: Monday, December 15, 2014 (4:00 – 8:00 p.m.)

The Scoping Summary Report can be found in Appendix B, First Responder Network Authority Nationwide Public Safety Broadband Network Programmatic Environmental Impact Statement Scoping Summary Report. The following major items were identified during the formal scoping comment period and in public meetings:

- Potential impacts of the NPSBN on sensitive natural resources;
- Concerns regarding the potential impacts of tower placement on culturally and ecologically sensitive areas, such as Tumamoc Hill in Tucson, Arizona; and
- The potential impact of the NPSBN on existing public safety communications infrastructure and operations.

FirstNet continued to accept comments after the close of the formal scoping period to allow the public as many opportunities as possible to provide input. Additional comments were received after the formal scoping period and, as appropriate, are addressed within the relevant resource area and state where the comment applied. The additional comments related to radio frequency (RF) emissions, concerns over the location of a tower on culturally and historically sensitive land, American Indian concerns, and general requests for updates.

The Draft PEIS for the East Region was released on May 6, 2016 for a 60-day public comment period, via an announcement in the Federal Register (81 FR § 27409 27410). During that period, FirstNet held a series of public meetings to provide the general public and interested stakeholders with an opportunity to learn about the PEIS, ask questions, and provide comments. Meetings were held in the following locations:

- Washington, D.C.: May 16, 2016, from 4:00 p.m. to 8:00 p.m.
- Annapolis, MD: May 19, 2016, from 4:00 p.m. to 8:00 p.m.
- Bangor, ME: May 24, 2016, from 4:00 p.m. to 8:00 p.m.
- New York City, NY: May 24, 2016, from 4:00 p.m. to 8:00 p.m.
- Boston, MA: May 25, 2016, from 4:00 p.m. to 8:00 p.m.
- New Haven, CT: May 25, 2016, from 4:00 p.m. to 8:00 p.m.
- Providence, RI: May 26, 2016, from 4:00 p.m. to 8:00 p.m.
- Albany, NY: May 26, 2016, from 4:00 p.m. to 8:00 p.m.
- Richmond, VA: May 31, 2016, from 4:00 p.m. to 8:00 p.m.
- Burlington, VT: May 31, 2016, from 4:00 p.m. to 8:00 p.m.
- Manchester, NH: June 1, 2016, from 4:00 p.m. to 8:00 p.m.
- Charleston, WV: June 2, 2016, from 4:00 p.m. to 8:00 p.m.
- Harrisburg, PA: June 14, 2016, from 4:00 p.m. to 8:00 p.m.
- Trenton, NJ: June 15, 2016, from 4:00 p.m. to 8:00 p.m.
- Dover, DE: June 16, 2016, from 4:00 p.m. to 8:00 p.m.

Comments received focused primarily on issues such as potential impacts of radio frequency (RF) emissions, best management practices (BMPs), climate change impact assessment guidelines, vibration impacts, requests for consultation, and legal questions surrounding FirstNet's network deployment procedures and future environmental compliance requirements. Appendix F contains the comments received by FirstNet during the public comment period for the East Draft PEIS, as well as responses.

Note that some comments arrived after the Final PEIS for the East Region was finalized. Those additional comments and FirstNet's responses can be found on an Errata Sheet located immediately after the Table of Contents.

ES-2. PURPOSE OF AND NEED FOR THE FIRSTNET PROPOSED ACTION

The Act meets a long-standing and critical national infrastructure need to create a NPSBN that would, for the first time, allow police officers, firefighters, emergency medical service professionals, and other public safety officials to effectively communicate with each other across agencies and jurisdictions.

ES-2.1 PURPOSE OF THE FIRSTNET PROPOSED ACTION

The purpose of the Proposed Action is to design, deploy, and operate the NPSBN—a dedicated public safety communications network to provide first responders with the tools they need to do their jobs more effectively and to minimize the loss of life in the event of any future natural or manmade emergencies or disasters.

FirstNet envisions the use of rugged, easy-to-use devices and plans to provide a set of applications and services on a single, interoperable platform built to open, non-proprietary, commercially available standards for emergency and daily public safety communications. These applications and services are intended to enhance the ability of the public safety community to perform more reliably, effectively, and safely. The NPSBN would also provide a backbone to allow for improved communications by carrying high-speed data, location information, images, and, eventually, streaming video. This capability would likely increase situational awareness during an emergency, thereby improving the ability of the public safety community to effectively engage and respond.

The FirstNet network intends to be "hardened" in terms of physical structure, user access, and cyber security considerations. These efforts would be designed not only to ensure that the network has greater resistance to system failure than what is currently available, but also that it can recover more rapidly should failure occur at any point in the system. The goal would be to provide not only interoperability, but also improved operability in the event of a natural or manmade disaster or emergency. The network operating standards are envisioned to also provide local control to public safety agencies, allowing for more control over the configuration, deployment, and management of multiple types of Information Technology resources, as well as device features and reporting.

ES-2.2 NEED FOR THE FIRSTNET PROPOSED ACTION

The Proposed Action is needed to address existing deficiencies in public safety communications interoperability, durability, and resiliency that have been highlighted in recent years for the ways in which they have hindered response activities in high profile natural and manmade disasters. Today, first responders rely on numerous separate, often incompatible, and often proprietary land

mobile radio networks. This makes it difficult, and at times impossible, for emergency responders from different jurisdictions to communicate, especially during major emergencies that require a multi-jurisdictional response (National Task Force on Interoperability, 2005).

The lack of interoperability in public safety communications and the hazards associated with it have been known within the public safety community and the telecommunications industry for quite some time. A 1996 report on the state of public safety wireless communications identified interoperability issues that hampered emergency response activities in the 1993 World Trade Center bombing in New York City and the 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City (Public Safety Wireless Advisory Committee, 1996).

Interoperability problems arose again during the terrorist attacks of September 11, 2001, the event that marks the true genesis of the NSPBN. As numerous onsite reports from public safety personnel at the World Trade Center, the Pentagon, and Somerset County, Pennsylvania, indicated, the lack of interoperable and resilient communications capability among the multiple police, fire, and emergency medical services personnel hampered rescue efforts and in many cases likely led to an increased loss of life, both among members of the public, as well as within the first responder community itself. Indeed, hundreds of police officers and fire fighters, including off-duty personnel who reported to the scene to engage in rescue efforts upon learning of the events that were unfolding, lost their lives in the line of duty; this amounted to the largest loss of first responders in a single event anywhere in U.S. history (National Commission on Terrorist Attacks upon the United States, 2004).

Subsequent disasters, such as Hurricane Katrina in 2005 and Hurricane Sandy in 2013, have shown that public safety response is still often compromised by an inability of public safety to communicate with each other due to radio systems operating on different, incompatible frequencies. This is largely the result of the fragmented initial design and upgrades of public safety communications that were often planned and executed at the local level. These disasters, along with the preceding terrorist events, demonstrated that the nation lacked an overarching plan to connect all first responders under one dedicated interoperable system.

ES-3. THE PROPOSED ACTION AND ALTERNATIVES

The Proposed Action would encompass the design, deployment, and operation of the NPSBN by FirstNet and/or their partner(s).[1] By statute, the network must have several characteristics, including:

- Security, resiliency, backwards compatibility with existing commercial networks, integration with public safety answering points[2] or their equivalents;
- Substantial rural coverage;
- Deployment that adheres to open, non-proprietary, commercially available standards; and
- Use of existing infrastructure to the maximum extent economically desirable.

[1] FirstNet's partners would assist in providing resources as necessary to deploy and operate the NPSBN.
[2] Public safety answering points are call centers responsible for answering calls to an emergency telephone number for police, fire, and emergency medical services.

The FirstNet network would have two components: the core network and the radio access network (RAN). The core network is a key component for ensuring that users have a single interoperable platform nationwide, and would consist of a wide range of telecommunications infrastructure including fiber optic cable, towers, data centers, microwave technology, and others. The RAN would consist of all radio base station infrastructure that would connect user devices.

FirstNet must also continue to maintain and improve the NPSBN to account for new and evolving technologies. In particular, the FirstNet network would be based on the minimum technical requirements on the commercial standards for Long Term Evolution (LTE) service, a proven upgradeable technology now in its fourth generation (4G).

In accordance with NEPA, FirstNet must examine a range of reasonable alternatives to design, construct, and operate the NPSBN. These alternatives must be reasonable ways in which FirstNet could meet the purpose and need for the Proposed Action. In addition to the range of reasonable alternatives, FirstNet is also required to "include the alternative of no action" as part of the alternatives analysis in the PEIS.

The "No Action Alternative" describes what would happen if FirstNet did not construct the NPSBN, and is used as a baseline against which the potential impacts of the action alternatives can be compared (see NEPA §1502.14). In addition to the alternatives described below, other alternatives were considered but not carried forward. Those alternatives are discussed in Section 2.3 of the Final PEIS, Alternatives Considered but not Carried Forward.

ES-3.1 PREFERRED ALTERNATIVE

Under the Preferred Alternative, FirstNet and/or its 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 NPSBN. Table ES3-1 summarizes the types of wired, wireless, and deployable projects that FirstNet may consider. Further details on NPSBN projects are provided in Section 2.1.2, Proposed Action Infrastructure.

Table ES3-1: Proposed Action Infrastructure Types

Project Type	Description
Wired Projects	
New Build – Buried Fiber Optic Plant	Plowing or trenching cable and/or cable conduit within public or (where necessary) private road, utility, or other rights-of-way (ROWs) or easements, along with new points of presence (POPs)[a] huts, or other facilities.
Use of Existing Conduit – New Buried Fiber Optic Plant	Installation of new fiber optic cable in existing, buried conduit. Ground disturbance would usually be limited to existing conduit entry and exit points.
New Build – Aerial Fiber Optic Plant	Installation of new poles with new cables in previously disturbed or new ROWs or easements, or installing replacement poles in an existing ROW. Deployment may include new access roads, POPs, huts, or other facilities to house plant equipment.
Collocation on Existing Aerial Fiber Optic Plant	Installation of new fiber optic cable on existing poles. This may require structural hardening or reinforcement, and/or pole replacement.

Project Type	Description
Use of Existing Buried or Aerial Fiber Optic Plant or Existing Submarine Cable	Activation of existing unused (dark) fiber. Deployment may require the installation of new equipment, usually in existing equipment huts.
New Build – Submarine Fiber Optic Plant	Installation of sealed cables in limited near-shore or inland bodies of water, along with new onshore landings and facilities to accept cable, which are typically buried close to shore.
Installation of Optical Transmission or Centralized Transmission Equipment	Installation of equipment as part of the core network deployment. This equipment is usually installed in small boxes or huts in the ROW of the utility corridor, and may involve construction of access roads.
Wireless Projects	
New Wireless Communication Towers	Installation of new towers, antennas, and/or microwave dishes to support wireless infrastructure, along with generators, equipment sheds, fencing, lighting, electrical feeds, concrete foundations and pads, and/or access roads.
Collocation on Existing Wireless Tower, Structure, or Building	Mounting or installation of equipment such as antennas or microwave dishes on existing towers, along with power units in some cases. Existing towers, structures, or buildings may require structural hardening or increased physical security measures.
Deployable Technologies (Technologies intended to provide service in areas where permanent, fixed infrastructure cannot or will not be deployed)	
Cell on Wheels (COW)	A cellular base station on a trailer with an expandable antenna mast, designed to be part of a cellular network and augment existing capacity. COWs typically include a small generator and microwave or satellite link.
Cell on Light Truck (COLT)	A cellular base station on a light truck platform with an expandable antenna mast, designed to be part of a cellular network and augment existing capacity. COLTs typically contain a small generator and microwave or satellite link.
System on Wheels (SOW)	A full base station and controller on a large towable trailer or truck, with a large antenna mast, suitable to address larger localized coverage or capacity shortages in the event of large incidents. A SOW can support an island system with no need for satellite/microwave link back, and typically includes a generator.
Deployable Aerial Communications Architecture (DACA)	Aerial vehicles such as drones, piloted aircraft, weather balloons, and blimps deployed at varying altitudes, capable of providing wide-area coverage, although with relatively low capacity/throughput. DACA would be generally used for addressing wide-scale loss of coverage after a major catastrophic event.
Satellite Technologies	
Satellite-Enabled Devices and Equipment	Installation of permanent equipment on existing structures or the use of portable devices that use satellite technology, such as satellite phones or video cameras.
Deployment of Satellites	FirstNet does not anticipate launching satellites as part of the deployment of the NPSBN; however, it could include equipment on satellites that are already being launched for other purposes.

[a] POPs are connections or access points between two different networks, or different components of one network.

ES-3.2 DEPLOYABLE TECHNOLOGIES ALTERNATIVE

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. This alternative is evaluated as a stand-alone alternative and would not involve

collocations of other equipment or construction of facilities, although some staging or landing areas (depending on the type of technology) could require minor construction and maintenance within public road ROWs and utility corridors, heavy equipment movement, and minor excavation and paving near public roads. 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 likely be stationed in every state and territory, often at multiple locations in each state or territory, to facilitate rapid response. These mobile communication units would be temporarily installed and may use existing satellite, microwave, or radio systems for backhaul.

ES-3.3 NO ACTION ALTERNATIVE

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.

ES-4. EAST REGION – AFFECTED ENVIRONMENT

The FirstNet East region encompasses 13 states and the District of Columbia. This PEIS contains analysis for Connecticut, the District of Columbia, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia. As depicted in Figure ES4-1, the region is bordered to the north by Canada, to the west by the Central region, to the south by the South region, and to the east by the Atlantic Ocean. The East region covers 7 percent of the U.S. landmass (U.S. Census Bureau, 2015a), yet in 2015 the estimated regional population was approximately 23 percent of the total U.S. population with an estimated population of over 74 million in 2015 (U.S. Census Bureau, 2015b).

