



DRAFT

**Environmental Assessment
Northern Border
Remote Radio Link Pilot Project
Essex and Orleans Counties, Vermont**

**U.S. Customs and Border Protection
Laguna Niguel, California**



February 2019

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**ENVIRONMENTAL ASSESSMENT
NORTHERN BORDER
REMOTE RADIO LINK PILOT PROJECT
ESSEX AND ORLEANS COUNTIES, VERMONT**

February 2019

Lead Agency:

U.S. Customs and Border Protection
24000 Avila Road, Suite 5020
Laguna Niguel, California 92677

Prepared by:

Gulf South Research Corporation
8081 Innovation Park Drive
Baton Rouge, Louisiana 70820

EXECUTIVE SUMMARY

Background and Purpose and Need

The area near the U.S./Canada International border in Vermont is extremely remote and contains dense forest and steep terrain intersected by numerous streams, lakes, and bogs. These conditions make it very difficult for U.S. Border Patrol (USBP) agents to patrol the area and communicate with each other and station personnel while on patrol. The Department of Homeland Security (DHS), Science and Technology Directorate (S&T), has developed a prototypical Remote Radio Link Project that includes the installation of a buried communications cable to enhance the communications capability and safety of Border Patrol agents who are conducting enforcement activities in these areas. U.S. Customs and Border Protection (CBP) is assisting S&T in developing this Environmental Assessment (EA) to address the proposed installation and operation of the pilot project.

The purpose of this pilot project is to determine the effectiveness of this type of remote radio link system in four-season weather. The need for the project is to identify such reliable communication methods that can enhance USBP enforcement activities and agent safety.

Proposed Action

The Proposed Action includes the installation, operation, and maintenance of a Remote Radio Link Pilot Project along the U.S./Canada International border west of Norton, Vermont. The project consists of the installation of a buried fiber-optic communication system within the International boundary, known as the Slash. The cable is proposed to be installed using a cable plow, trenchers, rock cutters, and directional drilling equipment and would extend for approximately 7 miles westward beginning about 1.5 miles west of the Norton Port of Entry. Three existing two-track access routes currently used as skidder trails would be improved to provide project access. Equipment and material would be staged during the installation phase at the existing Sugar Barn in a disturbed area that is routinely used for logging and syrup production equipment. In addition, electrical power is available at the Sugar Barn and would be used to power the fiber optic cable.

Alternatives

In addition to the No Action Alternative, two action items have been carried forward for analysis. The Full Build Alternative would be implemented for the entire 7-mile corridor. The Limited Build Alternative (Preferred Alternative) would involve installation of the cable as described above, but would be shortened in length to a total of approximately 5.5 miles. That is, the cable on the western side of Line Pond would be eliminated. The shorter amount of cable would still provide valuable information regarding the efficacy of the system and data collected from the pilot project could be used in developing similar projects in other northern regions of the United States.

Environmental Consequences

Based on review of past investigations and the Archaeological Resources Assessment prepared for the Proposed Action, no historic properties are anticipated to be adversely affected by the cable installation. Minor and temporary effects on soils, water quality, and air quality would occur during the cable installation activities. No effects on floodplains would occur although an estimated 4.9 acres of potentially jurisdictional waters of the U.S., including wetlands, are located along the project corridor. Impacts on these resources would be avoided or minimized by the use of ground protection matting, laying weighted cable on the bottom of streams or ponds with no trenching, or by conducting directional drilling. There are no activities that require dredge or fill activities anticipated for this project.

Negligible to minor impacts on vegetation communities would occur, primarily due to two-track access route clearing. Some small saplings and brush that have grown up in canopy openings may be cleared. The Slash clearing is currently maintained by the International Boundary Commission, so no additional clearing of vegetation would be required to allow for installation of the cable. Wildlife could be temporarily disturbed by the sight or noise of installation equipment. No long-term adverse impacts would be expected. Two Federally listed species, Canada lynx (*Lynx canadensis*) and northern long-eared bat (*Myotis septentrionalis*), could occur near the project corridor. Limiting the cable installation activities to daylight hours, limiting the amount of habitat disturbed, and avoiding potential roost trees that could be used by bats would minimize potential effects on these two species and result in discountable impacts.

Negligible and temporary beneficial effects would occur on socioeconomic resources as sales taxes and materials purchases would slightly increase during the project installation activities. No disproportionate impacts on minority or low-income populations, or children, would occur.

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1.0 BACKGROUND AND PROPOSED ACTION

1.1 INTRODUCTION

The Department of Homeland Security (DHS) is charged with managing, securing, and controlling the Nation's borders with a priority mission focus of preventing terrorists and terrorist weapons from entering the United States.

The U.S. Customs and Border Protection (CBP), formed in 2003 as a part of the DHS, is responsible for guarding nearly 7,000 miles of land border that the United States shares with Canada and Mexico and 2,000 miles of coastal waters. CBP's mission is to establish and maintain effective control of air, land, and maritime borders through the use of the appropriate mix of infrastructure, technology, and personnel. Border security depends on the successful implementation of personnel, intelligence, tactical infrastructure, and technology. The DHS Science and Technology Directorate (S&T) has the responsibility of investigating, developing, testing and implementing new methods and technology that would enhance CBP's ability to detect, deter, and apprehend illegal intruders.

1.2 BACKGROUND

The U.S. Border Patrol's (USBP) Swanton Sector area of responsibility (AOR) along the U.S./Canada International border in Vermont is extremely remote and contains dense forest and steep terrain intersected by numerous streams, lakes, and bogs. These conditions make it very difficult for USBP agents to patrol the area and to communicate with each other and station personnel while on patrol. DHS S&T has been investigating the utility of buried fiber-optic cable for DHS missions along both the southern and northern borders and has developed a prototypical project that includes the installation of a buried communications cable along the U.S./Canada International border near Norton Port of Entry (POE), Vermont. The cable would be in a remote area that currently has no cellular or other communications capability. The pilot system would enable USBP agent communications to be linked to other existing communication entry points, such as cellular or landline infrastructure. This would aid with USBP situational

awareness and agent safety. CBP prepared this Environmental Assessment (EA) to assess the potential effects of the pilot project.

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the project is to determine the effectiveness of this type of remote telecommunications system in a four-season northern climate. The results of this pilot project will be analyzed to determine if the project can be expanded to other areas, where improvements are needed, and if the technology provides an effective and efficient method of communicating in remote areas. The need for the project is to identify such reliable communication methods that can enhance USBP enforcement activities and agent safety.

1.4 SCOPE OF ENVIRONMENTAL ANALYSIS AND DECISION TO BE MADE

This EA analyzes the potential direct, indirect, and cumulative effects on the natural, social, economic, and physical environments that would result from the installation, operation, and maintenance of the Remote Radio Link Pilot Project within the USBP Newport Station and Beecher Falls Station's AOR (Figure 1-1).

A description of the affected environment and analysis of the potential impacts (direct, indirect, and cumulative) on physical and biological resources will be provided in Chapter 3.0 of this EA. Impacts on the following resources were identified as potential issues of concern during the internal scoping process and will be analyzed in regard to the Proposed Action and the No Action Alternative:

- Topography, Geology, and Soils
- Water Resources: Wetlands, Floodplains, and Surface Waters
- Biological Resources: Vegetation, Terrestrial, Aquatic, and Protected Species
- Air Quality
- Noise
- Socioeconomics