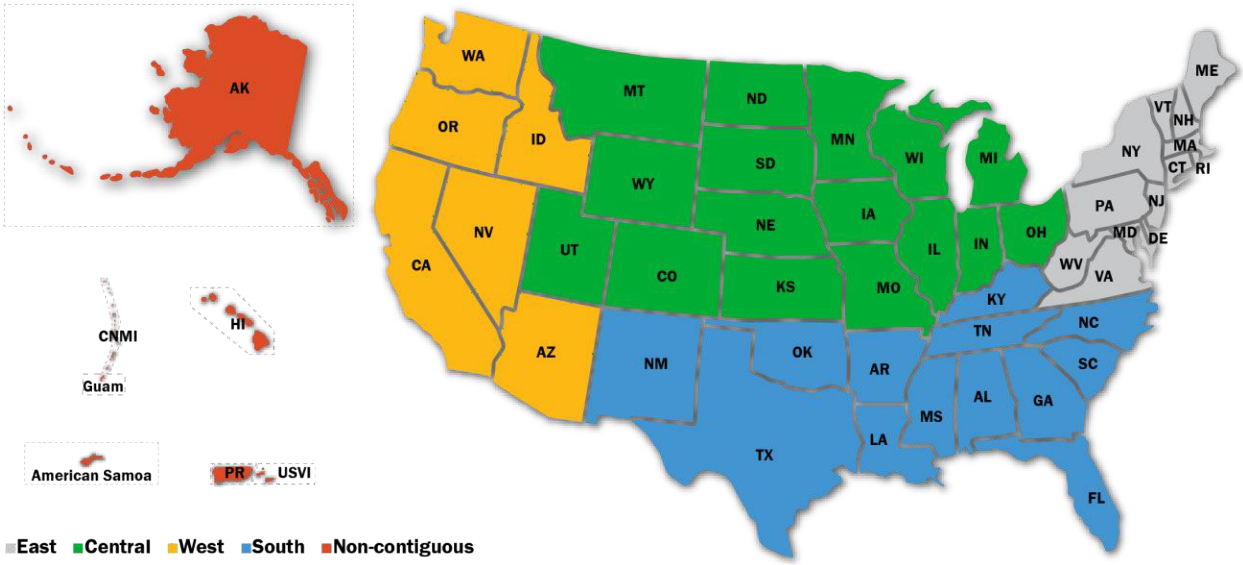

Figure ES4-1: FirstNet PEIS Regions of Analysis

Many of the states in the East region were part of the original 13 colonies founded in the 17th and 18th centuries, including Connecticut, Delaware, Pennsylvania, Maryland, Massachusetts, New Hampshire, New York, New Jersey, Rhode Island, and Virginia (University of Georgia, 2016). The cities Washington, D.C., Baltimore, Philadelphia, New York City, and Boston were settled in the colonial period, and today, including the suburbs, comprise one of the most extensively urbanized regions of the United States, often referred to as a "megalopolis" (Gottman, 1962). The District of Columbia serves as our nation's capital and is home to President's Park and the White House, in addition to numerous national landmarks (NPS, 2016a) (NPS, 2016b) (NPS, 2016c). The East region is bisected by the Appalachian Mountains, with a varied landscape including major rivers, valleys, marshes, rocky coasts, and beaches on the eastern side, and the Ohio River Valley and farmlands to the west.

ES-5. POTENTIAL IMPACTS OF THE PREFERRED ALTERNATIVE

This Final PEIS contains 23 stand-alone chapters – one chapter for each state and district, and other chapters with analyses and additional information as required by NEPA. Each of the state-specific chapters discusses 15 separate resource areas, such as biological resources, water resources, land use, air quality, etc. For each resource area, the Final PEIS provides an overview of the Affected Environment (i.e., existing conditions), and then discusses the potential impacts of the Preferred Alternative in an Environmental Consequences section. The programmatic approach creates a comprehensive analytical framework that assesses potential impacts expected from the program as a whole at the regional level. It also supports any subsequent site-specific environmental analyses that may be required for individual actions at specific locations, once they are identified. Site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work.

Through the programmatic approach, FirstNet has identified four categories of potential impacts on the resource areas:

- *Potentially significant;*
- *Less than significant with Best Management Practices (BMPs) and mitigation measures incorporated;*
- *Less than significant;* and
- *No impact.*

The specific methodology used to determine these impact levels and thresholds of significance is provided for each resource within each state or the District of Columbia. The sections below summarize in tabular form the impact categories for each potential impact type, within each resource, and within each state or The District of Columbia. For ease of reference, each impact category is assigned a color and a corresponding number, as shown below:

1. Potentially significant
2. Less than significant with BMPs and mitigations measures incorporated
3. Less than significant
4. No impact
NA: Not Applicable. White (no color) indicates resource not present in state(s)

The sections below discuss the potential impacts of the Preferred Alternative, focusing on potential impacts at the programmatic level[3]. At the programmatic level, and based on the impact significance ratings developed, there would be no *potentially significant* impacts as a result of the Preferred Alternative as a whole. However, the same impact significance criteria used at the programmatic level may not apply to site-specific buildout activities and actions. This Final PEIS acknowledges that site-specific impacts have the potential to be more significant on a localized basis, and therefore could require site-specific assessments and mitigation. Site-specific analysis may be required depending on the site conditions, the type of deployment, or any other permits or permissions necessary to perform the work. For example, while potential impacts from specific FirstNet projects taking place in a wetland would not rise to the level of significance at the programmatic level, such impacts could be considered *potentially significant* at the site-specific level. This document provides examples of circumstances where impacts could approach significance; in doing so, clear distinctions are made between the purpose and usefulness of this PEIS and subsequent analyses (such as environmental assessments). Site-specific locations may be subject to an environmental review to help ensure environmental concerns are addressed. The need for and level of environmental review would be dependent on site conditions and the nature of the deployment activity.

[3] Please note that this impact analysis is "programmatic" which means it evaluates the potential impacts over a broad area and does not evaluate the potential impacts associated with specific sites or locations. In some cases, additional site-specific analysis may be required depending on site conditions, the type of deployment, or any other permits or permissions necessary to perform the work.

Furthermore, the sections below include only certain select proposed BMPs or mitigation measures that are offered as examples.[4] The main body of this Final PEIS describes the potential impacts in greater detail, as well as BMPs or mitigation measures that could be implemented by FirstNet and/or its partner(s), as appropriate and feasible. Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

ES-5.1 INFRASTRUCTURE

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is entirely manmade with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "developed." 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. Individuals, businesses, government entities, and virtually all relationships between these groups depend on infrastructure for their most basic needs, as well as for critical and advanced needs (e.g., emergency response, health care, and telecommunications).

This section describes potential impacts to infrastructure including transportation, communications, and other utilities, associated with deployment and operation of the Preferred Alternative, and discusses some BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-1). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Summary of Impacts

Deployment and operation of the Preferred Alternative could potentially impact transportation system safety and capacity through the creation of traffic congestion or delay (e.g., lane closures), or result in the increase in transportation incidents (e.g., crashes, derailments) due to the transport of heavy equipment or deployment activities including plowing, directional boring, and trenching along roadways and within the public road ROWs. The presence of deployable technologies such as COWs, COLTs, SOWs, and Deployable Aerial Communications Architecture has the potential to impact air and land-based traffic congestion and safety. Submarine deployment activities in limited near-shore or inland bodies of water additionally have the potential to increase boat traffic and congestion on a short-term basis. These potential impacts to transportation capacity and safety would be *less than significant* at the programmatic level, as they would likely be short term, would be regionally based around the ongoing phase of deployment, and would return to normal conditions after a few months or less.

While potential impacts to health care and emergency health care systems are not certain, if they occurred as a result of deployment, these potential impacts would be localized, short-term, and temporary and therefore *less than significant* at the programmatic level. Any potential localized or temporary access restrictions to or strains on health care and emergency health services would likely improve during the operations phase of the Preferred Alternative.

[4] BMPs and mitigation measures have been developed based on consultation with other agencies as well as independent research by FirstNet and their environmental contractors.

Effects on commercial telecommunication systems, communications, or level of service would be *less than significant* at the programmatic level due to deployment activities that could generate temporary and minor disruptions to the current commercial telecommunications system. Minor decreased level of service could occur during deployment of the Preferred Alternative and during implementation of deployable technologies. Such deployment activities include plowing, directional boring, or trenching during the installation of fiber optic cable, as well as construction of wireless towers, structures, and buildings. Potential impacts to underwater telecommunications infrastructure would also be *less than significant* at the programmatic level due to submarine deployment activities in limited near-shore or inland bodies of water. During operations, the new NPSBN is anticipated to improve commercial telecommunication systems, communications, and level of service by expanding telecommunications service areas.

Potential impacts to utilities during system deployment would be *less than significant* at the programmatic level. Such potential impacts, if they occurred, would likely be temporary and minor.

Implementation of FirstNet public safety telecommunications infrastructure would likely significantly improve public safety communications capabilities and response times in both urban and rural areas during operations. Upgrades to the current infrastructure during the deployment phase could result in a temporary, likely minor disruption in emergency communications, generally lasting only as long as it takes to connect and begin using the new system. It is anticipated that public safety communications interoperability, durability, and resiliency would significantly improve during operation in comparison to existing conditions.

Although the individual states within the East region each have some specific infrastructure characteristics, as documented in the Final PEIS, the East region as a whole demonstrates characteristics of infrastructure common in the United States, and potential impacts would be similar throughout the region. Overall, the Preferred Alternative would have *less than significant* at the programmatic level, and oftentimes beneficial or positive, impact on existing and future infrastructure throughout the East region. The Preferred Alternative would create improvements in overall communications and response times, in both urban and rural areas across the region, and existing deficiencies would be addressed in public safety communications interoperability, durability, and resiliency. As a result, the general effects on existing infrastructure and public safety in the East region would be considered *less than significant* at the programmatic level (see Table ES5-1).

Table ES5-1: Summary of Potential Impacts, Infrastructure

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Transportation system capacity and safety	Connecticut	• Follow all applicable federal, state, and local requirements for construction codes, seismic criteria, and geotechnical designs; • Follow all applicable federal, state, and local requirements for construction on or near public roads; • Follow all applicable federal, state, and local laws concerning traffic speed and safety during the transport of equipment;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	New Hampshire	• Avoid roads with heavy traffic volumes and during peak travel hours, to the extent possible, when scheduling the transport of heavy equipment or construction materials; • Schedule deployment activities outside of peak traffic hours; • Design staging areas to minimize unnecessary equipment and material mobilizations; • Repave and restore disturbed roads and public road rights-of-way (ROWs), in accordance with federal, state, and local laws, as quickly as possible so as to not create any traffic impediments that hinder access to local public safety and emergency facilities and to allow traffic capacity and safety conditions to return to their pre-construction condition; • Design new deployment activities within 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 schedule; • Schedule new construction outside of seasons known to cause more accidents (e.g., hurricane or winter storm seasons 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 is identified and can be repaired quickly; • Implement a backup telecommunications system, as needed, which allows first responders to communicate 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 deployment activities that could interrupt power during times when people are less likely to use power or water; • Follow all applicable federal, state, or local requirements regarding utilities (water, sewer, power, and electricity) and construction within a utility ROW as to not exceed any acceptable limits; and • Follow all applicable state and local one-call[c] laws and procedures for buildouts.
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Capacity of local health, public safety, and emergency response services	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Modifies existing public safety response, physical infrastructure, telecommunication practices, or level of service in a manner that directly affects public safety communication capabilities and response times [b]	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Effects to commercial telecommunication	Connecticut	
	Delaware	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
systems, communications, or level of service	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Effects on utilities, including electric power transmission facilities and water and sewer facilities	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

[b] The discussion of impacts to public safety communication capabilities and response times focuses on potential adverse impacts during deployment. Overall, operation of the Preferred Alternative will result in—indeed, the purpose of the Preferred Alternative is to create—significant improvements in overall communications and response times.

[c] "One call" refers to the use of a single phone call to notify the utilities in the area of impending excavation activities. Often the utilities will go to the site and mark their lines (either with flags or paint) so that the excavation can avoid, if possible, damaging the utility equipment or disrupting service.

ES-5.2 SOILS

Soils are "the unconsolidated mineral or organic material on the immediate surface of the Earth that serves as a natural medium for the growth of land plants" and materials that are "subjected to and shows effects of genetic and environmental factors of: climate (including water and temperature effects), and macro- and microorganisms, conditioned by relief, acting on parent material over a period of time." (Natural Resources Conservation Service, 2015)

This section describes potential impacts to soil resources associated with deployment and operation of the Preferred Alternative, and discusses BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-2). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Summary of Impacts

In general, operation of the Preferred Alternative would involve minimal potential impacts to soils. Potential impacts, although *less than significant* at the programmatic level, would instead be more likely during deployment.

Construction activities associated with deployment could potentially impact sedimentation and soil erosion in areas where the slopes are steep and where the erosion potential is moderate to severe as indicated by soil characteristics. Increased sedimentation in waterways, for example, may alter natural sediment transport processes, which can impair water and habitat quality and potentially affect aquatic plants and animals. Potential impacts associated with erosion and sedimentation would be *less than significant* at the programmatic level, as they would likely be short term, would be localized to the deployment locations of individual facilities, and would return to normal conditions as soon as revegetation occurs, often by the next growing season.

The potential for the loss of topsoil (i.e., organic and mineral topsoil layers) by mixing would be present during deployment of the proposed facilities/infrastructure and during trenching, grading, and/or foundation excavation activities. It is anticipated that topsoil mixing would likely be minimal and isolated to specific locations; as a result, the potential impacts from topsoil mixing would be *less than significant* at the programmatic level.