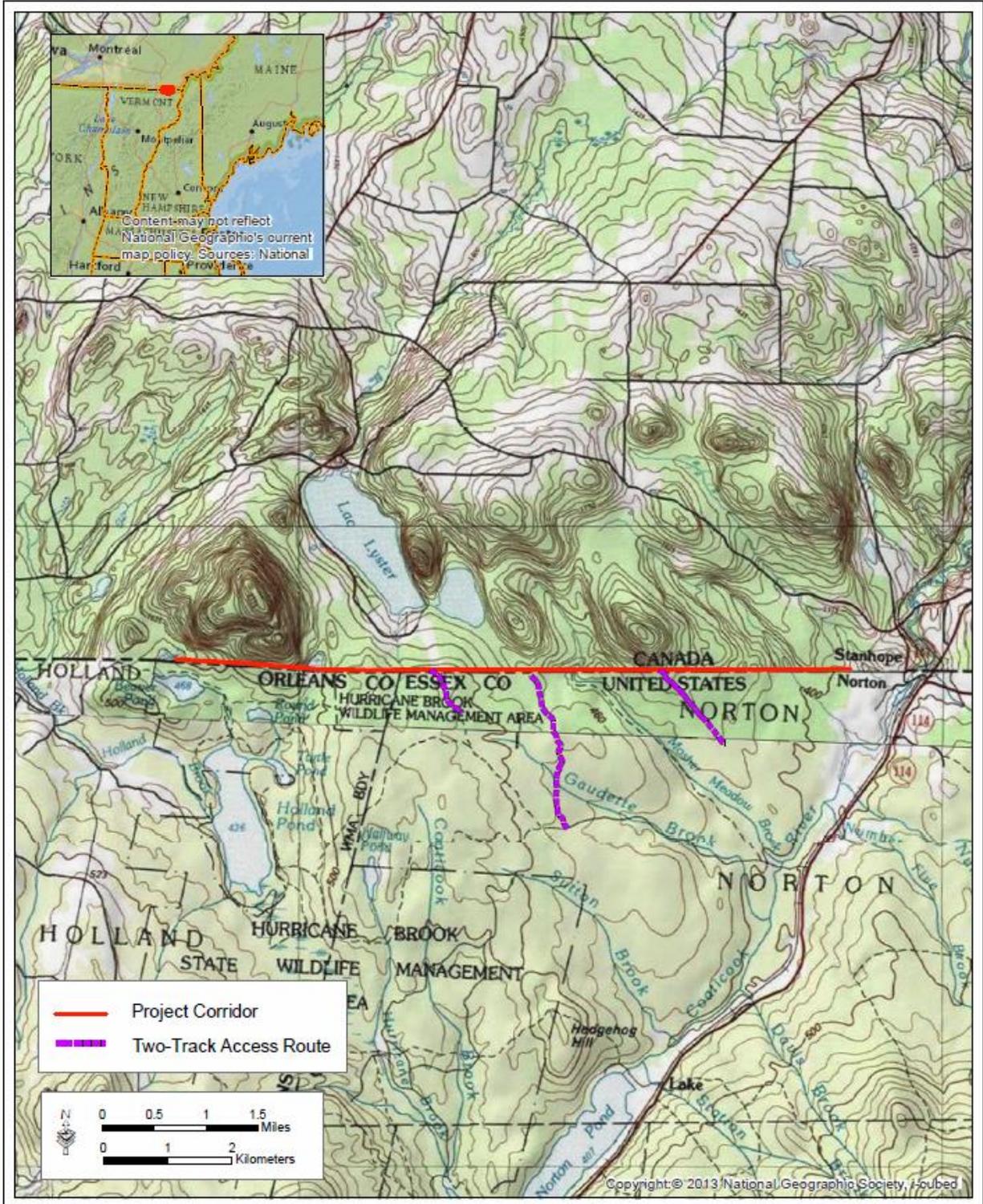


Figure 1-1. Project Vicinity Map



- Environmental Justice and Protection of Children
- Cultural Resources

This EA documents the environmental effects of the Proposed Action and considers alternative means to achieve project objectives. This EA allows decision makers to determine if the Proposed Action would or would not have a significant impact on the natural, social, and human environments, and if the Proposed Action can proceed to the next phase of project development or if an Environmental Impact Statement (EIS) is required. The EA also allows for input and comments on the Proposed Action from the concerned public and interested government agencies to assist in agency decision making.

1.5 ENVIRONMENTAL REVIEW AND CONSULTATION REQUIREMENTS

This EA was developed in accordance with the National Environmental Policy Act (NEPA), regulations issued by the Council on Environmental Quality (CEQ) published in 40 Code of Federal Regulations (CFR) Parts 1500-1508, DHS Directive 023-01, Revision Number: 01 (*Implementation of the National Environmental Policy Act*) and DHS Instruction Number: 023-01-001-01, Revision: 01 [*Instruction Manual on Implementation of the National Environmental Policy Act (NEPA)*], and other pertinent environmental statutes, regulations, and compliance requirements (Table 1-1). This EA will be the vehicle for compliance with all applicable environmental statutes, such as the Endangered Species Act (ESA) of 1973, 16 United States Code (USC) §1531 et seq., as amended, and the National Historic Preservation Act (NHPA) of 1966, 16 USC §470a et seq., as amended.

CBP issued the Final Programmatic Environmental Impact Statement (PEIS) for Northern Border Activities (“Northern Border PEIS”) (July 2012), which addressed numerous tactical infrastructure and remote surveillance systems to assist USBP in their mission to secure the borders (CBP 2012). In addition, the Northern Border PEIS preferred alternative is the Detection, Inspection, Surveillance, and Communications Technology Expansion Alternative.

Table 1-1. Summary of Guidance, Statutes, and Relevant Regulations Including Compliance Requirements

Policy Document	Administrative Authority	Invoking Action	Requirements for Compliance	Compliance Status
Archaeological Resources Protection Act of 1979 16 USC § 470 et seq.	Department of the Interior	Excavation, removal, damage, or other alteration or defacing; or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands 43 CFR 7.4	Because activities are exclusively for purposes other than the excavation and/or removal of archaeological resources, even though those activities might incidentally result in the disturbance of archaeological resources, no permit shall be required	No permit required
Clean Air Act (CAA) of 1963 16 USC § 470 et seq.	U.S. Environmental Protection Agency (USEPA)	Any Federal action where the total of direct and indirect emissions in a non-attainment area would equal or exceed the provided rates 40 CFR 51	Project emission levels were determined to be less than <i>de minimis</i> thresholds; therefore, a determination of conformity with applicable implementation plan is not required	No conformity analysis is required
Comprehensive Environmental Response, Compensation and Liability Act of 1980 42 USC § 9601 et seq.	USEPA	Release or threatened release of a hazardous substance 40 CFR 302	Development of emergency response plans, notification, and cleanup	No release is expected; therefore no plans are required
ESA of 1973 16 USC § 1531 et seq.	U.S. Fish and Wildlife Service (USFWS)	All Federal actions in which there is discretionary involvement or control potentially impacting species listed under the ESA 50 CFR 402.03	Determination of no jeopardy to listed species and no destruction or adverse modification of critical habitat through consultation with the USFWS	Informal Section 7 consultation has been initiated; no listed species are expected to be impacted.
Farmland Protection Policy Act of 1981 7 USC § 9601 et seq.	Natural Resources Conservation Service (NRCS)	Any Federal action that impacts prime or unique farmland soils 7 CFR 658	Identify and take into account the adverse effects on the protection of farmland	No prime or unique farmland soils are present in the area; therefore AD Form 1006 is not required
Federal Water Pollution Control Act of 1977 (also known as Clean Water Act [CWA]) 33 USC § 1251 et seq.	USEPA	Storage, use, or consumption of oil and oil products, which could discharge oil in quantities that could affect water quality standards, into or upon the navigable waters of the U.S. 40 CFR 112	Preparation of a Spill Prevention, Control, and Countermeasures Plan (SPCCP)	SPCCP is not required since no storage of oil products would occur on site.
Federal Water Pollution Control Act of 1977 (also known as CWA) 33 USC § 1251 et seq.	USEPA	Discharge of pollutants that could impact surface water or groundwater 40 CFR 122	Obtain a general National Pollutant Discharge Elimination System Permit	Erosion control measures and appropriate Best Management Practices, as required and promulgated through a site-specific Stormwater Pollution Prevention Plan
Federal Water Pollution Control Act of 1977 (also known as CWA) 33 USC § 1251 et seq.	USEPA, U.S. Army Corps of Engineers (USACE)	Excavation, fill or discharge of materials into wetlands 40 CFR 230 § 404	Identification of wetlands and application for permit, if necessary	Wetlands and waters of the U.S. have been identified and submitted to USACE New England District for review. CBP has committed to avoid fill or discharge into wetlands
Migratory Bird Treaty Act (MBTA) of 1918 16 USC § 703	USFWS	Any Federal action resulting in the take of any migratory bird, or the parts, nests, or eggs of such bird 50 CFR 21.11	Avoidance of take or application for permit	If clearing of vegetation occurs during breeding season; surveys would be conducted to identify active nests to be avoided
NHPA of 1966 16 USC § 470 et seq.	Advisory Council on Historic Preservation	Any Federal undertaking that could impact cultural resources 36 CFR 800.3	Assessment of effects through consultation with the Advisory Council on Historic Preservation	Archaeological Resources Assessment (ARA) has been accepted by Vermont State Historic Preservation Office and concurred that no historic properties would be affected
Occupational Health and Safety Act of 1970 29 USC § 651 et seq.	Occupational Safety and Health Administration (OSHA), Department of Labor	Employees performing in a workplace 29 CFR 1910.5 (a)	Adherence to occupational health and safety standards	Cable installation contractor would comply with all applicable OSHA regulations

Table 1-1, continued

Policy Document	Administrative Authority	Invoking Action	Requirements for Compliance	Compliance Status
Resource Conservation and Recovery Act (RCRA) of 1976 42 USC § 6901 et seq.	USEPA	Collection of residential, commercial, and institutional solid wastes and street wastes 40 CFR 243	Adherence to guidelines for waste storage and safety and collection equipment, frequency, and management	No solid waste would be generated during installation or operation of the cable
RCRA of 1976 42 USC § 6901 et seq.	USEPA	Procurement of more than \$10,000 annually of products containing recovered materials 40 CFR 247	Procure designated items composed of the highest percentage of recovered materials practicable	No recurring materials would be purchased
RCRA of 1976 42 USC § 6901 et seq.	USEPA	Recovery of resources from solid waste through source separation 40 CFR 246	Recovery of high-grade paper, residential materials, and corrugated containers	No solid waste would be generated during installation or operation of the cable
RCRA of 1976 42 USC § 6901 et seq.	USEPA	Treatment, storage, or disposal of hazardous waste on-site 40 CFR 262.10(c)	Determination of hazardous or non-hazardous nature of solid waste, obtain an USEPA identification number if necessary, properly accumulate hazardous waste, and maintain a record	No hazardous waste would be generated during installation or operation of the cable
Executive Order (EO) 11988: Floodplain Management 42 Federal Register (FR) 26,951 (May 24, 1977)	Water Resources Council, Federal Emergency Management Agency (FEMA)	Acquisition and management of Federal lands; Federally undertaken, financed, or assisted construction; conducting Federal activities affecting land use in a floodplain	Determine whether the proposed action would occur in a floodplain, then evaluate potential effects of any action in a floodplain	No floodplains would be impacted
EO 11990: Protection of Wetlands 42 FR 26,691 (May 24, 1977)	USACE, USEPA	Acquisition and management of Federal lands; Federally undertaken, financed, or assisted construction; conducting Federal activities affecting wetlands	Take action to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands	Impacts to wetlands would be avoided by drilling under streams and wetlands
EO 12898: Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations 59 FR 7629 (February 11, 1994)	USEPA	All programs or activities receiving Federal financial assistance that affect human health or the environment	Analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority communities and low-income communities	EA includes analysis of socioeconomic conditions.
EO 13045: Protection of Children from Environmental Health Risks and Safety Risks 62 FR 19883 (April 23, 1997)	USEPA	Any Federal action potentially affecting health and safety of children	Identify and assess environmental health risks and safety risks that may disproportionately affect children	EA includes analysis of socioeconomic conditions. No risks to health and safety of children were identified
EO 13423: Federal Environmental, Energy, and Transportation Management 72 FR 3919 (January 26, 2007)	USEPA, Department of Energy (DOE)	Acquisition planning, development of procurement programs, operation of a Federal facility	Incorporate waste prevention and recycling in the agency's daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products	No wastes would be generated during installation or operation of the cable
EO 13514: Federal Leadership in Environmental, Energy, and Economic Performance 74 FR 52117 (October 8, 2009)	CEQ	Construction, operation, and maintenance of a Federal facility; facility operations and worker commutes	Increase energy efficiency; measure, report, and reduce greenhouse gas emissions from direct and indirect activities; conserve and protect water resources through efficiency, reuse, and stormwater management; eliminate waste, recycle, and prevent pollution; design, construct, maintain, and operate high-performance sustainable buildings in sustainable locations	EA addresses greenhouse gases, waste and water resources issues.

According to the Record of Decision (ROD) for Northern Border Activities (April 2013), this alternative focuses on “deploying more and better technologies to support CBP’s detection, inspection, and surveillance capabilities and operational communications” and includes continuing the deployment of various technologies and plans such as fielding upgraded communications systems. The Northern Border PEIS and ROD are still considered valid.

The proposed pilot project would support those activities addressed in these documents and thus, they are incorporated herein by reference.

1.6 PUBLIC INVOLVEMENT

In accordance with 40 CFR §§1501.7, 1503 and 1506.6, S&T and CBP initiated public involvement and agency scoping activities to identify significant issues related to the proposed action. CBP is consulting and will continue to consult with appropriate local, state, and Federal government agencies throughout the EA process, including the following agencies:

Federal Agencies:

- USFWS
- USACE
- International Boundary Commission (IBC)
- National Telecommunications and Information Administration (NTIA)

State Agencies:

- Vermont Fish and Wildlife Department (VFWD)
- Vermont Department of Environmental Conservation (VDEC)
- Vermont Division for Historic Preservation

Counties:

- Essex County, Vermont
- Orleans County, Vermont

Towns/Cities:

- Town of Norton
- Town of Holland

This Draft EA will be made available for a period of 30 days for public review and comment. A Notice of Availability will be published in local and regional newspapers to announce the release of this Draft EA, which will start the public comment period. At that time, this Draft EA will be made available to Federal, state, and local agencies, to local libraries, and to the general public on CBP's website at <https://www.cbp.gov/about/environmental-cultural-stewardship/documents/docs-review>.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter discusses the Proposed Action and alternatives, and provides detail about the components of the Proposed Action. It also presents the criteria used to determine whether alternatives were reasonable and should be carried forward for analysis.

2.1 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action includes the installation, operation, and maintenance of a Remote Radio Link Pilot Project along the U.S./Canada International border. The project consists of the installation of a buried fiber-optic communication cable west of Norton, Vermont, that would travel west along the U.S./Canada International border within the Slash for approximately 7 miles (Figure 2-1). The Slash is the cleared strip of land 20 feet wide that runs between the U.S. and Canada, and is maintained by the IBC. From the Slash, the cable would be installed along an existing two-track access route to an existing Sugar Barn, which would also be used for staging equipment and materials. Electrical utilities currently at the Sugar Barn would be used to power the fiber optic cable. From the Sugar Barn, radio frequency would be used to communicate to the Beecher Falls USBP Station. A dish would be installed on the existing Sugar Barn or on the ground next to it to transmit the signal if satellite communication is needed.

The cable would be buried approximately 3 feet deep within the Slash. A trencher, vibratory cable plow, rock cutter, and directional drilling equipment would be used for the cable installation. The trench would be a maximum of 12 inches wide and would be backfilled immediately after installation of the cable. Blasting would not be required for installation of the cable. Hand holes will be installed approximately every mile. A hand hole is manufactured box (approximately 2 feet x 2 feet x 2 feet) that allows access to the cable and holds splice points. No towers, buildings, light standards, barriers, or roads would be constructed as part of this Proposed Action.

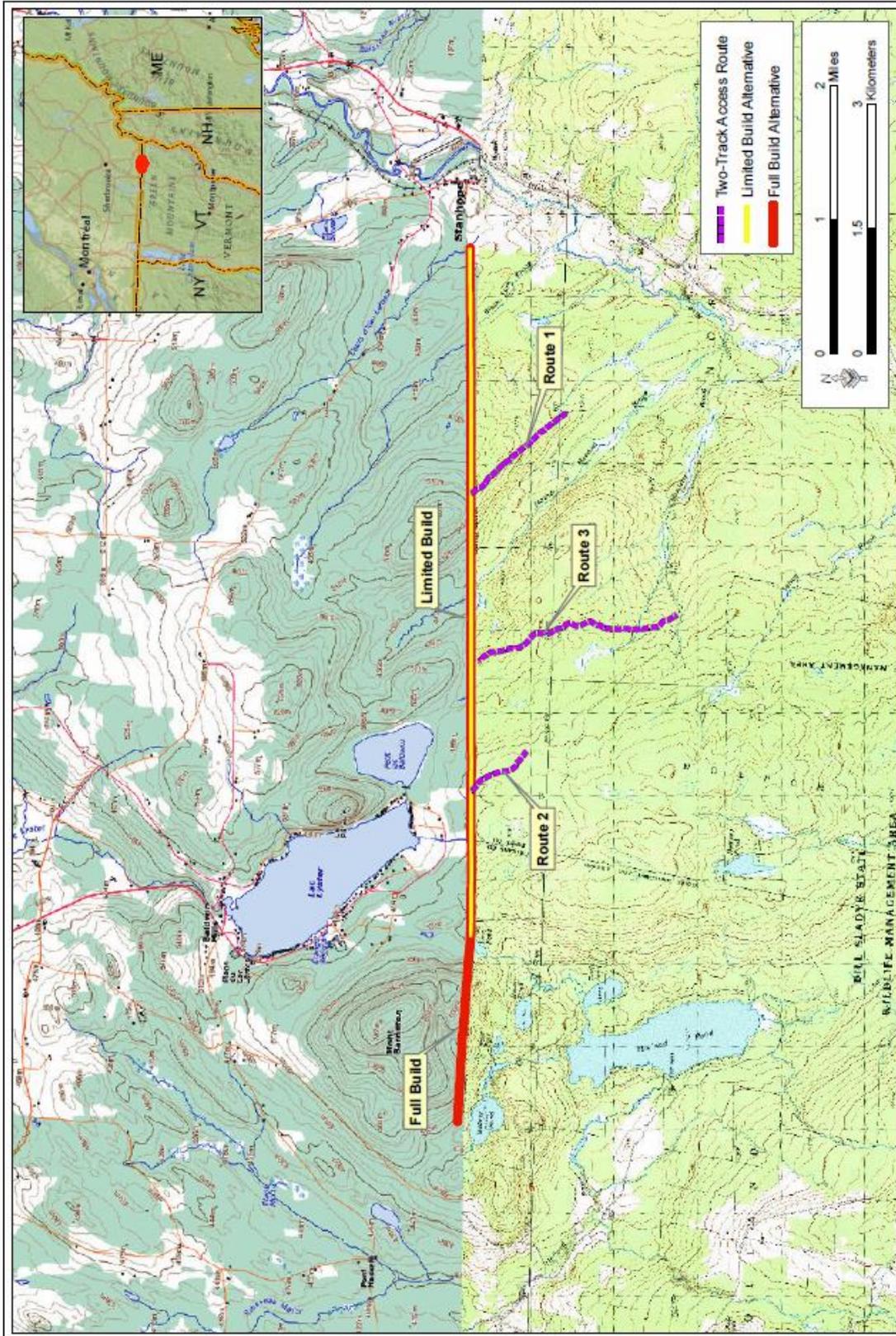


Figure 2-1. Project Corridor

Directional drilling would be used to install the cable under jurisdictional waters of the U.S, including wetlands, to the extent practicable, to avoid impacts on these resources. For larger bodies of water, the cable would be pulled across the stream/pond, weighted, and allowed to sink to the stream/pond bottom. In addition, minor clearing would only be required along two-track access routes, as described below.