The movement of heavy equipment required to support any clearance, drilling, and construction activities, as well as installation of equipment or modification of structures needed to support network deployment could potentially impact soil resources by causing the compaction and rutting of susceptible soils. Potential impacts associated with erosion and sedimentation would be *less than significant* at the programmatic level, as they would likely be short term, localized to the routes used to access off-road deployment locations, and would only be likely to occur in a limited range of soil types.

Although the individual states within the East region each have some state-specific soil characteristics, as documented in the Final PEIS, they also share common regional characteristics and the potential impacts would be similar throughout the region. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in minimal topsoil

mixing, soil compaction, and rutting. As a result, the general effects on soils in the East region would be considered *less than significant* at the programmatic level (see Table ES5-2).

Table ES5-2: Summary of Potential Impacts, Soils

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Soil erosion	Connecticut	• Follow all applicable federal, state, and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize erosion and sedimentation and restore disturbed soil; • Minimize soil disturbance to the extent practicable;[b] • Avoid construction in areas with steep (greater than 20 percent) 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 and mitigation measures including the use of silt fences, fiber rolls, gravel bag berms, erosion control blankets[c] retention ponds, straw and sandbag barriers, and other controls as needed to reduce soil erosion, stormwater runoff, and sedimentation; • Schedule construction activities to avoid, to the extent possible, movement of heavy equipment across land surfaces immediately following heavy rainfall; • 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 achieve stabilization;[d] • For areas requiring plowing, remove and store topsoil with a woven weed barrier or similar material for post-construction site restoration; • To the extent possible, avoid construction activities immediately following heavy precipitation events, or cover exposed areas with tarps or similar materials to prevent exposure; • Avoid areas identified as having soils that are vulnerable to compaction; select alternate locations to construct facilities if practical. All vehicles should stay on existing roads or previously disturbed areas to the maximum extent practicable; • Use deep tillage procedures where practical to loosen compacted soils; • Restore soil surface to original or improved contours; • Segregate topsoil to avoid topsoil compaction; • Use timber mats or similar infrastructure, as deemed necessary, to distribute vehicle and heavy equipment weight; • Minimize soil disturbance to the extent practicable, especially in wetland and designated natural resource areas; • Segregate topsoil or surface soil from subsurface layers during construction;[e] • Implement temporary topsoil storage areas;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Topsoil mixing	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Soil compaction and rutting	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	New Hampshire	• Identify and maintain topsoil; • Replace topsoil as soon as possible following construction; • Avoid construction activities resulting in soil disturbance during periods or months with heavy rainfall and snowmelt,[f] to the extent possible; and • 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.
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

[b] See Section 17.5, Wetlands, for a discussion of BMPs and mitigation measures in wetlands.

[c] 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.

[d] 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.

[e] 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.

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

ES-5.3 GEOLOGY

Geology is an interdisciplinary science focusing on aspects of earth sciences such as geologic hazards and disasters, climate variability and change, energy and mineral resources, ecosystem and human health, and groundwater availability.

Summary of Impacts

Deployment and operation of the Preferred Alternative could affect and/or be affected by geologic conditions and processes. The Final PEIS considers the following aspects of geology:

- The potential for impacts to surface geology, bedrock, topography, physiography, and geomorphology, particularly as a result of trenching, grading, and/or foundation excavation activities;
- Potential impacts to mineral and fossil fuel resources, generally more likely in states with a higher density of extraction areas (compared to the nation as a whole);
- The potential for impacts to paleontological resources, particularly during trenching, grading, and/or foundation excavation activities, and particularly in areas of a state where known paleontological resources are highly prevalent;
- The effects of seismic hazards on the Preferred Alternative;

- The effects of volcanic activity on the Preferred Alternative (although there are no volcanos in the South region, for the sake of consistency with other regions, volcanos were discussed and dismissed from further review); and
- Land subsidence due to the Preferred Alternative activities, particularly soil compaction and rutting from the movement of heavy equipment.

In general, operation of the Preferred Alternative would involve minimal potential impacts to geologic resources (See Table ES5-3). The potential impacts described in this section would instead be more likely during deployment.

Although the individual states within the East region each have some specific geological characteristics, they also share common regional characteristics and the potential impacts would be similar throughout the region. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. As a result, the general effects of the Preferred Alternative on geologic resources in the East region would be considered *less than significant* at the programmatic level (see Table ES5-3). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Table ES5-3: Summary of Potential Impacts, Geology

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Seismic Hazard	Connecticut	• Follow all applicable federal, state, and local requirements for construction codes, seismic criteria, and geotechnical designs; • Locate construction/deployment activities outside of high risk seismic hazard zones, active faults, and away from low coastal areas; • 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; • Avoid, to the extent practicable, deployment in areas that undergo significant geomorphological changes, such as within streams and rivers; • Design and deploy resilient infrastructure to withstand earthquakes typical to the region; • Construct all infrastructure to standards that meet or exceed state seismic requirements; • Locate construction/deployment activities away from steep slopes with unconsolidated material and other areas prone to landslides, to the extent practicable; • Locate construction/deployment activities outside of areas identified as having karst topography, loosely compacted soils, and low-density sediments prone to subsidence or compaction, to the extent practicable; • Follow all applicable federal, state, and local requirements for mineral, fossil fuel, and paleontological resources; • Avoid rock ripping to the extent practicable to preserve bedrock resources, topography, and physiography;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Volcanic Activity	There are no volcanos in the FirstNet East region	
Landslides	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	New Jersey	• Minimize the area/volume of disturbed/removed terrain during deployment/construction; • Avoid areas with significant fossil resources, if practicable; • Monitor deployment/construction activities and salvage fossils if areas with significant fossil resources cannot be avoided, to the extent practicable and in accordance with applicable laws and regulations; • If paleontological resources are encountered on a project construction site, suspend all work until a certified paleontologist has been brought on-site to oversee project activities and ensure that fossil resources are handled properly; • Limit construction to areas that are not actively mined or undergoing mineral or other material or petroleum extraction activities, or coordinate deployment with mining and extraction activities (both existing and planned) in active areas; • Restore topographic features and grades to pre-construction/deployment conditions; and • 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.
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Land Subsidence	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Mineral and Fossil Fuel Resource Impacts	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Paleontological Resource Impacts	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Surface Geology, Bedrock, Topography, Physiography, and Geomorphology	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: White (no color) indicates resource not present in state(s)

ES-5.4 WATER RESOURCES

Water resources are defined as all surface waterbodies and groundwater systems including streams, rivers, lakes, canals, ditches, estuarine waters, floodplains, aquifers, and other aquatic habitats (wetlands are discussed separately in Section ES-5.5). These resources can be grouped into watersheds, which are defined as areas of land whose flowing water resources (including runoff from rainfall) drain to a common outlet such as a river or ocean. The value and use of water resources are influenced by the quantity and quality of water available for use and the demand for available water. Water resources are used for drinking, irrigation, industry, recreation, and as habitat for wildlife. Some water resources that are particularly pristine, sensitive, or of great economic value enjoy special protections under federal and state laws. An adequate supply of water is essential for human health, economic wellbeing, and ecological health. (USGS, 2014)

This section describes potential impacts to water resources associated with deployment and operation of the Preferred Alternative, and discusses BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-4). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Summary of Impacts

In general, operation of the Preferred Alternative would likely involve minimal potential impacts to water resources. Potential impacts would instead be more likely during deployment (see Table ES5-4).

Construction activities associated with deployment of the Preferred Alternative could affect water quality primarily as a result of ground-disturbing activities (both within and outside of floodplains), and alteration of drainage patterns. These potential impacts to water resources would generally be *less than significant* at the programmatic level, since they would be isolated and short-term, and would likely return to baseline conditions once revegetation of disturbed areas is complete. These potential impacts and could be further reduced by implementation of BMPs and mitigation measures.

Groundwater or aquifer characteristics could potentially be impacted if Preferred Alternative activities involved contamination of groundwater with petroleum, lubricants, or other fluids from heavy equipment. Spills from vehicles or machinery used during deployment tend to be associated with refueling activities, and as such, would likely be a few gallons or less in volume, an amount that would likely be easily contained and/or cleaned up on site. As a result, potential impacts to groundwater are not anticipated, while potential impacts to surface water quality due to spills would be minor, sporadic, and isolated, and therefore would be *less than significant* at the programmatic level.

Although the individual states within the East region each have state-specific water resources (e.g., lakes, reservoirs), as documented in the Final PEIS, the potential impacts would be similar throughout the region. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. As a result, the general effects on water resources in the East region would be considered *less than significant* at the programmatic level (see Table ES5-4).

Table ES5-4: Summary of Potential Impacts, Water Resources

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Water Quality (groundwater and surface water) - sedimentation, pollutants, nutrients, water temperature	Connecticut	• Minimize ground disturbance in or near waterbodies during construction, as practicable, particularly in areas prone to erosion; • Follow all applicable federal, state, and local requirements for soil erosion and sedimentation control and permitting to avoid or minimize introduction of eroded materials into waterbodies; • Development of a stormwater pollution prevention plan (SWPPP); • Include engineered or site designed methods to control stormwater; • For large-scale construction activities, implement stormwater reduction methods, including minimizing impervious surfaces, using porous materials, or collecting and reusing stormwater (e.g., extended detention ponds, stormwater wetlands, filtration structures,[c] and infiltration [or recharge] basins);[d] • For large-scale construction activities, direct water to stormwater drains, or to constructed bioretention,[e] rain garden, or other storage and retention areas designed to slow water and allow sediments to settle out; • Minimize the total area of bare soil 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; • 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, 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 aboveground structures outside of the 100-year floodplain, to the extent practicable. If deployables or aboveground 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; • Restore native vegetation/wetlands to stabilize streambanks and stop erosion; • Ensure any development proposed in a floodway or floodplain meets or exceeds state or local regulations; • Avoid construction, where feasible, in areas with steep or unstable slopes with soils known to be particularly
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Floodplain degradation[b]	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Drainage pattern alteration	Connecticut	
	Delaware	
	District of Columbia	
	Maine	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Maryland	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, stormwater 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; • 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; • Inspect and maintain tanks and equipment containing oil, fuel, or chemicals for drips or leaks to prevent spills to the ground or directly into waterbodies; • Maintain and repair all equipment and vehicles on impervious surfaces, as practicable, away from all sources of surface water; • Park vehicles at least 50 feet from any stream or wetland unless authorized by a permit or on an existing roadway, as practicable; • Deposit and stabilize all excavated material not reused in an upland area outside of floodplains and streams; • Design any structures located in floodplains, as feasible, with structural hardening to withstand flooding and to not increase the risk of flooding for other areas of the floodplain; • Properly space and size culverts in accordance with federal, state or local regulations; • Stabilize approaches to streams and stream crossings with clean rock or steel plates during construction to minimize erosion and sedimentation, as practicable; • Do not permit underwater blasting and pile driving activities in any waterbody.
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Flow alteration	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Changes in groundwater or aquifer characteristics	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	New York	• Place materials storage and staging areas outside of waterways and floodplains; • Deposit and stabilize all excavated material not reused in an upland area outside of floodplains and streams; and • If in-stream construction (trenching or roads) must be conducted 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.
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

[b] Since public safety infrastructure is considered a critical facility, project activities should avoid the 500-year floodplain wherever practicable, per the Executive Orders on Floodplain Management (EO 11988 and EO 13690).
[c] Stormwater filtration structures use a filtering media (sand, soil, gravel, peat, or compost) to remove pollutants from stormwater runoff.
[d] Infiltration basins (also known as recharge basins) are considered a treatment BMP because they can remove pollutants from surface discharges by capturing the stormwater 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.
[e] Bioretention is a structural stormwater control measure that captures and temporarily stores stormwater runoff using soils and vegetation in shallow basins or landscaped areas to provide enhanced removal of dissolved stormwater pollutants, including nutrients, pesticides, organics, metals, and biological constituents.

ES-5.5 WETLANDS

The Clean Water Act defines wetlands as "those areas that are inundated or saturated by surface or groundwater 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. Wetlands generally include swamps, marshes, bogs and similar areas" (40 CFR 230.3(t), 1993).

This section describes potential impacts to wetland resources associated with deployment and operation of the Preferred Alternative, and discusses BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-5). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Summary of Impacts

In general, operation of the Preferred Alternative would involve minimal potential impacts to wetlands. Potential impacts would instead be more likely during deployment.

Direct and indirect wetland loss or alteration can be caused by a variety of activities often associated with deployment activities, such as the placement of fill into wetlands, changes in hydrology, vegetation clearing, ground disturbance, changes to soils, or hydrologic alteration such as flooding or draining.

Although the individual states within the East region each have their own unique wetland resources, as documented in the Final PEIS, they also share common regional characteristics and the potential impacts would be similar throughout the region. In general, the loss or alteration of wetlands associated with deployment of the Preferred Alternative would be considered *less than significant* at the programmatic level (see Table ES5-5) given the small amount of land disturbance associated with the project locations (generally less than an acre) and the short time-frame of deployment activities. Additionally, site-specific locations could be subject to an environmental review to help ensure environmental concerns are addressed. Potential wetlands impacts could be further reduced by implementing BMPs and mitigation measures. As a result, the general effects on wetlands in the East region would be considered *less than significant* at the programmatic level (see Table ES5-5).