A rock saw would be used for part of the installation within exposed bedrock, particularly west of Line Pond (see Figure 2-1). Once the trench is completed through exposed bedrock, the trenches would be backfilled with an epoxy. Any slurry/tailings from these activities would be contained on-site. Silt fences or other erosion control measures would be installed downslope of rock cutting activities to minimize or eliminate potential sedimentation into adjacent streams. The slurry generated by the rock cutting would be managed in a manner to reduce the potential for contamination by implementing the following measures: (1) remove the slurry pile from the installation area as soon as reasonably possible; (2) manage the interaction of rock slurry and stormwater to prevent contamination of water supply wells or surface water by installing wattles or sediment fences and covering the material with a non-permeable tarp until it can be removed; and (3) dried rock slurry would be spread on the existing gravel pad at the Sugar Barn.

The power source for the communication system would be commercial grid power that is available at the Sugar Barn.

Minor improvements to three existing two-track access routes, which are currently used as skidder trails, would consist of the removal of small saplings or brush where needed for equipment passage. Appendix A contains a description of the methods and equipment that would be used to install the fiber optic cable.

Access to the western end of the project corridor is more difficult due to the presence of a large natural pond that is situated on the border and appropriately named Line Pond. Installation of the cable west of Line Pond would require equipment to be brought around the south side of Line Pond, or more likely, to barge the equipment across the pond. A small barge would be assembled on-site from smaller modules to transport the various pieces of equipment needed to

the west bank of Line Pond. The barge would be pulled across the pond via a cable system, rather than using a motorized barge. If access is required south of the Slash in the vicinity of Line Pond, coordination with the VFWD would be required, as this land is part of the Bill Sladyk Wildlife Management Area (WMA).

As mentioned previously, a staging area would be established at the Sugar Barn. This area would be approximately 100 feet by 100 feet and would be located within a site that has been previously disturbed and used to store equipment related to logging and maple syrup operations. The staging areas would be restored to pre-project conditions once the installation is completed. Installation of the cable is expected to be completed within 6 months, beginning in the spring of 2019, after mud season. Installation activities would occur only during daylight hours, but could occur 7 days per week. Installation equipment anticipated to be used includes a vibratory cable plow, trencher, rock saw, bulldozer, 4-wheel drive trucks, and utility terrain vehicles.

Upon completion of the pilot project, CBP would evaluate whether the cable would be removed if the project was unsuccessful. Any additional potential impacts that would result from removing the cable would be addressed in supplemental NEPA analyses, as appropriate.

2.2 DESCRIPTION OF ALTERNATIVES CARRIED FORWARD FOR ANALYSIS

Two action alternatives and the No Action Alternative are carried forward for analysis, as described below.

2.2.1 Alternative 1: No Action Alternative

Under the No Action Alternative, installation of the proposed Remote Radio Link Pilot Project would not occur and current practices and procedures would continue. Communication and situational awareness would not be enhanced within the Newport Station and Beecher Falls Station's AOR. The operational efficiency (interdiction of illegal intruders) and effectiveness of the USBP would not be enhanced or understood by the data resulting from the pilot project.

The No Action Alternative serves as a baseline for the comparison of anticipated effects associated with the Proposed Action. Its inclusion in this EA is required by NEPA regulations (40 CFR 1502.14(d)).

2.2.2 Alternative 2: Full Build Alternative

The Full Build Alternative would be implemented as described previously for the entire 7-mile corridor. This area was selected due to its remoteness and the limited communications in the area. If the pilot project proves to be an effective and efficient method of enhancing communications, DHS can evaluate installation of similar projects along the northern border. Other locations along the northern border were considered in the early planning stages, but this area was deemed to be the most advantageous because of the challenging terrain and remoteness and, thus, would provide the best data with which to evaluate the pilot project.

2.2.3 Alternative 3: Limited Build Alternative (Preferred Alternative)

The Limited Build Alternative would involve installation of the cable as described above, but the cable on the western side of Line Pond would be eliminated. The total length of cable under the Limited Build Alternative would be approximately 5.5 miles. The shorter amount of cable would still provide valuable information regarding the efficacy of the system and data collected from the pilot project could be used in developing similar projects in other regions of the United States. The Preferred Alternative would result in less costs and reduced impacts on the environment.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section of the EA describes the natural and human environments that exist within the project site and region of influence (ROI), and the potential impacts of the two action alternatives and the No Action Alternative outlined previously in Section 2.0. The ROI for this project comprises Essex and Orleans counties and the immediate vicinity of the installation. Only those resources with the potential to be affected by the Proposed Action are described, per CEQ regulation (40 CFR 1501.7).

The impact analysis presented in this EA is based upon existing regulatory standards, scientific, and environmental knowledge and best professional judgment. Some topics are limited in scope due to the lack of direct effect from the proposed project on the resource, or because that particular resource is not located within the proposed project location. Resources that were identified that could be potentially impacted include geology and soils, wildlife and aquatic resources, Federally listed species, surface waters, wetlands, air quality, noise, and cultural and historic resources. These resources and the potential effects on them are described in this section.

Resources eliminated from further discussion include the following:

Noise - the installation equipment would produce noise during the installation activities; however, the only noise sensitive receptor in proximity to the slash is a golf course located in Canada. Installation activities would be short term and sporadic and ambient noise levels would return immediately upon completion of the cable installation. Further, installation would occur only during daylight hours; therefore, noise effects on wildlife would also be discountable.

Aesthetic and Visual Resources - the Proposed Action would occur within the Slash, which is already cleared/disturbed and the cable would be buried; thus, the Proposed Action would have no effects on visual resources and aesthetics.

Land Use - because the cable would be installed within the Federally managed Slash and would not require a change in the use or purpose of the Slash, no effects on land use would occur.

Utilities/Transportation - the Proposed Action would not create any new roads or increase traffic in the project corridor. The Proposed Action would also only require a negligible amount of power to operate the fiber-optic cable. Consequently, these resources were eliminated from further discussion.

Impacts (consequences or effects) can be either beneficial or adverse, and can be either directly related to the action or indirectly caused by the action. According to the CEQ regulations, direct impacts are those effects that are caused by the action and occur at the same time and place (40 CFR § 1508.8). Indirect impacts are those effects that are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable (40 CFR § 1508.8). The magnitude of adverse impacts for a given case can range from negligible to major, as described below:

- Negligible impacts have effects that would be at or below the level of detection, with no perceptible consequences.
- Minor impacts have detectable, but localized effects, with little consequences to the sustainability of the affected resources. Mitigation measures, if needed to offset adverse effects, would be simple and easily achievable.
- Moderate impacts are those with effects that are readily detectable and long-term, but localized and measurable. Mitigation measures, if required to offset adverse effects, may be greater in scope than those required for minor impacts, but would be reasonably achievable.
- Major impacts are those with effects that are obvious, long-term, and with substantial consequences on a regional scale. Mitigation measures to offset adverse effects are always required, extensive, and their success may not necessarily be guaranteed.

In addition, impacts may be classified as temporary (e.g., lasting the duration of implementation), short-term (e.g., up to 3 years), or long-term (e.g., greater than 3 years in duration). In the case of temporary impacts, Best Management Practices (BMPs) may be used to minimize the impact of proposed installation activities and operations. BMPs are designed to avoid, remedy, or reduce adverse impacts during implementation and operation of the project.

3.1 CULTURAL RESOURCES

Cultural resources can include prehistoric or historic buildings, sites, districts, objects, or structures evaluated as significant (54 USC 300308; see also National Park Service [NPS] 1990:53). Also included in the definition are significant properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization (54 USC 302706 [a]). This section describes the state of knowledge pertaining to cultural resources including previously reported archaeological sites and historic resources, as well as previously conducted research in the study corridor.

3.1.1 Affected Environment

In support of this EA, a background investigation using the Vermont Division for Historic Preservation Online Resource Center (ORC) was conducted and revealed 16 records from previous cultural resources investigations conducted within 1 mile of the proposed project corridor. Ten of the records were produced as a result of four separate projects and filed according to trinomial project numbers. Project ES-01-0013 was conducted in 1995 by the General Services Administration as part of their Historic Building Restoration Program. The project produced one record including a historic building evaluation of the Norton Land Port of Entry (LPOE) for the purpose of restoring the wooden windows. The document does not indicate whether the action to restore windows would have had an adverse effect or what became of the evaluation effort.

Project ES-03-003 was conducted in 2008 by the General Services Administration on behalf of CBP and produced four records pertaining to the assessment of potential adverse effects on cultural resources resulting from the installation of Radiation Portal Monitors at the Norton LPOE. Although the Norton LPOE main building is considered eligible for the National Register of Historic Places (NRHP), it was determined that no adverse effects would result from that proposed project.

Project ES-89-004 consisted of correspondence in 1989 between the Vermont Division for Historic Preservation and the Immigration and Naturalization Service pertaining to the

demolition of the Carpenter House, a historic building in Norton, for the construction of a new Ammex duty-free shop. The Carpenter House was most likely demolished prior to any mitigation effort. One record was produced for this project, which contains multiple articles of correspondence.

Four records were on file for project number ES-93-002. The project included a historic building evaluation to determine if adverse effects on historic resources would occur through the actions involved in rehabilitating the Norton Electric Light and Power Company Plant. The project was initiated by James A. Riendeau, who requested authorization from the Federal Energy Regulatory Commission to operate the hydroelectric facility in 1993.