Table ES5-5: Summary of Potential Impacts, Wetlands

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Direct wetland loss (fill or conversion to non-wetland)	Connecticut	• Follow all applicable federal, state, 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; • Follow all BMPs and mitigation measures related to minimizing soil erosion, sedimentation, and soil compaction presented in Section 17.2, Soils; • Conduct a detailed baseline study of the wetland to be impacted, if impacts to a specific wetland are unavoidable, 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 SWPPP; • Ensure that soil erosion and sediment controls are properly installed and maintained; • 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;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Rhode Island	• 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; • When construction is unavoidable, time construction to outside the breeding and migratory seasons of wetland wildlife; • When construction is unavoidable, time construction activities to the low flow period, as defined by the USACE general permit, or to when the soil is frozen; • Preserve existing tree canopies and natural areas in and around wetlands as much as possible; • When cutting wetland vegetation is unavoidable, complete the work by hand (chain or hand saw) instead of using large equipment; • Use timber mats when working in or near wetlands; • Avoid both above and belowground wetland crossings; • When crossing a wetland is unavoidable, take advantage of already disturbed areas such as easements, roads, roadway shoulders, bridges, or old railroad beds; • 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; • Prohibit use of herbicides or pesticides within 100 feet of any wetland (unless allowed or required by the appropriate land management, tribal, or federal, state, or local agency); • Conduct post-construction monitoring inspections after the first growing season to determine success of revegetation, as applicable, unless otherwise required by a permit; • Include engineered or site designed methods to control stormwater; • Create and maintain buffer zones around wetlands to protect their functions and values; • 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 federal, state, and local agencies; • Position deployment activities to avoid wetlands to the greatest extent practicable and to minimize the project footprint while safely and practically conducting work; • Install and maintain sediment barriers, as appropriate, at saturated wetlands or wetlands with standing water
	Vermont	
	Virginia	
	West Virginia	
Other direct effects: vegetation clearing; ground disturbance; direct hydrologic changes (flooding or draining); direct soil changes; water quality degradation (spills or sedimentation)	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Vermont	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; • When construction within wetlands is unavoidable, time use of heavy equipment to avoid periods of heavy moisture, as appropriate; • Where practicable, 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; • Use wide-tracked or low-ground pressure construction equipment and/or conventional equipment operating from the ROW, timber mats, or prefabricated equipment mats; • Prohibit storage of hazardous materials; chemicals, fuels, and lubricating oils in wetlands; • Use existing access roads whenever possible; • Where construction is required, maintain natural drainage patterns to the extent practicable by installing culverts in sufficient number and size to prevent ponding, diversion, or concentrated runoff; • Use gravel for road surfaces where possible to avoid an increase in permeable surfaces and use proper drainage structures to minimize sedimentation and erosion to adjacent wetlands; • Consult local wetland restoration guidance, including communicating with local agency and other wetland and restoration scientists. Use suggested up-to-date published restoration manuals to ensure that appropriate wetland restoration measures are followed and to increase restoration success; • In areas where wetlands would be restored, stockpile wetland topsoil and sod mats removed during installation using 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; and • Determine restoration to be successful if the surface condition is similar to adjacent undisturbed communities or found acceptable by the applicable regulatory body.
	Virginia	
	West Virginia	
Indirect effects:[b] change in function(s)[c] change in wetland type	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

[b] Indirect effects are those resulting from direct effects, but they occur elsewhere in space and/or time. Indirect effects would include indirect hydrologic effects (wetting or drying) that in turn alters wetland function or type.
[c] Wetland functions include hydrologic, ecological, geomorphic, and social functions typically assessed for wetlands as part of USACE compensatory mitigation planning. Typical functions assessed may include flood attenuation, bank stabilization, water quality, organic matter input/transport, nutrient processing, wildlife habitat, threatened and endangered species habitat, biodiversity, and recreational/social value.

ES-5.6 BIOLOGICAL RESOURCES

Biological resources include terrestrial vegetation, wildlife, fisheries and aquatic habitats, threatened and endangered species, and species of conservation concern. Wildlife habitat and associated biological ecosystems are also important components of biological resources.

This section describes potential impacts to biological resources including terrestrial vegetation; wildlife; fisheries; and federally listed plant and animal species associated with deployment and operation of the Preferred Alternative. Representative BMPs and mitigation measures that could avoid or minimize those potential impacts are also discussed (see Table ES5-6). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Summary of Impacts

Preferred Alternative activities that involve collocation or shared use of existing facilities or do not require new ground disturbance or substantial construction activity would have *no impact* on biological resources at the programmatic level. The infrastructure development scenarios or deployment activities that could be part of the Preferred Alternative and result in potential effects on biological resources include: New Build Scenarios (Buried Fiber Optic Plant, Aerial Fiber Optic Plant, or Submarine Fiber Optic Plant); New Wireless Communication Towers; Deployable Technologies; and Deployable Aerial Communications Architecture. The primary actions related to these components that could cause potential impacts to biological resources include land/vegetation clearing; excavation and trenching; construction of access roads; installation or restructuring of towers and poles; installation of underwater cables in limited near-shore or inland bodies of water; installation of security/safety lighting and fencing; and deployment of aerial platforms. Potential impacts of deployment and operation of the Preferred Alternative to biological resources (including wildlife, fisheries, and threatened and endangered

species) are assessed separately in this Final PEIS, but include the same categories of potential impacts:

- Direct injury or mortality—includes injury or death of an individual or localized population due to physical injuries, extreme stress, or injury or death of an individual from interactions associated with the Preferred Alternative;
- Indirect effects from disturbance or displacement—includes changes in an individual or population's habitat use or life history pattern due to disturbance from increased noise and vibration, lighting, human activity, visual disturbance, RF emissions, and transportation activity; increased competition for resources or habitat due to displacement of individuals from the affected area into the territory of other animals; or other indirect effects that ultimately cause mortality, decreased fitness, or reduced breeding and recruitment in the future population; and
- Direct or indirect effects on habitats that affect population size and long-term viability of species—direct habitat effects are primarily physical disturbances that result in alterations in the amount or quality of a habitat. Indirect habitat loss can occur through preventing an animal from accessing a regular (e.g., migratory route) or optimal habitat (e.g., breeding, forage, or refuge), either by physically preventing use of a habitat or by causing an animal to avoid a habitat, either temporarily or long-term.

Any species with individuals, populations, or habitat in the vicinity of activities related to the Preferred Alternative could be subject to one or more of the above potential impacts from the Preferred Alternative; however, implementation of BMPs and mitigation measures, as defined through consultation with the appropriate resource agency, could avoid potential impacts on some species and reduce potential impacts on others. The nature and extent of potential impacts to biological resources would vary depending on many factors, including but not limited to, the species; the nature, location, and extent of the Preferred Alternative activity; the time of year in relation to species life history; and the duration of deployment.

Although the individual states within the East region each have some specific characteristics related to biological resources, as documented in the Final PEIS, they also share common regional characteristics and the potential impacts would be similar throughout the region. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. As a result, the general effects on biological resources in the East region would be considered *less than significant* at the programmatic level except for birds and bats due to RF emissions, collisions with towers, and tower lighting. The potential effect on birds and bats is considered *less than significant with BMPs and mitigation measures incorporated* at the programmatic level (see Table ES5-6).

With full implementation of BMPs and mitigation measures, as defined through consultation with the appropriate resource agency, the Preferred Alternative *may affect, but is not likely to adversely affect*, listed species at the programmatic level (see Table ES5-7). If proposed project sites are unable to avoid sensitive areas, BMPs and mitigation measures as defined through consultation with the appropriate resource agency, would be implemented. Site-specific analysis

would be required to determine the potential impacts on listed species at specific proposed locations.

Table ES5-6: Summary of Potential Impacts, Biological Resources

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Vegetation		
Vegetation and habitat loss, alteration, or fragmentation	Connecticut	• Engage in early consultation with appropriate agencies and stakeholders, including but not limited to the U.S. Fish and Wildlife Service (USFWS) and state agencies; • Follow all applicable federal, state, and local requirements for vegetation removal, disturbance, and restoration; • Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practicable; • Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce vegetation loss; • Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles before moving from one deployment site to another; • 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; • Minimize land clearing and vegetation disturbance by using existing roads and unvegetated areas, when feasible, during deployment activities; • 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; • Minimize or avoid removal of forest vegetation whenever possible; • Obtain all appropriate permits and comply with permit conditions to minimize or avoid impacts to vegetation; • Revegetate disturbed areas as progressively and proactively as possible to minimize impacts associated with vegetation loss; • Segregate topsoil or surface soil from subsurface layers during construction for reuse during post-construction seeding; • Store soil containing noxious or invasive plants awaiting proper disposal, in a location away from clean topsoil and subsoil; • Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss and habitat fragmentation; • Inspect and clean all construction equipment and deployable vehicles on an impervious surface with high-pressure washing equipment to remove soil and plant matter prior to moving to the next job site or staging location; • Limit construction equipment and vehicles to approved roads or ROWs; • Use existing roads and regularly maintained areas when conducting routine maintenance and inspections to the extent feasible; and • Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Invasive species effects	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Vermont	
	Virginia	
	West Virginia	
Wildlife		
Marine Mammals	Connecticut	• Engage in early consultation with appropriate agencies and stakeholders as necessary, including but not limited to USFWS, the NMFS, and other relevant federal or state agencies; • Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) (APLIC and USFWS, 2005) for any aboveground lines or cables (e.g., use of diverters); • Implement seasonal and spatial buffer zones around sensitive areas for deployment and maintenance activities, where possible, as recommended by USFWS and state wildlife and natural resources agencies; • Implement the National Bald Eagle Management Guidelines (USFWS, 2007); • Assess locations of roost sites for bats and timing of critical life stages (e.g., maternity and weaning periods) and hibernation for deployment and associated activities (these times vary greatly depending on region, species, and habitat); • Avoid construction/deployment in areas with sensitive vegetation, unique habitat, or designated natural resources, if practical; • Avoid Important Bird Areas (IBAs) and other known important bird habitats to the maximum extent practicable; • Minimize or avoid the need for or use of sodium vapor lights at site facilities to reduce attraction of migratory birds; • Turn off all unnecessary lighting at night; • Install anti-perching or nesting devices on existing or new structures; • Avoid known marine mammal haulouts or concentration areas for deployment and associated activities; • Assess critical life stages of marine mammals in haulouts within 1 mile of deployment and associated activities; • Consolidate facilities as much as possible (collocation and use of existing ROWs) to reduce potential habitat loss; • Minimize construction of all roads, fences, and other ancillary facilities to reduce overall vegetation loss and habitat fragmentation; • Control the spread of invasive animals and plants by inspecting and cleaning equipment and vehicles before moving from one deployment site to another, coordinating mowing schedules and assisting agencies and groups with ROW permits, washing mowers and equipment between sites, and educating staff; • Develop "good housekeeping" procedures to ensure that sites would be kept clean of debris, garbage, and fugitive trash or waste during operation; • Develop monitoring programs and adaptive management strategies;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Terrestrial Mammals (except for bats)[b]	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Rhode Island	• 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 migration seasons); • Locate project activities, facilities, and roads away from key habitats (e.g., wetlands and stream sites) for amphibians and reptiles; • Minimize herbicide and pesticide use during maintenance activities to the extent possible; • Minimize vehicular harm of animals migrating between seasonal habitats by locating activities, roads, and infrastructure away from these areas or installing barriers along roadsides; • Do not permit pets on site in order to avoid harassment and disturbance of wildlife; • Follow food and waste management protocols to minimize attractants to proposed network deployment sites; • Report observations of potential wildlife interactions, including wildlife mortality, to the appropriate agency immediately; • Segregate topsoil or surface soil from subsurface layers during construction for reuse during post-construction seeding; • Store soil containing noxious or invasive plants that are awaiting proper disposal in a location away from clean topsoil and subsoil; • Use existing roads and regularly maintained areas when conducting routine maintenance and inspections to the extent feasible; • Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts; • Limit construction equipment and vehicles to approved roads or ROWs; • Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) (APLIC and USFWS, 2005) for any aboveground lines or cables (e.g., use of diverters and anti-perching and anti-nesting devices); • Install bat exclusions on existing and new structures; • Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) (APLIC and USFWS, 2005) for any aboveground lines or cables (e.g., use of diverters); • Follow guidelines outlined by USFWS for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning (USFWS, 2013); • Avoid activities within migratory bird flyways and in the immediate vicinity of bat roosts to the extent practicable; • Do not operate aircraft at an altitude that could disturb known natural roosting sites of bats, with the only exception being 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 seal haulouts observed on land, with the exception only for severe weather conditions.
	Vermont	
	Virginia	
	West Virginia	
Birds[b]	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Amphibians and Reptiles	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Invertebrates	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Fisheries and Aquatic Habitats		
Fish and Aquatic Organisms	Connecticut	• Engage in early consultation with appropriate agencies and stakeholders, including but not limited to USFWS, NMFS, and other relevant federal or state wildlife and natural resources agencies; • Follow all applicable federal and state requirements for construction activities near/in fish and fish habitat; • Establish buffers around sensitive areas (e.g., nesting sites, wetlands); • Avoid construction, as practicable, during sensitive seasons for fish such as migration, spawning, egg development (including intra-gravel development) and larval fish (benthic or pelagic) development (sensitive seasons/time periods vary by species and location); • Avoid construction/deployment, as practicable, in productive riparian zones, marine preserves, and wetlands since construction could potentially result is less refuge for fish, fundamental changes
	Delaware	
	District of Columbia	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Maine	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, 2014). • Avoid physical barriers in waterbodies, to the extent practicable, during installation and operation to allow for the migration of invertebrates and other aquatic fauna; • Avoid productive habitats to the extent practicable, such as coastal wetlands, inland waterways, essential fish habitats, spawning areas, and reefs; • Consolidate facilities as much as possible; • Control the spread of invasive plants and animals by inspecting and cleaning equipment and vehicles before moving from one deployment site to another; • Implement an emergency response plan for fuel spills and environmental emergencies; • Implement invasive species plans to minimize introduction of aquatic plant and animal species (i.e., wash and inspect equipment and vehicles before moving from one drainage basin or watershed to the next); • 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; • 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; • Minimize construction noise and vibration in and near fish habitats, as practicable; • Avoid vegetation removal or siting projects in areas in areas with poor bank or shoreline stability to minimize the potential for erosion and sedimentation; • Minimize sedimentation and turbidity in fish habitats by implementing sediment and erosion control measures, as practicable; the use of such measures (e.g., silt fences, silt curtains,[c] 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; • Revegetate and restore riparian areas and other vegetated areas around aquatic resources to the extent possible once construction activities are complete; • Use setbacks 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; • Use site-appropriate native plants and invasive-free materials (e.g., seed mixes, rock, mulch, soil) for revegetation and restoration efforts;
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Virginia	• Perform regular maintenance checks of equipment near protected areas to minimize detachment of components reaching critical habitat by tidal flow; • Report spills or other observed pollutants to the appropriate agency immediately; • Use horizontal directional drilling where possible and appropriate, for stream crossings to avoid potential impacts to the streambed, banks, and associated fish habitat; • Keep poles or lines clear of excess vegetation growth during equipment operation and non-operation periods; and • Keep poles or lines clear of excess vegetation growth during equipment operation and non-operation periods.
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: White (no color) indicates resource not present in state

[b] Additional BMPs and mitigation measures may be required to further reduce potential impacts to migratory birds and bats.