Six of the records encountered in the ORC search were not associated with trinomial project numbers. Four of these records were associated with the Norton LPOE, including two surveys of the associated structures at the facility, one NRHP nomination form, and one archaeological survey report. The archaeological survey report described the results of an archaeological survey conducted by the Public Archaeology Laboratory on behalf of DHS in support of proposed improvements to the Norton LPOE. The archaeological survey included background research, an Archaeological Resources Assessment, pedestrian walkover survey, historic structure survey, and subsurface testing by way of shovel test pits. The survey found no potentially significant pre- or post-contact cultural materials as a result of the investigation and recommended no further work for the proposed project area.

The remaining two records found in the ORC search included a town file evaluating the Norton Town Hall, formerly the Norton School, and a State Register nomination form for four properties including the Lake Side Inn, Nelson Store/town clerk's office, Nelson House, and Hadlock House. All properties except for the Lake Side Inn are within 1 mile of the project area.

Additional resources accessed in support of this EA included the online National Register Information System (<http://nrhp.focus.nps.gov/natreghome.do>) and the Native American Consultation Database (NACD) (<http://www.nps.gov/nacd>). The National Register Information System revealed that no properties listed in the NRHP are located in Norton, Vermont. No

Federally recognized tribes claiming affinity to the area including Norton, Vermont, were listed in the NACD.

In the course of the background investigation for the proposed project, no records for cultural resources sites located within the proposed project area were found. In addition, no records of previous cultural resources surveys having been conducted within the proposed project corridor were found.

Two field visits of the proposed project area were conducted. The first field visit was conducted along the Slash only. The field visit confirmed what could be construed from the U.S. Geological Survey (USGS) Norton Pond OE N Quadrangle, Morgan Center OE N Quadrangle, and aerial imagery for the area. The project area is lowest in elevation, approximately 1,300 feet above mean sea level (amsl), on its eastern end, 0.8 mile east of the Norton LPOE at the edge of an agricultural field. Westward from the eastern end of the project corridor, the terrain climbs to 1,580 feet amsl at approximately 1.6 miles before descending to 1,420 feet amsl where Mosher Meadow Brook crosses the project corridor at approximately 2.7 miles. The terrain climbs again to 1,700 feet amsl at approximately 3.7 miles and descends to 1,600 feet amsl at Line Pond at 5.1 miles. Westward from Line Pond the elevation along the project corridor climbs steeply to 1,740 feet amsl approximately 750 feet west of the pond and descends again to 1,540 amsl at the project corridor's western terminus. Along this undulating terrain some sections of the Area of Potential Effect (APE) include slopes of 15 percent or greater.

Three permanent streams, Black Turn Brook, Mosher Meadow Brook, and an unnamed stream draining into Duck Pond, which are depicted on the USGS quadrangles, cross the project area, as well as the confluence of two intermittent streams. Line Pond, depicted on the USGS Morgan Center OE N Quadrangle, is located within the APE and several small ponds consisting of water trapped in bedrock depressions occur along the APE.

The first field visit additionally revealed that the ground surface within the slash includes numerous stumps, boulders, occasional exposed bedrock, bushes, and saplings. During the field

visit, no cultural resources were observed on the surface. The field visit did not include subsurface testing.

A second field visit of the proposed project area concentrated on the two-track access routes (Route 1 and Route 2). No cultural resources were observed on the surface. The second field visit also confirmed what could be interpreted from the USGS Norton Pond OE N Quadrangle, USGS Norton Pond Quadrangle, and aerial imagery for the area. Along Route 1, the two-track access route is lowest in elevation approximately 1,380 amsl on its southern end, where the two-track access route intersects the gravel road (see Figure 2-1). Northwestward, the relief increases steadily along a ridgeline on a 5 percent slope to 1,640 feet amsl at the U.S./Canada International border. For approximately 0.3 mile to the east below the ridgeline approximately 295 to 600 feet away, a small permanent stream with associated wetland areas parallels the southernmost portion of the proposed project corridor.

For Route 2, the two-track access route is lowest in elevation, approximately 1,680 feet amsl, on its southeastern end and rises at a 1 percent grade to where it reaches the U.S./Canada International border at 1,720 feet amsl. Route 2 ascends a gradual rise through hardwood forest to where it intersects with the border. Along Route 2 are two depressed areas that retain runoff, forming small isolated wetland areas. Reconnaissance of the third two-track route was not conducted by professional archaeologists, but the terrain is similar to the other two-track access routes.

The Vermont Division for Historic Preservation Environmental Predictive Model for Locating Precontact Archaeological Sites was applied separately to the APE of the 7 miles of the Slash and each of the three two-track access routes (Routes 1, Route 2, and 3). The predictive model is based on environmental and landform variables that have indicated high, moderate, or low potential for archaeological sites to be present. As a result of application of the predictive model, the project area was found to be archaeologically non-sensitive.

In summary, few archaeological surveys have occurred in the area, no archaeological sites have been previously reported, and historic resources consist of buildings related to the Norton LPOE,

which are outside of the proposed project area. The terrain is rugged, with ascents and descents of rocky hillslopes interspersed with stream crossings, bogs, and ponds. Application of the Vermont Division for Historic Preservation Environmental Predictive Model for Locating Precontact Archaeological Sites resulted in scores that would suggest that the proposed project corridor and the two-track access routes are archaeologically non-sensitive.

3.1.2 Environmental Consequences

3.1.2.1 Alternative 1. No Action Alternative

Under the No Action Alternative, there would be no effects on cultural resources.

3.1.2.2 Alternative 2. Full Build Alternative

No cultural resources have been previously reported within the proposed Full Build Alternative project corridor. Application of the Vermont Division for Historic Preservation Environmental Predictive Model for Locating Precontact Archaeological Sites determined that the project corridor is archaeologically non-sensitive. Additionally, if unanticipated cultural resources are encountered during installation activities of the proposed Full Build Alternative, the contractor would stop all ground-disturbing activities in the vicinity of the discovery until a qualified archaeologist is notified and the nature and significance of the find can be evaluated per 54 USC 306108. If human remains are encountered during project activity, all work will cease immediately and CBP will follow its Standard Operating Procedure Post-Review Discovery of Cultural Materials or Human Remains. The Vermont State Police would be notified first. Then CBP would notify the Vermont Division for Historic Preservation and appropriate tribal organizations would be consulted per the Native American Graves Protection and Repatriation Act of 1990. As a result, no cultural resources would be adversely affected by the proposed Full Build Alternative.

Since no ground disturbance is expected for any of the two-track access routes, no impacts on cultural resources are anticipated along these routes.

3.1.2.3 *Alternative 3. Limited Build Alternative (Preferred Alternative)*

The Limited Build Alternative project corridor consists of a portion of the Full Build Alternative project corridor and would have similar environmental consequences if executed. As a result, no cultural resources would be adversely affected by the proposed Limited Build Alternative. If human remains are encountered during project activity, all work will cease immediately and CBP will follow its Standard Operating Procedure Post-Review Discovery of Cultural Materials or Human Remains, as noted above.

3.2 GEOLOGY AND SOILS

3.2.1 Affected Environment

3.2.1.1 *Geology*

The surficial geology of the project region consists of the Averill pluton, a Devonian-period granite of the Paleozoic Era. A pluton is an intrusive body of igneous rock. Most granites of Vermont are assigned to the New Hampshire Plutonic Series. The suite extends the entire length of the state from the Black Mountain pluton in Dummerston, to Averill in northeastern Vermont (Conrad and Vanacek 1990). The Averill granite was originally formed as a mudstone, and was melted in the Acadian orogeny between 400 and 340 million years before present (Doolan 1996). The Averill can be described as grayish-white to pink, medium- to coarse-grained, two-mica granite, with subporphyritic texture (Schroder 1921). The Averill granite forms an irregularly shaped pluton covering approximately 75 square miles in the northwest corner of Vermont and across the U.S./Canada International border into Quebec (Myers 1964). All of Vermont was impacted by the imprint of the glacial periods, and the project region is no different. As the glaciers retreated from Vermont roughly 13,000 years ago, they left a barren tundra-like landscape with north-south trending ridges and valleys. Gouged-out, low-lying areas became ponds and bogs, while the upland areas began to develop soil horizons and accompanying vegetation as seen today (Bazilchuck and Stimbeck 1999).

3.2.1.2 Soils

Figure 3-1 depicts the mapped soil units present within the project region. A map unit represents an area dominated by one or more major soil types, and is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape; however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Soil units along and adjacent to the project corridor are mapped by the U.S. Department of Agriculture, NRCS as described in Table 3-1.