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

Table ES5-7: Summary of Potential Impacts, Threatened and Endangered Species

Potential Impact	Impact Rating [a]														Typical BMPs and Mitigation Measures
	Connecticut	Delaware	District of Columbia	Maine	Maryland	Massachusetts	New Hampshire	New Jersey	New York	Pennsylvania	Rhode Island	Vermont	Virginia	West Virginia	
Threatened and Endangered Species [b]															
Marine Mammals	There are no marine mammals listed as Threatened or Endangered in the FirstNet East region.														• Avoid activities within seagrass beds and control turbidity to minimize potential indirect impacts on seagrass.
Terrestrial Mammals	2	2	2	2	2	2	2	2	2	2	2	2	2	2	• 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. • Avoid potential impacts to known grouper spawning sites. • Avoid potential impacts within coastal estuarine habitats. • Train construction and deployment staff in the Proposed Action BMPs and mitigation measures and incentivize reporting of any lapses in BMP and mitigation measure implementation. • Implement a strict policy prohibiting pets on site and prohibiting hunting or fishing or any other action that would result in any avoidable disturbance of listed species. • 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 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
Birds	2	2	NA	2	2	2	2	2	2	2	2	NA	2	2	

Potential Impact	Impact Rating [a]														Typical BMPs and Mitigation Measures
	Connecticut	Delaware	District of Columbia	Maine	Maryland	Massachusetts	New Hampshire	New Jersey	New York	Pennsylvania	Rhode Island	Vermont	Virginia	West Virginia	
Threatened and Endangered Species [b]															
Reptiles and Amphibians	2	2	NA	2	2	2	2	2	2	2	2	NA	2	2	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, sites would be kept clean of debris, garbage, and fugitive trash or waste. • Turn off all unnecessary lighting at night. • Avoid or minimize the use of sodium vapor lights at site facilities to reduce attraction of migratory birds. • Develop and implement operational monitoring and adaptive management procedures. • Follow standards and guidelines outlined by the Avian Power Line Interaction Committee and USFWS (APLIC, 2012) for any
Invertebrates	2	NA	2	NA	2	2	2	2	2	2	2	2	2	2	
Fish	NA	NA	NA	2	2	2	NA	NA	NA	2	NA	NA	2	2	

Potential Impact	Impact Rating [a]														Typical BMPs and Mitigation Measures
	Connecticut	Delaware	District of Columbia	Maine	Maryland	Massachusetts	New Hampshire	New Jersey	New York	Pennsylvania	Rhode Island	Vermont	Virginia	West Virginia	
Threatened and Endangered Species [b]															
Plants	2	2	NA	2	2	2	2	2	2	2	2	2	2	2	aboveground lines or cables (e.g., use of diverters) or other structures (e.g., perch and nest diverters).

[a] Impact rating/colors for Threatened and Endangered Species (and the equivalent impact categories and numeric ratings used in Table ES5-6) are as follows.

1: May affect, likely to adversely affect (*potentially significant*)

2: May affect, not likely to adversely affect (*less than significant with BMPs and mitigation measures incorporated*)

3: No effect (*no impact*)

NA: Not Applicable. Taxa not present

[b] Note that the impact ratings used for Threatened and Endangered Species are a distinct set of impact categories, based on those in the *Endangered Species Consultation Handbook* (USFWS and NMFS, 1998), to facilitate impact evaluation under Section 7 of the Endangered Species Act.

ES-5.7 LAND USE, AIRSPACE, AND RECREATION

Land use is defined as "the arrangements, activities and inputs people undertake in a certain land cover type to produce, change, or maintain it" (Di Gregorio & Jansen, 1998). A land use designation can include one or more pieces of land, and multiple land uses may occur on the same piece of land. Land use also includes the physical cover, observed on the ground or remote sensing and mapping, on the earth's surface; land cover includes vegetation and manmade development (USGS, 2012). Recreational uses are activities in which residents and visitors participate, and include activities, such as hiking, fishing, boating, athletic events (e.g., golf), and other attractions (e.g., museums, historic monuments, and cultural sites). Airspace is generally defined as the space lying above the earth, above a certain area of land or water, or above a nation and the territories that it controls, including territorial waters. Airspace is a finite resource that can be defined vertically and horizontally, as well as temporally, when discussing it in relation to aircraft activities. Airspace management addresses how and in what airspace aircraft fly. Air flight safety considers aircraft flight risks, such as aircraft mishaps and bird/animal-aircraft strikes. The Federal Aviation Administration is responsible for the safe and efficient use of the nation's airspace and has established criteria and limits to its use.

This section describes potential impacts to land use, airspace, and recreation, and discusses BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-8).

Summary of Impacts

Deployment and operation of new aboveground facilities associated with the Preferred Alternative, such as new towers, antennas, or other structures, could result in direct changes to land use where such deployment occurs on land not already used for telecommunications, industrial, or public utility activity.

Deployment of the Preferred Alternative could temporarily block or hinder access to recreation lands, or could reduce the enjoyment that residents and visitors experience while using those recreation lands—particularly in areas where high-quality visual conditions are expected. Potential impacts from the loss of access would generally be *less than significant* at the programmatic level, while potential impacts from diminished enjoyment of recreation areas would generally be *less than significant* at the programmatic level, reflecting the ability to screen or block most individual structures from view.

Deployment and operation of new aboveground facilities associated with the Preferred Alternative, particularly taller structures such as new towers and antennas, could add new obstructions to existing airspace. These potential impacts would generally be *less than significant* at the programmatic level, due to the sporadic location of such aboveground facilities, the avoidance of military airspace and the heavily used airspace around airfields, and the application of any Federal Aviation Administration requirements regarding lighting or other markings.

Although the individual states within the East region each have specific land use, recreation, and airspace characteristics, as documented in the Final PEIS, the potential impacts would be similar throughout the region. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. Changes in land use and airspace, which may result in longer-term impacts, from deployment and operation of new aboveground facilities (taller structures such as new towers and antennas), would generally result in *less than significant* at the programmatic level impact due to the sporadic location of such aboveground facilities. As a result, the general effects on land use, recreation, and airspace in the East region would be considered *less than significant* at the programmatic level (see Table ES5-8). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Table ES5-8: Summary of Potential Impacts, Land Use, Recreation, and Airspace

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Direct land use change	Connecticut	• Follow applicable federal, state, and local land use plans and policies to ensure compatibility with existing and surrounding land uses; • Follow and comply with applicable existing zoning requirements to ensure compatibility with existing and surrounding land uses; • Contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify potentially sensitive land uses and land use issues and concerns specific to the region; • Sign areas, access roads, and/or easements that would require temporary closure or limited access to accommodate certain land uses; • Schedule construction activities, where feasible, to minimize impacts to existing and surrounding land uses; • Utilize existing roads, rights-of-way, easements, and utility corridors to the maximum extent feasible and to minimize the number of new access roads; • Give preference to development options that involve use of existing physical infrastructure, and/or that do not involve new aboveground structures (e.g., collocation on existing structures, new buried or undersea infrastructure, etc.), especially near recreation lands; • Select infrastructure locations that are screened from view by topography and/or vegetation, that do not require noticeable permanent changes in landforms (e.g., 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; and • Select infrastructure designs that minimize contrast with the surrounding landscape and land uses.
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Indirect land use change	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Loss of access to public or private recreation land or activities	Connecticut	• Contact appropriate agencies, property owners, and other stakeholders early in the planning process to identify recreation activities specific to the region and their respective seasons; • Sign areas, access roads, and/or recreation trails that would require temporary closure, limited access, or detours to accommodate certain recreation activities; • Schedule deployment activities, where feasible, to not interfere with seasonal recreation activities; • Utilize existing roads, rights-of-way, easements, and utility corridors to the maximum extent feasible and to minimize the number of new access road; • Complete deployment activities with minor, temporary impacts to recreation resources during periods or seasons of low use; • Give preference to infrastructure locations that are compatible with existing park or recreation planning documents; • Complete deployment activities, to the extent practicable, outside of and away from existing recreation locations, and • Select infrastructure locations that are as far from recreation lands as possible.
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Loss of enjoyment of public or private recreation land (due to visual, noise, vibration, or other impacts that make recreational activity less desirable)	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Use of airspace	Connecticut	• Follow all applicable federal, state, and local requirements for preservation of the airspace to avoid or minimize reducing existing capacity, decreasing safety, negatively impacting current operations, or increasing the risk to airspace users or persons and property; • To the extent practicable, avoid deploying and operating wired and wireless sources near airports/facilities that trigger the need for an OE/AAA by the FAA based on height and airport elevation criteria; and • For new construction, prepare site plans with sufficient detail to assess potential impacts to SUAs, restricted airspace, and general and military aviation. • Select the shortest possible structures necessary to meet the FirstNet system's needs, and only deploy towers less than 200 feet in height wherever possible; • Place new infrastructure near existing similar infrastructure where possible, to minimize the total number of new aerial navigation hazards;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	New York	• Avoid placing new infrastructure near airports or the areas regulated under the FAA's Part 77 regulations (FAA, 2015); • Avoid placing new infrastructure within Military Operations Areas or under Military Training Routes unless coordinated with the relevant military unit. • Coordinate early with FAA on aerial deployable technologies (flying UASs and balloon launches) to establish procedures that are in place prior to the need to use these technologies during emergency response events; and • 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).
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

ES-5.8 VISUAL RESOURCES

Visual resources influence the human experience of a landscape. Various aspects combine to create visual resources, such as color, contrast, texture, line, and form. Features such as mountain ranges, city skylines, ocean views, unique geological formations, rivers, and constructed landmarks such as bridges, memorials, cultural resources, or statues are considered visual resources. For some, cityscapes are valued visual resources; for others, views of natural areas are valued visual resources. While many aspects of visual resources are subjective, evaluating potential impacts on the character and continuity of the landscape is a consideration when evaluating proposed actions for NEPA and NHPA compliance. A general definition of visual resources used by the Bureau of Land Management is "the visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features)" (BLM, 1984).

This section describes potential impacts to visual resources associated with deployment and operation of the Preferred Alternative, and discusses BMPs and mitigation measures that could avoid or minimize potential negative impacts, and/or that would preserve or enhance potential positive impacts (see Table ES5-9).

Summary of Impacts

Deployment and operation of new aboveground facilities, such as new towers, antennas, or other structures, could add new permanent elements to the visual landscape (what observers can readily see from a given vantage point), while deployment of options other than aboveground facilities could create only temporary changes to the landscape—such as construction scars or the presence of construction equipment. Observers are more likely to perceive Preferred Alternative facilities adversely in or near public or recreational areas, such as local parks, historic

neighborhoods, and landmarks. Other areas where higher scenic values or the absence of new structures may be preferred include relatively undeveloped areas.

These visual potential impacts would generally be *less than significant* at the programmatic level, since they would likely be localized to the deployment locations of individual facilities, and individual structures or facilities can often be screened or otherwise blocked from view.

Taller aboveground facilities, such as towers, would likely require nighttime and possibly daytime lighting. The visual potential impacts of that lighting would generally be *less than significant* at the programmatic level in more developed areas, where new light sources would not be noticeable, but could be *less than significant with BMPs and mitigation measures incorporated* at the programmatic level in rural areas or near National Parks where new light sources might interfere with enjoyment of the night sky.

Although the individual states within the East region each have specific visual characteristics, as documented in the Final PEIS, the potential impacts would be similar throughout the region given common regional characteristics. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively short deployment timeframes and small scale (generally less than an acre), resulting in isolated and short-term impacts. Deployment and operation of new aboveground facilities could add new permanent elements to the visual landscape, but such facilities can often be screened or otherwise blocked from view. New light sources on such structures may also require BMPs and mitigation measures. As a result, the general effects on visual resources in the East region would be considered *less than significant* at the programmatic level or *less than significant with BMPs and mitigation measures incorporated* at the programmatic level (see Table ES5-9). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Table ES5-9: Summary of Potential Impacts, Visual Resources

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Adverse change in aesthetic character [b]	Connecticut	• Proposed design should take into account the scenic character of the surrounding area to reasonably minimize or avoid visual impacts to the surrounding area when viewed from existing roadways or shorelines; • Utilize non-reflecting coatings to towers, antennas, buildings, and associated structures where possible; • Implement sensitive grading techniques that blend with the natural terrain; • Treat all disturbed slopes for erosion control; • Where appropriate, use vegetation as screens to block views of structures and roadways; • 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 restrict the duration and directionality of needed lighting;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
	Connecticut	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Nighttime lighting (overall)	Delaware	• 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, 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; • Comply with all relevant and applicable federal, state, or local regulations and guidance regarding visual and aesthetic conditions and impacts; • Comply with the BMPs and mitigation measures for towers required by USFWS, as detailed in Section 17.6.2, Wildlife; • 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.
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Nighttime lighting (isolated rural areas)[c]	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

[b] Additional BMPs and mitigation measures may be required for towers.
[c] Potential nighttime lighting impacts during deployment would be *less than significant* at the programmatic level due to the temporary nature of the potential impacts but would be *less than significant with BMPs and mitigation measures incorporated* at the programmatic level during operations.

ES-5.9 SOCIOECONOMICS

NEPA requires consideration of socioeconomics; specifically, Section 102(A) of NEPA requires federal agencies to "insure the integrated use of the natural and social sciences…in planning and in decision making" (42 U.S.C. 4332(A)). Socioeconomics refers to a broad, social science-based approach to understanding a region's social and economic conditions. It typically includes

population, demographic descriptors, economic activity indicators, housing characteristics, property values, and public revenues and expenditures. When applicable, it includes qualitative factors such as community cohesion. Socioeconomics provides important context for analysis of FirstNet projects, as those projects may affect the socioeconomic conditions of a region.

The choice of socioeconomic topics and depth of their treatment depends on the relevance of potential topics to the types of federal actions under consideration. FirstNet's mission is to provide public safety broadband and interoperable emergency communications coverage throughout the nation. Relevant socioeconomic topics include population density and growth, economic activity, housing, property values, and state and local taxes. The financial arrangements for deployment and operation of the FirstNet network may have socioeconomic implications. This socioeconomics section provides some additional, broad context, including data and discussion of state and local government revenue sources that FirstNet may affect. This section describes potential impacts to socioeconomics associated with deployment and operation of the Preferred Alternative, and discusses BMPs and mitigation measures that could avoid or minimize potential negative impacts, and/or that would preserve or enhance potential positive impacts.

Deployment and operation of the Preferred Alternative may have a variety of potential socioeconomic impacts (both positive and negative), including potential direct and indirect, impacts. In general, operation of the Preferred Alternative would involve minimal impacts to socioeconomics. Potential impacts would instead be more likely during deployment (see Table ES5-10). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Summary of Impacts

Deployment and operation of new aboveground facilities, such as new towers, antennas, or other structures, could adversely affect local real estate values, due to the diminishment of surrounding aesthetic character. These potential impacts would generally be *less than significant* at the programmatic level as recent studies have shown a minimal impact on property prices due to the presence of a nearby tower and decreased to no effect beyond 100 meters (328 feet).

Potential impacts to economic activity would generally be *less than significant* at the programmatic level, due to the relatively small amount of economic activity associated with the Preferred Alternative. Deployment and operation could additionally affect the state's economy through changes in tax revenue, wages, and spending. The Preferred Alternative could additionally create direct, indirect, and induced employment, through new jobs associated with the Preferred Alternative (direct), its contractors and subcontractors (indirect), and other businesses that serve the Preferred Alternative employees, contractors, or subcontractors (induced). Economic effects are typically positive, although potential negative economic impacts are possible.

Increases in employment associated with deployment and operation of the NPSBN would be temporary, and would likely consist at least in part of local labor. The potential impacts of land acquisition for Preferred Alternative activities would generally have no potential impacts to land

or natural resources; however, site-specific evaluation would be required to confirm the absence of impacts.

Potential real estate purchasers (individuals who wish to purchase a home or property, investors, developers, etc.) and renters could see the presence of aboveground facilities as a negative aesthetic element—a perception that could affect property values.

Although the individual states within the East region each have specific socioeconomic characteristics, as documented in the Final PEIS, they share common regional characteristics and the potential impacts would be similar throughout the region. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts, with relatively small amounts of economic activity in any give area. As a result, the general effects on socioeconomics in the East region would be considered *less than significant* at the programmatic level (see Table ES5-10).

Table ES5-10: Summary of Potential Impacts, Socioeconomics

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Impacts to real estate (deployment and operation) (could be positive or negative)	Connecticut	• Avoid development of new wireless communication towers in or near residential areas, in order to reduce the potential that such activities could have adverse impacts on residential property values; • Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, 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; • Select infrastructure designs that minimize construction footprints; • Avoid development or enlargement of storage, staging, and launch/landing areas for deployable technologies in or near residential areas, in order to reduce the potential that such activities could have adverse impacts on residential property values; • Give preference to hiring workers who are local residents, where practicable; and • Share deployment plans with public service providers, especially first responders, as early in the process as possible and throughout the deployment process.
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Changes to spending, income, industries, and public revenues	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	West Virginia	
Impacts to employment	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Changes in population number or composition	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigation measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

ES-5.10 Environmental Justice

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, issued in 1994, sets out principles of environmental justice and requirements that federal agencies should follow to comply with the EO. The fundamental principle of environmental justice as stated in the EO is, "fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws,

regulations, and policies" (Executive Office of the President, 1994). Under the EO, each federal agency must "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (Executive Office of the President, 1994). In response to the EO, the U.S. Department of Commerce developed an Environmental Justice Strategy in 1995, and published an updated strategy in 2013 (U.S. Department of Commerce, 2013).

Potential environmental justice impacts could occur if minority (race or ethnicity) or low-income groups are disproportionately affected by adverse social, health, or environmental consequences of the Preferred Alternative. Given that these potential impacts could only occur if these particular groups are present, and the specific locations within states of deployment and operations activities of the Preferred Alternative have not been identified, this Final PEIS mapped the potential of environmental justice impacts' occurrence as low, moderate, or high within each of the states considered. This section describes potential impacts to environmental justice communities associated with deployment and operation of the Preferred Alternative, and discusses BMPs and mitigation measures that could avoid or minimize potential negative impacts, and/or that would preserve or enhance potential positive impacts (see Table ES5-11). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Summary of Impacts

In general, the impacts from deployment activities would be *less than significant* at the programmatic level as the potential impacts would be short-term and could potentially involve objectionable dust, noise, vibration, traffic, or other localized impacts due to construction activities (see Table ES5-11). Potential environmental justice impacts associated with routine maintenance and inspection of the facilities are anticipated to have *less than significant* at the programmatic level impacts if the same roads are used to perform inspections and maintenance activities. Any major infrastructure replacement as part of ongoing system maintenance would result in potential impacts similar to the deployment impacts described above.

Although the individual states within the East region each have some specific environmental justice characteristics, as documented in the Final PEIS, they also share common regional characteristics and the potential impacts would be similar throughout the region. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. As a result, the general effects on environmental justice in the East region would be considered *less than significant* at the programmatic level (see Table ES5-11). Analyses of individual proposed projects would be needed to determine potential impacts to specific environmental justice communities, and BMPs and mitigation measures may be required to address potential impacts to environmental justice communities at the site-specific level.

Table ES5-11: Summary of Potential Impacts, Environmental Justice [a]

Potential Impact	Impact Rating [b]	Typical BMPs and Mitigation Measures
Effects associated with other resource areas (e. g., human health and safety, cultural resources, socioeconomics) that have a disproportionately high and adverse impact on low-income populations and minority populations	Connecticut	• Follow all BMPs identified throughout this PEIS that reduce adverse impacts of construction activities, such as generation of noise, vibration, dust, and traffic; • Avoid setting deployment activities and facilities requiring construction in proximity to environmental justice communities, in order to reduce the potential that such activities would be seen as disproportionately affecting environmental justice communities; • Because of their potential impacts on property values, avoid development of new wireless communication towers in proximity to environmental justice communities in order to reduce the potential that such activities would be seen as disproportionately affecting environmental justice communities; • Where possible, identify specific communities (i.e., neighborhoods or populations that may be contained within individual block groups) that are at risk of experiencing environmental justice impacts; • Give preference to development options that involve use of existing physical infrastructure (e.g., collocation on existing structures, buried, or undersea infrastructure, etc.); and • Where possible, select infrastructure locations that are not within or near environmental justice communities, particularly new build options.
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Since potential environmental justice impacts occur at the site-specific level, analyses of individual proposed projects would be needed 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.
[b] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant
2. Less than significant with BMPs and mitigations measures incorporated
3. Less than significant
4. No impact
NA: Not Applicable. White (no color) indicates resource not present in state(s)

ES-5.11 Cultural Resources

Cultural Resources are defined as natural or manmade structures, objects, features, locations with scientific, historic, and cultural value, including those with traditional religious or cultural importance and any prehistoric or historic district, site, or building included in, or eligible for inclusion in, the National Register of Historic Places (NRHP).

This definition is consistent with the how cultural resources are defined in the:

- Statutory language and implementing regulations for Section 106 of the NHPA, formerly 16 U.S.C. 470a(d)(6)(A) (now 54 U.S.C. 306131(b)) and 36 CFR 800.16(l)(1);
- Statutory language and Implementing regulations for the Archaeological Resources Protection Act of 1979, 16 U.S.C. 470cc(c) and 43 CFR 7.3(a);

- Statutory language and implementing regulations for the Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001(3)(D) and 43 CFR 10.2(d);
- National Park Service's (NPS) program support of public and private efforts to identify, evaluate, and protect America's historic and resources (NPS, 2016d); and
- Advisory Council on Historic Preservation's guidance for protection and preservation of sites and artifacts with traditional religious and cultural importance to Indian tribes or Native Hawaiian organizations (Advisory Council on Historic Preservation, 2004).

As discussed in the Cultural Resources sections of the Final PEIS, the evaluation of potential impacts to cultural resources uses a distinct set of impact categories, 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, 1995). These impact categories for cultural resources (and the equivalent impact categories and numeric ratings used throughout the rest of this Executive Summary) are:

- Adverse effect (1, *potentially significant*);
- Mitigated adverse effect (2, *less than significant with BMPs and mitigation measures incorporated*);
- Effect, but not adverse (3, *less than significant*); and
- No effect (4, *no impact*).

Summary of Impacts

The primary cultural resource concern during deployment and operation activities is physical damage to and/or destruction of historic properties (see Table ES5-12). Indirect effects on historic properties could include changes to the views to and from a resource (potential viewshed impacts); increased noise and vibration levels at a resource; vibration; and/or visual or atmospheric effects caused by dust, emissions, or pollutants. The goal of historic preservation is not only to preserve and protect historic properties, but also to provide access to cultural resources, especially to those who value them.

The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes. To the extent practicable, FirstNet does not expect to raze, adversely affect, or permanently restrict access to any historic structures, historic properties, traditional cultural properties, or other cultural resources throughout the region. If the proposed deployment activities would have the potential to adversely affect historic properties, FirstNet could apply BMPs and mitigation measures, as practicable and feasible, and/or consult with appropriate federal, state, and interested parties to apply appropriate mitigation measures to resolve adverse effects. Potential residual impacts (those occurring after implementation of BMPs and mitigation measures) would generally be temporary and limited to the area near individual Preferred Alternative deployment sites. Based on the analysis of deployment activities, impacts to cultural resources as a result of direct and indirect effects are anticipated to *effect, but not adverse* at the programmatic level (see Table ES5-12). Potential effects associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Table ES5-12: Summary of Potential Impacts, Cultural Resources

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Physical damage to and/or destruction of historic properties	Connecticut	• 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; • 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 and 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, ripping5 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, noise, and vibration 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; and • 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.
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Indirect effects to historic properties (i.e. visual, noise, vibration, atmospheric)	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Loss of character defining attributes of historic properties	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	

[5] Ripping is typically performed by a tractor or other heavy equipment to pull the rock.

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	West Virginia	
Loss of access to historic properties	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors for the evaluation of Cultural Resources are as follows.

1. Adverse effect

2. Mitigated adverse effect

3. Effect, but not adverse

4. No effect

NA: Not Applicable. White (no color) indicates resource not present in state(s)

ES-5.12 Air Quality

Air quality in a geographic area is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the area, and the prevailing weather and climate conditions. The levels of pollutants and pollutant concentrations in the atmosphere are typically expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$) determined over various periods of time (averaging time). The U.S. Environmental Protection Agency (USEPA) designates areas within the United States as attainment, nonattainment, maintenance, or unclassifiable depending on the concentration of air pollution relative to ambient air quality standards.

This section describes potential impacts to air quality associated with deployment and operation of the Preferred Alternative, and discusses BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-13). In general, operation of the Preferred Alternative would involve minimal potential impacts to air quality, generally limited to vehicle emissions associated with periodic inspection of structures, emissions from power generators, or operation of deployables during times of emergency. These cases notwithstanding, potential air quality impacts from the Preferred Alternative would be more likely during deployment due to emissions from the heavy equipment used in deployment.

Summary of Impacts

Increased air emissions could result in negative potential impacts to human health, wildlife, vegetation, and visibility. Emissions could result from stationary or mobile equipment that is powered by fossil fuels such as excavators, backhoes, front-end loaders, graders, pavers, dump trucks, and other equipment required to support any clearance, drilling, and construction activities associated with network deployment. In addition, the use of power generators, first responder on-road vehicles, and aerial platforms associated with the use of deployable technologies could also increase air emissions, both from fossil fuel combustion and, in some cases, from stirring up dust on unpaved roads and construction areas.

Potential impacts from increased air emissions could occur in any location; however, they would be most significant in nonattainment areas (where air quality does not currently meet local standards), maintenance areas (where air quality has improved but historically did not meet local standards), and designated Class I Areas (areas of special national or cultural significance including certain national parks, wilderness areas, and national monuments).