Table 3-1. Soil Units Within or Adjacent to the Project Corridor

Map Unit	Map Unit Name	Description
12C	Tunbridge-Lyman complex, 8 to 15 percent slopes, very rocky	The Tunbridge series consists of moderately deep, well-drained soils on glaciated uplands. They formed in loamy supraglacial till. The Lyman series consists of shallow, somewhat excessively drained soils on glaciated uplands.
12D	Tunbridge-Lyman complex, 15 to 35 percent slopes, very rocky	See above.
SIE8	Wonsqueak, Pondicherry, and Bucksport mucks, 0 to 2 percent slopes	The Wonsqueak series consists of very deep, very poorly drained soils that formed in a mantle of well-decomposed organic soil material over loamy mineral material. They are in depressions in glaciated uplands and lowlands, and on floodplains. The Bucksport series consists of very deep, very poorly drained soils that formed in well-decomposed organic soil material more than 130 centimeter thick. They are in depressions in glaciated uplands and lowlands, and on floodplains.
SIE11	Cabot silt loam, 0 to 8 percent slopes, very stony	The Cabot series consists of poorly drained soils that formed in loamy lodgment till on glaciated uplands and lowlands. They are shallow to dense substratum and very deep to bedrock.
SEI12	Cabot-Colonel complex, 8 to 15 percent slopes, very stony	The Cabot series consists of poorly drained described above. The Colonel series consists of somewhat poorly drained soils that formed in loamy lodgment till on hills and mountains in glaciated uplands. They are shallow to a dense substratum and very deep to bedrock.
SIE21	Wilmington-Colonel complex, 0 to 8 percent slopes, very stony	The Wilmington series consists of poorly drained soils that formed in loamy lodgment till on hills and mountains in glaciated uplands and lowlands. They are shallow to a dense substratum and very deep to bedrock. The Colonel series consists of somewhat poorly drained soils as described above.
SIE41	Tunbridge-Peru-Wilmington complex, 0 to 8 percent slopes, very stony	The Tunbridge series consists of moderately deep, well-drained soils as described above. They formed in loamy superglacial till. The Peru series consists of moderately well drained soils that formed in loamy lodgment till on hills and mountains in glaciated uplands. They are moderately deep to a dense substratum and very deep to bedrock. The Wilmington series consists of poorly drained soils as described above.

Table 3-1, continued

Map Unit	Map Unit Name	Description
SIE42	Tunbridge-Colonel-Cabot complex, 8 to 15 percent slopes, very stony	The Tunbridge series consists of moderately deep, well-drained soils as described above. The Colonel series consists of somewhat poorly drained as described above. The Cabot series consists of poorly drained soils as described above.
SIE43	Tunbridge-Peru-Colonel complex, 15 to 35 percent slopes, very rocky	The Tunbridge series consists of moderately deep, well-drained soils as described above. The Peru series consists of moderately well drained soils as described above. The Colonel series consists of somewhat poorly drained soils as described above.

Source: NRCS 2017

The Farmland Protection Policy Act of 1980 and 1995 was established to preserve the Nation’s farmland. Section 7 of CFR Part 657.5 defines Prime Farmlands as having the best combinations of physical and chemical properties to be able to produce fiber, animal feed, and food and are available for these uses. They have the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. None of the soil units along the project corridor have been classified by the NRCS as Prime Farmland.

3.2.2 Environmental Consequences

3.2.2.1 *Alternative 1. No Action Alternative*

No ground-disturbing activities would occur as a result of this alternative. Therefore, the No Action Alternative would have no direct impacts, whether beneficial or adverse, on the local rocks and soils.

3.2.2.2 *Alternative 2. Full Build Alternative*

The Full Build Alternative would have a minor impact on soils and geology in the project area, resulting in some impacts along the buried fiber-optic cable installation areas. All slurry generated from rock cutting and directional drilling would be removed from project areas and disposed of properly. Rock and soils along the project area would be stockpiled adjacent to the trench for reuse as backfill after the fiber-optic cable is installed, and BMPs would be implemented to reduce off-site sediment loss resulting in negligible and temporary impacts.

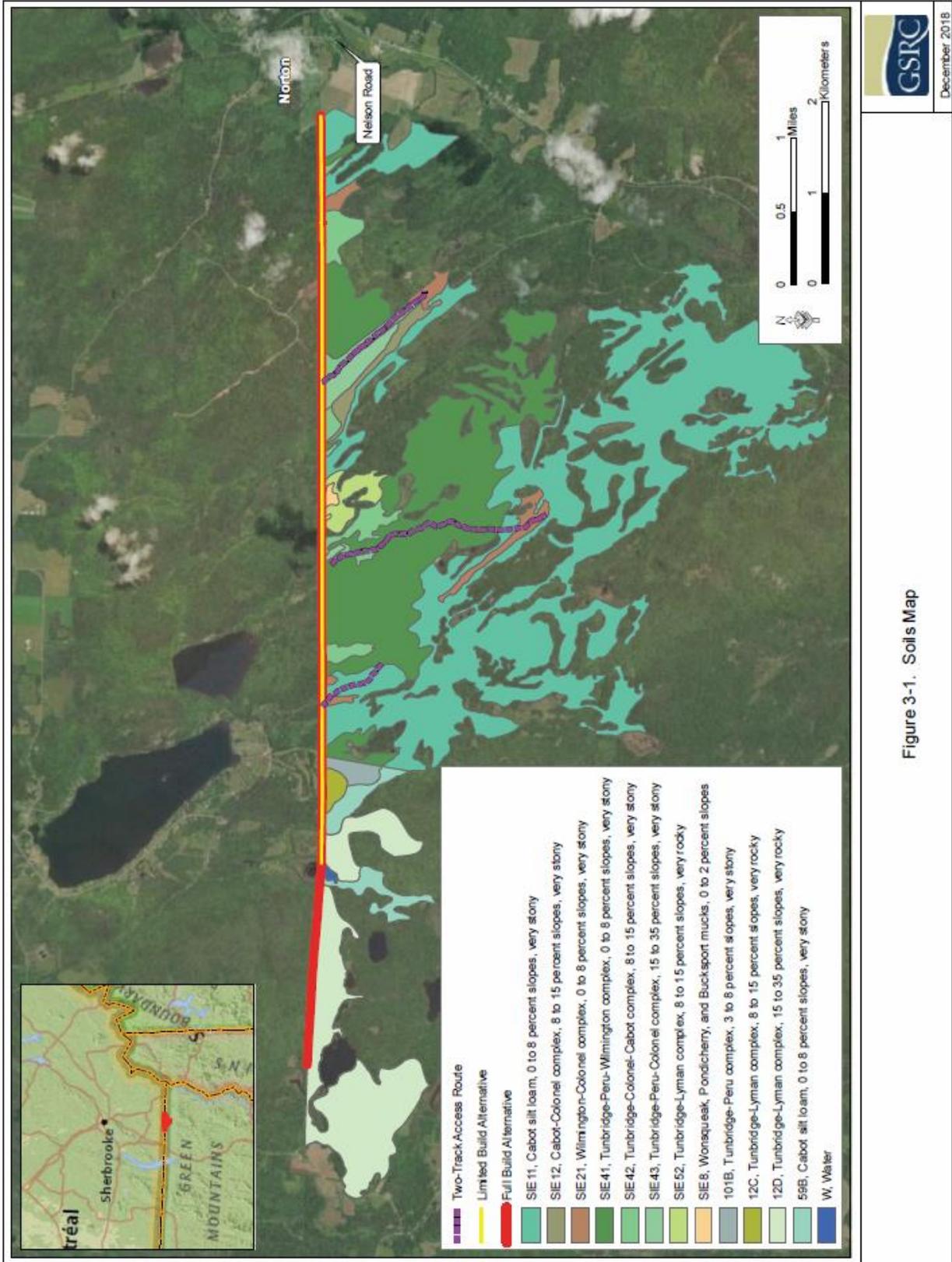


Figure 3-1. Soils Map

Upon completion of the cable installation, all temporary disturbance areas would be allowed to revegetate naturally. There are no Prime Farmlands in the proposed project corridor, and, thus, the Farmland Protection Policy Act is not applicable.

3.2.2.3 *Alternative 3. Limited Build Alternative (Preferred Alternative)*

Under the Limited Build Alternative, the Remote Radio Link Pilot Project would stop on the west edge of Line Pond, approximately 7,500 feet short of the Full Build Alternative. The Limited Build Alternative would avoid laying fiber-optic cable through rather steep and rocky terrain west of Line Pond. All other environmental consequences would be the same as the Full Build Alternative.

3.3 HYDROLOGY AND WATER QUALITY

3.3.1 Affected Environment

Groundwater

Vermont's dependence on groundwater is considerable, with most population centers relying on water wells for their drinking water supply and industries. Gale et al. (2009) mapped the locations of 92,315 water wells based on data provided by the VDEC, Water Supply Division, the groundwater regulatory agency for the state. Of those mapped wells, the mean yield was 13.76 gallons per minute and the mean depth drilled was 293.02 feet. Due to the absence of occupied dwellings along and immediately adjacent to the project corridor, its relative remoteness, and the absence of productive shallow groundwater strata due to the intrusive igneous geology of the region, there are no water wells in the immediate vicinity of the proposed project corridor.