Although the individual states within the East region each have some specific air quality characteristics, as documented in the Final PEIS, the potential impacts would be similar throughout the region. These potential impacts would generally be *less than significant* at the programmatic level, because Preferred Alternative deployment would avoid, to the degree possible, areas sensitive to decreased air quality, such as designated Class I Areas. Also, the Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. It is anticipated that any air pollution increase due to deployment would likely be short-term with pre-existing air quality levels generally achieved after some months (typically less than a year). As a result, the general effects on air quality in the East region would be considered *less than significant* at the programmatic level (see Table ES5-13). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Table ES5-13: Summary of Potential Impacts, Air Quality

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Increased air emissions	Connecticut	• Follow all applicable federal, state, and local requirements for obtaining air pollution control permits for applicable emission sources; • To the extent practicable, avoid constructing and operating sources in extreme or severe nonattainment areas; • To the extent possible, avoid placement of air emission sources within Class I Areas; [b] • Ensure all activities are in compliance with general conformity requirements in nonattainment and maintenance areas; • For equipment with internal combustion engines, 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; • Use low-sulfur or ultra-low-sulfur diesel fuel in construction equipment, trucks, vehicles, and generators;
	Delaware	
	District of Columbia	
	Maine	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Maryland	• When possible, use vehicles with hybrid or electric technology to reduce or eliminate criteria pollutant emissions from fuel combustion; • To control dust from construction or other land-disturbing activities, spray water on roads/construction areas, limit the area of uncovered soil to the minimum needed for each activity, site staging areas to minimize fugitive dust, use a soil stabilizer (chemical dust suppressor), mulch areas or use a temporary gravel cover, limit the number and speed of vehicles on the site, and cover 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 UAS or aircraft below the mixing height (i.e., typically estimated at 3,000 feet aboveground level); • Use electric or alternate fueled ground support equipment for UAS or other aircraft; • Ensure all activities conform to the State Implementation Plan; • Follow all applicable federal, state, and local air quality requirements, including standards for nuisance (where possible) and fossil fuel-powered generators; • Ensure all diesel engines are compliant with USEPA emission standards for the corresponding engine class; • Ensure all equipment are appropriately sized for the project; • Consider using hydrogen-fueled generators where practicable to reduce nitrous oxides emissions; • Obtain permits, where required, to install and operate fossil fuel-powered generators; [c] • Implement a dust control plan for construction activities and any travel over unpaved roads; and • Ensure all fuel-burning equipment including, but not limited to, heavy construction equipment, power generators, and aerial platforms are maintained in accordance with manufacturer's specifications.
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

[b] 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.
[c] Permits for stationary sources (diesel generators) should be obtained in advance of future deployment.

ES-5.13 NOISE AND VIBRATION

Noise is caused by pressure variations that the human ear can detect and is often defined as unwanted sound (USEPA, 2012). Noise is one of the most common environmental issues that interferes with normal human activities and otherwise diminishes the quality of the human environment. Typical sources of noise and vibration that result in this type of interference in urban and suburban surroundings includes interstate and local roadway traffic, rail traffic, industrial activities, aircraft, and neighborhood sources, such as lawn mowers and leaf blowers.

Ground-borne vibrations, which in many instances can be caused by tools or equipment that generate noise, can also result from roadway traffic, rail traffic, and industrial activities as well as from some construction-related activities such as blasting, pile-driving, vibratory compaction, demolition, and drilling. Unlike noise, most ground-borne vibrations are not typically experienced every day by most people because the existing environment does not include a significant number of perceptible ground-borne vibration events.

This section describes potential impacts from noise and vibration associated with deployment and operation of the Preferred Alternative and alternatives, and discusses BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-14). In general, operation of the Preferred Alternative would involve minimal potential noise or vibration impacts, with the notable exception being potential localized noise and vibration impacts from generators associated with operation of deployables or on tower sites as back-up power. That case notwithstanding, potential noise and vibration impacts would be more likely during deployment due to noise and vibrations associated with heavy equipment used for deployment.

Summary of Impacts

Potential impacts from increased noise and vibration levels could occur in wilderness areas or pristine environments (including wildlife refuges, historic sites, ecological preserve areas, etc.) where natural quiet is expected, rural and outer suburban areas with negligible traffic, general suburban areas with infrequent traffic, general suburban areas with medium density traffic, or suburban areas with some commerce or industry. These areas are most sensitive to increased noise and vibration levels because of their low to medium baseline average noise or vibration levels. Urban areas are less susceptible to increased noise and vibration levels because of their higher average ambient noise or vibration levels.

Increased noise and vibration levels could result in community annoyance by interfering with speech and other human-related activities. Noise emissions and vibration associated with movement of construction equipment such as excavators, backhoes, trenchers, graders, pavers, rollers, dump trucks, cranes, and other equipment required to support deployment activities needed for network deployment could potentially temporarily impact sensitive receptors, such as residences, hotels/motels/inns, hospitals, and recreational areas.

The individual states within the East region each share common regional noise and vibration characteristics and the potential impacts would be similar throughout the region. These potential impacts would generally be *less than significant* at the programmatic level, because Preferred Alternative deployment would avoid or minimize, to the degree practicable, areas sensitive to

increased noise and vibration, such as designated wilderness areas, and lands managed for recreation (such as national parks or national wildlife refuges) where noise and vibration are less common. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. It is anticipated that any noise and vibration increase due to deployment would likely be isolated within those locations and would be short-term with pre-existing noise and vibration levels generally achieved after some months (typically less than a year; could also be a few hours for linear activities such as pole construction). As a result, the general effects on noise and vibration in the East region would be considered *less than significant* at the programmatic level (see Table ES5-14). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Table ES5-14: Summary of Potential Impacts, Noise and Vibration

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Increased noise and vibration levels	Connecticut	• Follow all applicable federal, state, and local requirements for construction noise and vibration restrictions; • For those projects involving heavy equipment for deployment that can generate noise and vibration, avoid, as practicable, deployment in areas with highly sensitive receptors and construct facilities in alternate locations; • For construction and grading activities near populated areas, heavy equipment should use noise mufflers to limit noise exposure on noise-sensitive receptors; • For construction and grading activities near other noise and vibration sensitive receptors, including parks or other protected areas, heavy equipment should use noise mufflers to limit noise exposure, and the use of such equipment should be limited to operation only during daytime hours; • Follow all state and federal guidelines for limiting aircraft noise and vibration on populated areas and over national parks; • Equipment that is expected to generate significant noise and vibration should include mitigation measures during the design and implementation phases of the project (e.g., use of noise barriers such as walls, shrubbery); • Limit construction activities to daytime hours (7 a.m. to 7 p.m.) to the extent possible when increased noise and vibration 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, setting equipment away from noise and vibration 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 and vibration levels;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Virginia	• Ensure, as practicable, all heavy equipment, power generators, and boats are maintained in accordance with manufacturer's specifications; • Do not permit underwater blasting and pile driving activities in any waterbody; and • Do not permit underwater blasting and pile driving activities in any waterbody.
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

ES-5.14 Climate Change

Climate change, according to the Intergovernmental Panel on Climate Change, is defined as "…a change in the state of the climate that can be identified (e.g., using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or human activity" (Intergovernmental Panel on Climate Change, 2007).

This section describes potential climate change-related impacts associated with deployment and operation of the Preferred Alternative and alternatives, and discusses BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-15). The analysis of climate change focuses on two primary factors: greenhouse gas (GHG) emissions from Preferred Alternative activities and the effects of climate change on Preferred Alternative facilities (see Table ES5-15). GHG emissions, which would generally occur during deployment of the Preferred Alternative (as well as during operation of deployables during emergency situations), would arise from combustion of fossil fuel in stationary or mobile equipment (such as construction equipment and deployables), clearing of vegetation, use of generators, and changes in land use during deployment and operation. GHG emissions would be emitted locally but likely have a minimal effect globally.

Summary of Impacts

The magnitude of GHG potential impacts would generally be *less than significant* at the programmatic level.

Climate changes due to increasing global GHG emissions from all sources, which would generally affect operation of the Preferred Alternative, are projected to produce a range of effects, including changes in temperature, precipitation, and sea level as well as changes in frequency and intensity of weather events when compared to historical trends. These climate effects can exacerbate, lessen, or have a positive effect on environmental resources during operation of the Preferred Alternative, for example:

- Projections indicate increasing average annual temperatures through the end of the century. These increases could lead to potential impacts associated with heat stress on equipment and wildfire risk particularly for aboveground infrastructure.
- Climate change can lead to increased or decreased precipitation in different parts of the world. Increased precipitation could lead to flooding, erosion, and similar effects, while decreased precipitation could lead to soil compaction. All of these effects can potentially impact the stability of aboveground infrastructure, such as towers, antennas, POPs, huts, poles, and microwave dishes.
- Projections indicate that global mean sea level would rise through the end of the century. Sea level rise increases the likelihood for coastal flooding and erosion, which could pose significant potential impacts to infrastructure near or on the coast.

Based on the analysis of the operational activities described above, climate change effects on the Preferred Alternative could be *potentially significant* to *less than significant with BMPs and mitigation measures incorporated* at the programmatic level because climate change effects such as changes in temperature, precipitation, and sea-level rise during operations could potentially impact the infrastructure of the Preferred Alternative. Mitigation measures could minimize or reduce the severity or magnitude of potential impacts on the Preferred Alternative, while adaptation refers to anticipating adverse effects of climate change and taking appropriate action to prevent and minimize the damage climate change effects could cause.

Although the individual states within the East region each have some specific climate and GHG characteristics, as documented in the Final PEIS, the East region states share common regional characteristics and the potential impacts would be similar throughout the region. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. Climate change effects on the Preferred Alternative could be *potentially significant* to *less than significant with BMPs and mitigation measures incorporated* at the programmatic level because climate change may potentially impact FirstNet installations or infrastructure during periods of extreme heat, severe storms, natural disasters, or other weather events. As a result, the effect the project would have on climate change due to increased GHG emissions in the East Region would be considered *less than significant* at the programmatic level, however, the potential impact of climate change on the project would be considered *less than significant with BMPs and mitigation measures incorporated* at the programmatic level (see Table ES5-15). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Table ES5-15: Summary of Potential Impacts, Climate Change

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Contribution to climate change through GHG emissions	Connecticut	• Ensure proper sizing of both transmitting and generating equipment; • 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;
	Delaware	
	District of Columbia	
	Maine	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Maryland	• Select energy-efficient technologies (both consuming and generating) whenever possible; • Use renewable energy such as photovoltaic/battery/hybrid combinations where possible; • Ensure proper loading of generating equipment during operations; and • Rely on grid-delivered power whenever available and feasible.
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Effect of climate change on FirstNet installations and infrastructure (Operations)	Connecticut	• Ensure design of aboveground structures and equipment has included allowances for maximum temperature and precipitation changes; • Assess sea level rise prior to installation of infrastructure near coastal areas; • Reinforce structures to include allowances for extreme weather events and flooding; • Work jointly with public authorities in the implementation of monitoring plans and action plans related to potential impacts that could affect the Preferred Alternative; • 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 collocating 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.
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
[a] Impact rating/colors (Refer to Section ES-5):		
1. Potentially significant		
2. Less than significant with BMPs and mitigations measures incorporated		
3. Less than significant		
4. No impact		
NA: Not Applicable. White (no color) indicates resource not present in state(s)		

ES-5.15 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. There are two human populations of interest within the existing environment of health and safety: 1) telecommunication occupational workers and 2) the general public near telecommunication sites. Each of these populations could experience

different degrees of exposure to hazards as a result of their relative access to FirstNet telecommunication sites and their function throughout the implementation of the FirstNet telecommunication network infrastructure.

Health effects from human exposure to environmental contaminants can range from experiences of physical irritation/nuisance to acute illness, to chronic disease outcomes, depending on the type of contaminant and level of exposure. Potential human health impacts of the Preferred Alternative generally include (see Table ES5-16):

- Existing environmental contaminants in soil or water: Preferred Alternative deployment activities could pose a health risk to workers and communities if deployment causes or facilitates direct contact with contaminated soil (i.e., soil that is already contaminated, or that becomes contaminated as a result of Preferred Alternative activities) or surface water runoff containing soil chemicals from the construction site;
- Potential pollutants in surface water from spills (i.e., spills associated with Preferred Alternative activities);
- Air emissions from stationary and mobile sources that are powered by fossil fuels. Particularly sensitive populations include those with chronic respiratory diseases, acute respiratory infections, chronic heart disease, and/or diabetes;
- Workplace and construction site accidents and injuries, including injuries to FirstNet workers as well as community members;
- Road traffic accidents and injuries, including accidents involving FirstNet workers as well as members of the community; and
- Potential noise- and vibration-related health impacts, including at Preferred Alternative deployment sites, as well as at nearby residences and businesses.

This section describes potential impacts to human health and safety associated with deployment and operation of the Preferred Alternative, and discusses BMPs and mitigation measures that could avoid or minimize those potential impacts (see Table ES5-16).

Summary of Impacts

Although the individual states within the East region each have some specific health and safety characteristics, as documented in the Final PEIS, they also share common regional characteristics and the potential impacts would be similar throughout the region. These potential impacts would generally be *less than significant* at the programmatic level, due to the relatively small amount of hazardous materials (such as vehicle fuels), air emissions, noise, and vibration associated with Preferred Alternative deployment and operation, safety procedures required by federal and state law, and limited potential for increased risk of communicable disease. The Preferred Alternative would be implemented at individual FirstNet project sites with a relatively small scale (generally less than an acre), and over relatively short deployment timeframes, resulting in isolated and short-term impacts. In general, operation of the Preferred Alternative would involve minimal potential impacts to human health, except for new air emissions and potential road traffic accidents associated with operation of deployables during emergencies. Although still minimal, potential impacts would instead be more likely during deployment. As a result, the general effects on human health and safety in the East region would be considered *less than significant* at

the programmatic level (see Table ES5-16). Potential impacts associated with the Deployable Technology Alternative are discussed in section ES 7.1 (below).