Surface Water

The CWA §303[d][1][A] requires that each state monitor surface waters and compile a "303[d] List" of impaired streams and lakes. A watershed is a distinct land area that drains into a particular waterbody, either through channelized flow or surface runoff. The Vermont Agency of Natural Resources (ANR) leads a team of state agencies that has state oversight of Vermont Water Quality Standards and has divided the state into 17 separate watershed basins for planning

and monitoring purposes. ANR has conducted water quality assessment and improvement efforts at a watershed level since the 1970s (ANR 2012). The project corridor is located in the Lake Memphremagog Drainage Basin (Basin 17), which includes the following sub-basins:

- Coaticook River
- Tomifobia River
- Lake Memphremagog
- Clyde River
- Barton River
- Black River

Basin 17 encompasses a total of 687 square miles, of which 489 square miles (71 percent) are in Vermont and 198 square miles (29 percent) are in Quebec, Canada. Although much more of the watershed is in the United States, about three-quarters of the lake water is in Canada. The eastern portion of the project is located in the Coaticook River sub-basin and the western portion is in the Tomifobia River sub-basin. Multiple ponds, lakes, and streams feed these two rivers and both flow in a northerly direction across the U.S./Canada International border. These two sub-basins are located in the Northeastern Highlands biophysical region of Basin 17 (ANR 2015).

The eastern end of the project corridor begins just west of an unnamed stream flowing south into the Coaticook River. Black Turn Brook and Meadow Brook, both of which flow south towards their confluence in the Coaticook River, are located approximately 0.75 mile and 1.75 miles west of the eastern terminus of the project corridor, respectively. The Tomifobia River sub-basin begins approximately 4 miles west of the eastern terminus of the project corridor (Goodwin 1963). Line Pond, which straddles the U.S./Canada International border, is located approximately 5.5 miles west of the eastern starting point of the project corridor. As mentioned previously, several smaller unnamed drainages cross the project corridor (Figure 3-2).

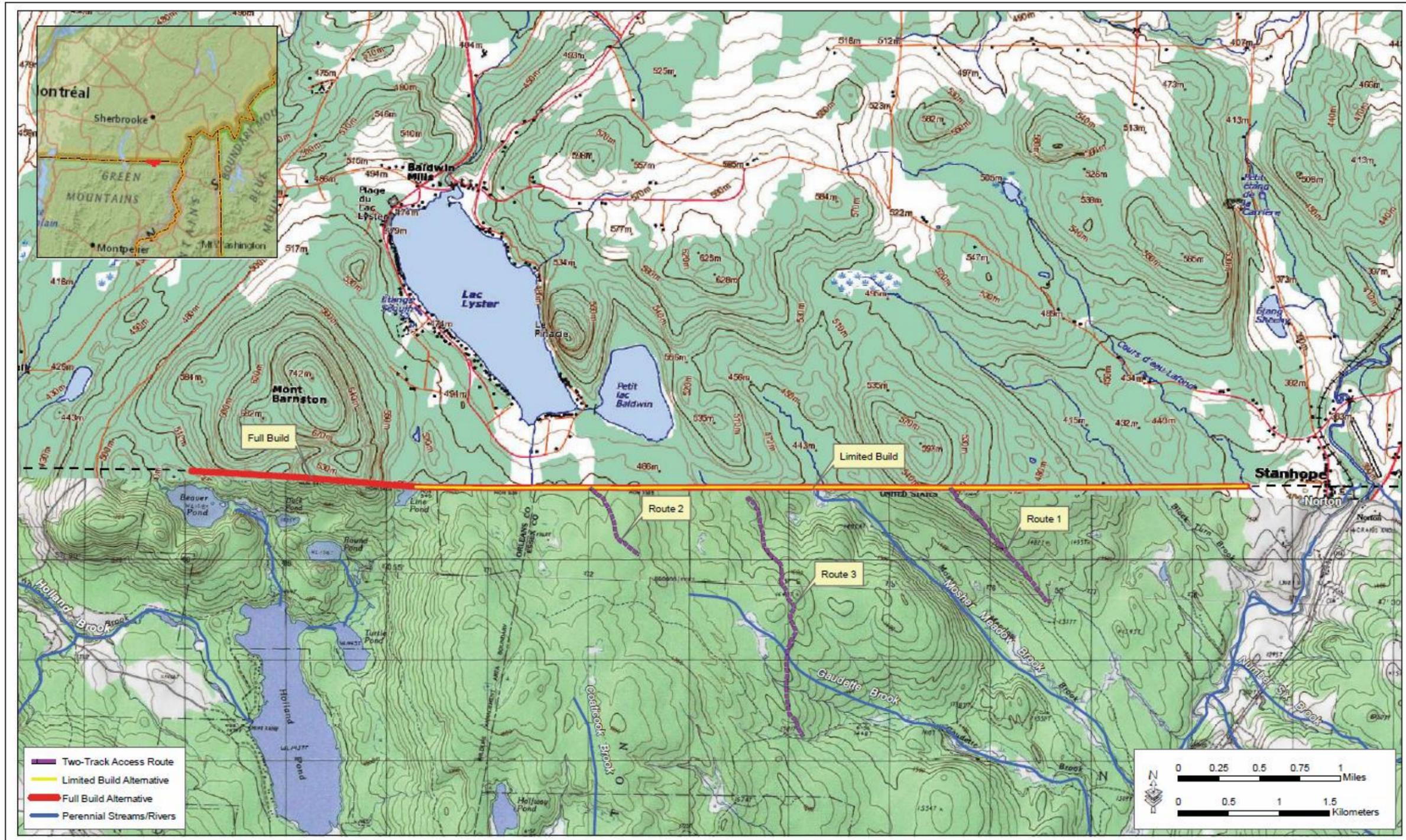


Figure 3-2. Surface Water Features along the Project Corridor



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Total Maximum Daily Load (TMDL) is a regulatory term in the CWA, describing a plan for restoring impaired waters that identifies the maximum amount of pollutant that a body of water can receive while still meeting water quality standards. Vermont ANR categorizes their ponds and streams in four levels:

1. Part B (impaired TMDL not required)
2. Part D (impaired with approved TMDL)
3. Part E (altered exotic species)
4. Part F (altered flow regulation)

All of the streams listed above are currently categorized by Vermont ANR as Part D streams (ANR 2016). None of the streams in the project corridor are listed in the most recent 303(d) List of Impaired Waters – Surface Waters In Need of TMDL (ANR 2016). However, Line Pond is listed by ANR as an “Acid Impaired Pond” (ANR 2012).

If more than 1 acre of soil would be disturbed, a Construction Stormwater General Permit would be obtained prior to the cable installation, and this would require approval of a site-specific Stormwater Pollution Prevention Plan (SWPPP). A site-specific SPCCP would also be in place prior to the start of installation. BMPs outlined in these plans would reduce potential migration of soils, oil and grease, and construction debris into local surface waters. Once the installation is complete, the temporary construction footprints would be allowed to revegetate naturally, which would mitigate the potential for non-point source pollution to enter local surface waters.

Floodplains

A floodplain is the area adjacent to a river, creek, lake, stream, or other open waterway that is subject to flooding when there is a major rain event. Floodplains are further defined by the likelihood of a flood event. If an area is in a 100-year floodplain, there is a 1 percent chance in any given year that the area would flood. FEMA is responsible for identifying floodplains and flood risk zones. The project corridor has yet to be mapped (FEMA 2017), presumably due to the remoteness and lack of development in the region.

Wetlands

Wetlands are a subset of waters of the U.S. that may be subject to regulation under Section 404 of the CWA (40 CFR 230.3). Wetlands are defined as “areas that are inundated or saturated 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” (40 CFR 230.3). The *1987 Corps of Engineers Wetland Delineation Manual* and the *2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* follow a three-parameter approach to defining a wetland (Environmental Laboratory 1987, USACE 2012). A site must contain hydric soils, wetland hydrology, and a dominance of hydrophytic vegetation in order to be considered a wetland.

Approximately 4.9 acres of jurisdictional wetlands were delineated within the project corridor. These wetlands were located in multiple natural communities including northern hardwood forest, seeps, alder shrub swamp, and dwarf shrub bog.

Activities that result in the dredging and/or filling of waters of the U.S., including wetlands, are regulated under Sections 404 and 401 of the CWA. However, there are no dredging or filling activities anticipated for this project.

3.3.2 Environmental Consequences

3.3.2.1 Alternative 1. No Action Alternative

No ground-disturbing activities would occur as a result of this alternative. Therefore, the No Action Alternative would have no direct impacts, whether beneficial or adverse, on the local streams, ponds, lakes, and rivers. No changes in the current status of groundwater or floodplains would occur.

3.3.2.2 Alternative 2. Full Build Alternative

The Full Build Alternative would have temporary, minor, and localized impact on stream crossings in the project corridor. Directional drilling would be used at all stream crossings, including some of the major streams such as Black Turn Brook and Mosher Meadow Brook, to

avoid disturbances to these streams. Consequently, no long-term water quality impact would be expected. No changes in the current status of groundwater or floodplains would occur.

Although there are 4.9 acres of wetlands within the project corridor, not all of the wetlands would necessarily be impacted. CBP currently proposes to use directional drilling techniques to install the cable below the surface and under the wetland or stream; another method considered is to just lay the cable with weights, along the bottom of streams or ponds (see Appendix A). Neither of these methods would have impacts on wetlands. Additionally, specialized ground protection matting would be employed in order to distribute the weight of heavy equipment over a greater surface area, thereby reducing the amount of disturbance in wetlands and streams. However, at this time, the areas where such techniques would be used have not been determined. If none of the wetlands could be avoided, it is estimated that a maximum of 0.29 to 0.59 acre would be impacted. If it is determined during the installation that wetlands would be modified, CBP would obtain CWA Section 404 and 401 permits prior to disturbance on these resources. It is anticipated that any such activities, if necessary, would be authorized under Nationwide Permit (NWP) 12. Through the permitting process, all necessary mitigation would be obtained and would ensure a no net loss of wetlands. S&T and CBP has coordinated with state and Federal agencies regarding the wetlands located within the project corridor and followed the guidance provided in EO 11990 and 11988 in an effort to minimize impacts on wetlands and floodplains.