Table ES5-16: Summary of Potential Impacts, Human Health and Safety

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
Exposure to worksite occupational hazards as a result of activities at existing or new FirstNet sites	Connecticut	• Utilized trained and licensed heavy equipment operators, when available or required; • Develop site-specific Health and Safety Plans that identify 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 mines; • Follow all applicable federal, state, and local requirements for hazardous materials and hazardous waste management; • Incorporate all BMPs and mitigation measures listed in Section 17.4, 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 17.12, Air Quality; • Incorporate all BMPs and mitigation measures listed in Section 17.2, Soils, for potential impacts from soil erosion; • Conduct air, noise, and vibration 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 OSHA; • Search for the location of federal and state Superfund sites prior to site section in the area being considered for new or existing infrastructure projects. If a Superfund site is located at or immediately adjacent to the deployment area, site-specific worker health and safety protection measures may be required; • Ensure that appropriate measures are taken in compliance with applicable regulations (including Resource Conservation and Recovery Act and Comprehensive Environmental Response, Compensation, and Liability Act) 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;
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Exposure to hazardous materials, hazardous waste, and mine lands as a result of FirstNet site selection and site-specific land disturbance activities	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	

Potential Impact	Impact Rating [a]	Typical BMPs and Mitigation Measures
	Pennsylvania	• 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; [b] • 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 Preferred Alternative; • Incorporate all BMPs and mitigation measures listed in Section 17.1, Infrastructure, on potential impacts to transportation system capacity and safety; • As needed, implement community education and public awareness about the Preferred Alternative'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 or heat-related hazards such as heat stroke; • Incorporate all BMPs and mitigation measures listed in Section 17.13, Noise and Vibration; • Inform community members of dates and times of construction activities that are likely to generate noise, at levels above 55 A-weighted decibels, and vibration 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; and • Follow OSHA recommended Workplace Precautions against West Nile Virus, another mosquito-borne illness for which the only preventive measure is avoidance of bites by infected mosquitoes.
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	
Exposure to hazardous materials, hazardous waste, and occupational hazards as a result of natural and man-made disasters	Connecticut	
	Delaware	
	District of Columbia	
	Maine	
	Maryland	
	Massachusetts	
	New Hampshire	
	New Jersey	
	New York	
	Pennsylvania	
	Rhode Island	
	Vermont	
	Virginia	
	West Virginia	

[a] Impact rating/colors (Refer to Section ES-5):

1. Potentially significant

2. Less than significant with BMPs and mitigations measures incorporated

3. Less than significant

4. No impact

NA: Not Applicable. White (no color) indicates resource not present in state(s)

[b] 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.

ES-6. CUMULATIVE EFFECTS

NEPA regulations (40 CFR § 1500-1508) require the assessment of the Proposed Action to address potential cumulative impacts: the potential incremental impact of the Proposed Action in combination with other past, present, and reasonably foreseeable future actions. 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.

The design, deployment, and operation of the Preferred Alternative would occur throughout the East 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 may use to implement and deploy the Preferred Alternative. Therefore, this Final PEIS addresses potential cumulative impacts qualitatively.

The geographic extent of the Preferred Alternative as considered for the cumulative impact analysis includes the area under the jurisdiction of the Preferred Alternative, specifically the East region that is the subject of this Final PEIS. The timeframe considered for this analysis is 50 years. There are few other past, present, and reasonably foreseeable future telecommunication projects planned for the East region. As described in Sections 3 through 16 of this Final PEIS, the Preferred Alternative would not result in significant potential impacts at the programmatic level, either alone or when combined with other ongoing telecommunications infrastructure development or operations, to the extent such projects were foreseeable at the time of the preparation of this Final PEIS.

ES-7. POTENTIAL IMPACTS OF OTHER ALTERNATIVES

ES-7.1 DEPLOYABLE TECHNOLOGIES ALTERNATIVE

Under the Deployable Technologies Alternative option, a nationwide fleet of mobile communications systems would provide temporary coverage in areas not covered by the existing, usable infrastructure. There would be no collocation of equipment and no new construction associated with wired or wireless projects discussed above under the Preferred Alternative. 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.

Table ES7-1: Summary of Potential Impacts, Deployment and Operation of the Deployable Technologies Alternative summarizes the impact ratings for the Deployable Technologies Alternative at the programmatic level. The ratings for each type of potential impact reflect the overall rating for that potential impact across all 13 states and the District of Columbia evaluated in this Final PEIS. In cases where the states had different values, the value selected for Table ES7-1: Summary of Potential Impacts, Deployment and Operation of the Deployable Technologies Alternative reflects the more potentially impactful category. See the discussion of

the Deployable Technologies Alternative in Section 18, Comparison of Alternatives, and in each state-specific Environmental Consequences section in this Final PEIS for more detailed discussions. BMPs and mitigation measures for the Deployable Technologies Alternative would generally be the same as those described for the Deployable Technologies option within the Preferred Alternative.

ES-7.1.1 Potential Deployment Impacts

Deployment of deployable technologies would generally involve the purchase, initial testing, staffing, and mobilization of deployables. These activities would generally result in potential impacts similar to those described throughout Section ES-5 (such as additional air emissions, noise, and vibration). In general, these potential impacts would range from *no impact* to *less than significant with BMPs and mitigation measures incorporated* at the programmatic level, although most deployment potential impacts would be *less than significant* at the programmatic level (including potential socioeconomic impacts, which would be beneficial due to equipment purchase and staffing).

ES-7.1.2 Potential Operation Impacts

Operation of deployable technologies would involve the mobilization and stationing of deployables at various pre-determined locations in (or above, in the case of deployable aerial communications architecture) each state, for periods up to approximately two years.

As shown in Table ES7-1: Summary of Potential Impacts, Deployment and Operation of the Deployable Technologies Alternative, these potential impacts would range from *no impact* to *less than significant with BMPs and mitigation measures incorporated* at the programmatic level. The exact value of operational potential impacts would depend on the type and length of time of deployable technology used.

Table ES7-1: Summary of Potential Impacts, Deployment and Operation of the Deployable Technologies Alternative

Resource Area/Type of Effect	Potential Impact [a]	
	Deployment	Operations
Infrastructure		
Transportation system capacity and safety	3	3
Capacity of local health, public safety, and emergency response services	3	3
Modifies existing public safety response, physical infrastructure, telecommunication practices, or level of service in a manner that directly affects public safety communication capabilities and response times	3	3
Effects to commercial telecommunication systems, communications, or level of service	3	3
Effects to utilities, including electric power transmission facilities and water and sewer facilities	3	3
Soils		
Soil erosion	3	3
Topsoil mixing	3	3

Resource Area/Type of Effect	Potential Impact [a]	
	Deployment	Operations
Soil compaction and rutting	3	3
Geology		
Potential Impacts to the Project		
Seismic hazard	3	3
Volcanic activity	NA	NA
Landslide	3	3
Land subsidence	3	3
Potential Impacts of the Project		
Mineral and fossil fuel resource impacts	3	3
Paleontological resources impacts	3	3
Surface geology, bedrock, topography, physiography, and geomorphology	3	3
Water Resources		
Water quality (groundwater and surface water) - sedimentation, pollutants, nutrients, water temperature	3	3
Floodplain degradation	3	4
Drainage pattern alteration	3	4
Flow alteration	4	4
Changes in groundwater or aquifer characteristics	3	4
Wetlands		
Direct wetland loss (fill or conversion to non-wetland)	3	3
Other direct effects: vegetation clearing; ground disturbance; direct hydrologic changes (flooding or draining); direct soil changes; water quality degradation (spills or sedimentation)	3	3
Indirect effects: change in function(s), change in wetland type	3	3
Biological Resources		
Vegetation		
Vegetation and habitat loss, alteration, or fragmentation	3	3
Invasive species effects	3	3
Wildlife		
Amphibians and Reptiles	3	3
Terrestrial Mammals	3	3
Marine Mammals	3	3
Birds	3	2
Bats	3	2
Invertebrates	3	3
Fisheries		
Direct injury/mortality	3	3
Vegetation and habitat/loss	3	3
Indirect injury/mortality	3	3
Migration effects	3	3
Reproductive effects	3	3
Effects of invasive species	3	3

Resource Area/Type of Effect	Potential Impact [a]	
	Deployment	Operations
Threatened and Endangered Species [b]		
Marine Mammals	2	2
Terrestrial Mammals	2	2
Birds	2	2
Reptiles	2	2
Fish	2	2
Invertebrates	2	2
Plants	2	2
Land Use, Recreation, and Airspace		
Direct land use change (site of FirstNet facility installation or deployable base)	4	3
Indirect land use change (site of FirstNet facility installation or deployable base)	4	3
Loss of access to public or private recreation land or activities	4	3
Loss of enjoyment of public or private recreation land (due to visual, noise, vibration, or other potential impacts that make recreational activity less desirable)	4	3
Use of airspace (at and near site of FirstNet facility installation or deployable base)	3	3
Visual Resources		
Adverse change in aesthetic character of scenic resources or viewsheds	3	3
Nighttime lighting (overall)	3	3
Nighttime lighting (isolated rural areas)	3	3
Socioeconomics		
Impacts to real estate (could be positive or negative)	4	3
Changes to spending, income, industries, and public revenues	3	3
Impacts to employment	3	3
Changes in population number and composition	4	4
Environmental Justice		
Effects associated with other resource areas (e.g., cultural resources) that have a disproportionately high and adverse impact on low-income populations and minority populations	3	3
Cultural Resources[c]		
Physical damage to and/or destruction of historic properties[d]	3	3
Indirect effects on historic properties (i.e. visual, noise, vibration, atmospheric)	3	3
Loss of character defining attributes of historic properties	3	3
Loss of access to historic properties	3	3
Air Quality		
Increased air emissions	3	3
Noise and Vibration		
Increased noise and vibration levels	3	3
Climate Change		
Contribution to climate change through GHG emissions	3	3
Effect of climate change on FirstNet installations and infrastructure	4	3
Human Health and Safety		

Resource Area/Type of Effect	Potential Impact [a]	
	Deployment	Operations
Exposure to worksite occupational hazards as a result of activities at existing or new project sites	3	3
Exposure to hazardous materials, hazardous waste, and mine lands as a result of project site selection and site-specific land disturbance activities	3	3
Exposure to hazardous materials, hazardous waste, and occupational hazards as a result of natural and manmade disasters	3	3

[a] Except for the evaluation of Threatened and Endangered Species and Cultural Resource, impact rating/colors are as follows (Refer to Section ES5).

1. Potentially significant
2. Less than significant with BMPs and mitigations measures incorporated
3. Less than significant
4. No impact

NA: Not applicable; resource area is not present in the FirstNet East region.

[b] Impact rating/colors for Threatened and Endangered Species:

1. May affect, likely to adversely affect (potentially significant)
2. May affect, not likely to adversely affect (less than significant with BMPs and mitigation measures incorporated)
3. No effect (no impact)

[c] Impact ratings/colors for the Cultural Resources:

1. Adverse effect (potentially significant)
2. Mitigated adverse effect (less than significant with BMPs and mitigation measures incorporated)
3. Effect, but not adverse (less than significant)
4. No effect (no impact)

[d] Categories of impacts to Cultural Resources are defined as an *adverse effect; mitigated adverse effect; effect, but not adverse;* and *no effect* are comparable to those defined in *36 CFR 800*, *Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation*, and the U.S. National Park Service's *National Register Bulletin: How to Apply the National Register Criteria for Evaluation*.

ES-7.2 No Action Alternative

Under the No Action Alternative, the NPSBN would not be deployed; therefore, there would be no associated deployment or installation of wired, wireless, deployable infrastructure, or satellites and other technologies. As a result, there would be *no impacts* at the programmatic level as a result of the No Action Alternative. Conditions would therefore be the same as those described in the Affected Environment sections of this Final PEIS.

ES-8. COMPARISON OF ALTERNATIVES

Potential impacts associated with the two Proposed Action alternatives are generally similar. Both alternatives have potential impacts whose significance ranges from *no impacts* to *less than significant with BMPs and mitigation measures incorporated* at the programmatic level, with most impacts analyzed as *less than significant* at the programmatic level. For many resources, impact ratings are identical, although some differences exist for some resource areas. For example, the Preferred Alternative would have somewhat greater potential impacts than the Deployable Technologies Alternative to floodplains, birds and bats, land use, nighttime lighting,

and real estate value. Conversely, the Deployable Technologies Alternative would have somewhat greater potential impacts than the Preferred Alternative to air resources. Both alternatives would be expected to have no potentially significant impacts at the programmatic level if BMPs and mitigation measures are incorporated in those areas discussed above that would require additional protective measures. The purpose and need of the NPSBN would not be met under the No Action Alternative.

ES-9. FINAL PEIS CONTENTS

This Final PEIS includes descriptions of the affected environment, potential impacts, and alternatives of the Proposed Action, including cumulative impacts, in each of the 13 states and The District of Columbia that comprise the East region. The structure and contents of this document have been developed consistent with NEPA requirements. The main organization of this document is as follows:

- Chapter 1: Introduction;
- Chapter 2: Description of the Proposed Action and Alternatives;
- Chapters 3 through 16: Each chapter contains a state-specific analyses of the affected environment (including descriptions of the portions of the environment that could be affected by the Proposed Action), environmental consequences (including descriptions of the potential environmental, social, historic, and cultural impacts of the Proposed Action and alternatives) and references;
- Chapter 17: Best Management Practices and Mitigation Measures;
- Chapter 18: Comparison of Alternatives;
- Chapter 19: Cumulative Impacts;
- Chapter 20: Other Required Analysis;
- Chapter 21: List of Preparers and Contributors;
- Chapter 22: Distribution List;
- Chapter 23: Glossary; and
- Appendices.

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