Border infrastructure is best applied directly along the border and there was no other feasible location. Therefore, the Full Build Alternative would be in compliance with both EO 11990 and EO 19988, and impacts on wetlands would be considered minor.

3.3.2.3 *Alternative 3. Limited Build Alternative (Preferred Alternative)*

Under the Limited Build Alternative, the Remote Radio Link Pilot Project would stop on the eastern side of Line Pond, approximately 7,500 feet short of the Full Build Alternative. All other environmental consequences would be the same as the Full Build Alternative. No changes in the current status of groundwater or floodplains would occur.

Cable installation within wetland areas would be accomplished by one of two methods depending upon the size (width) of the wetland: (1) directional drilling or (2) laying weighted cable on bottoms of wetland with no burial. Consequently, no impacts on waters of the U.S., including wetlands would occur. A maximum of 0.52 acre of impact would occur if no wetlands could be avoided. Laying the cable in wetlands may be considered a “fill” activity; however, there would be no adverse effect on the wetland’s function, extent, or quality, and the activity would be authorized under a NWP 12.

3.4 AIR QUALITY

3.4.1 Affected Environment

Air quality is defined by ambient air concentrations of specific pollutants determined by the USEPA to be of concern related to the health and welfare of the general public and the environment. The primary pollutants of concern are called “criteria pollutants” and include carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), suspended particulate matter with a diameter less than or equal to 10 micrometers (PM-10), fine particulate matter with a diameter less than or equal to 2.5 micrometers (PM-2.5), and lead (Pb). Under the CAA, the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) for these pollutants (USEPA 2016a). These standards represent the maximum allowable atmospheric concentrations that may occur while ensuring protection of public health and welfare, with a reasonable margin of safety. Short-term standards (1-, 8-, and 24-hour periods) are established for pollutants contributing to acute health effects, while long-term standards (quarterly and annual averages) are established for pollutants contributing to chronic health effects. NAAQS, which are presented in Table 3-2, represent the maximum levels of background pollution that are considered safe, and within an adequate margin of safety, to protect the public health and welfare. The VDEC has adopted the NAAQS, but also has promulgated Hazardous Ambient Air Standards that regulate over 290 hazardous air contaminants.

In addition to the ambient air quality standards for criteria pollutants, national standards exist for hazardous air pollutants, which are regulated under Section 112(b) of the 1990 CAA

Amendments. The National Emission Standards for Hazardous Air Pollutants regulate hazardous air pollutant emissions from stationary sources (40 CFR Part 61). Hazardous air pollutants emitted from mobile sources are called Mobile Source Air Toxics; these are compounds emitted from highway vehicles and non-road equipment (including project equipment) that are known or suspected to cause cancer or other serious health and environmental effects.

Areas that do not meet NAAQS standards are called nonattainment areas; areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR Parts 51 and 93) specifies criteria or requirements for conformity determinations for Federal projects. The Federal Conformity Final Rule was first promulgated in 1993 by the USEPA, following the passage of Amendments to the CAA in 1990. The rule mandates that a conformity analysis must be performed when a Federal action generates air pollutants in a region that has been designated a nonattainment or maintenance area for one or more NAAQS.

A conformity analysis is the process used to determine whether a Federal action meets the requirements of the General Conformity Rule. It requires the responsible Federal agency to evaluate the nature of a Proposed Action and associated air pollutant emissions, and calculate emissions as a result of that Proposed Action. If the emissions exceed established limits, as presented in Table 3-2, the proponent is required to implement appropriate mitigation measures.

The project site is located in Essex and Orleans counties, both of which are classified as in attainment (USEPA 2017). In fact, the VDEC (2017) claims that “Vermont’s air quality is often considered to be among the best in the nation.” VDEC’s Air Quality and Climate Division (AQCD) monitors air quality throughout the state and provides current and forecasted air quality indices in several different regions of the state. The current and projected air quality index for the northern region of the state is good (Vermont AQCD 2017).

Table 3-2. NAAQS

Pollutant	Primary/ Secondary	Averaging Time	Level	Form
CO	primary	8 hours	9 parts per million (ppm)	Not to be exceeded more than once per year
CO	primary	1 hour	35 ppm	Not to be exceeded more than once per year
Pb	primary and secondary	Rolling 3-month average	0.15 µg/m ³ ⁽¹⁾	Not to be exceeded
NO ₂	primary	1 hour	100 parts per billion (ppb)	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
NO ₂	primary and secondary	1 year	53 ppb ⁽²⁾	Annual Mean
O ₃	primary and secondary	8 hours	0.070 ppm ⁽³⁾	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution				
PM-2.5	primary	1 year	12.0 µg/m ³	Annual mean, averaged over 3 years
PM-2.5	secondary	1 year	15.0 µg/m ³	Annual mean, averaged over 3 years
PM-2.5	primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
PM-10	primary and secondary	24 hours	35 µg/m ³	98th percentile, averaged over 3 years
PM-10	primary and secondary	24 hours	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
SO ₂	primary	1 hour	75 ppb ⁽⁴⁾	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
SO ₂	secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m³ as a calendar quarter average) also remain in effect.

(2) The level of the annual NO₂ standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed 1 October 2015, and effective 28 December 2015. The previous (2008) O₃ standards additionally remain in effect in some areas. Revocation of the previous (2008) O₃ standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO₂ standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO₂ standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous SO₂ standards (40 CFR §50.4(3)). A SIP call is a USEPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the require NAAQS.

Source: USEPA 2016a: <https://www.epa.gov/criteria-air-pollutants/naaqs-table>

3.4.2 Environmental Consequences

3.4.2.1 Alternative 1. No Action Alternative

Under the No Action Alternative, no project activity would occur and, thus, no effects on the ambient air quality within the airshed would occur.

3.4.2.2 Alternative 2. Full Build Alternative

Under the Full Build Alternative, temporary, minor increases in air pollution would occur from the use of cable installation equipment (combustion emissions) and the disturbance of soils (fugitive dust) during installation work related to equipment and material transportation, and cable installation. Criteria pollutant and greenhouse gas emissions from proposed activities are expected to result from the following sources:

- Direct emissions from project equipment (non-road equipment)
- Indirect emissions from commuting workers and delivery vehicles (on-road vehicles).

All air emissions associated with this project would be short-term and temporary, occurring only during cable installation or during transportation of personnel, equipment, and material. Thus, the proposed installation activities would not be expected to exceed Federal *de minimis* thresholds, based on professional judgement and experience of past similar CBP installation projects. Since the two affected counties are both in attainment and the emissions would be below the *de minimis* thresholds, the Proposed Action would not require a Conformity Determination. Upon project completion, ambient air quality is assumed to return to its current state.

3.4.2.3 Alternative 3. Limited Build Alternative (Preferred Alternative)

Under Alternative 3, impacts on air quality would be similar to those described for the Full Build Alternative. However, the amount of the emissions would be less, since the installation activities would be reduced by eliminating the portion west of Line Pond.

3.5 WILDLIFE AND HABITAT

3.5.1 Affected Environment

3.5.1.1 Vegetation

The proposed corridor lies within the Northern Vermont Piedmont (NVP) and Northeastern Highlands (NH) biophysical regions on the northern border of Vermont (Thompson 2002). The NH and eastern NVP regions have a diverse structural topography due to the igneous activity

that typified the historical geological formation of the area, as well as the effect of the glacial periods on landforms. This varied topography led to the establishment and current presence of a large number of natural communities within the project area, including boreal forests and wetlands such as dwarf shrub bogs and alder swamps (Thompson 2002). Much of the corridor is intersected by creeks, beaver ponds, and steep rock outcroppings. The various habitat types located along the project corridor are described in the following paragraphs.

Boreal Outcrops and Cliffs

Cliffs and rocky outcrops are steep, open areas where vegetative growth is sparse. The acidic nature of the primarily granitic bedrock, as well as the lack of soil on the rock faces, creates a nutrient-poor substrate for plant growth. Within the area surrounding the project corridor, this habitat type is scattered due to glacial activity, and typically surrounded by boreal forests such as the Spruce-Fir complex. Species that grow on the cliffs and outcrops are usually represented within the surrounding communities, though their maximum size is limited due to the poor growth conditions on the rock faces (Thompson and Sorenson 2005). Characteristic plant species include red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), bush-honeysuckle (*Diervilla lonicera*), harebell (*Campanula rotundifolia*), and hay-scented fern (*Dennstaedtia punctilobula*).

Lowland Spruce-Fir Forest

Though this habitat type is described as ‘Lowland,’ it is common throughout the cold, high elevation regions of Vermont, including NVP and NH. It is often found in valleys and commonly adjoins the wetlands of these high elevation areas. Though typified by red spruce and balsam fir, the vegetative composition of these forests is highly variable, with common species including white pine (*Pinus strobus*), yellow birch (*Betula alleghaniensis*), tamarack (*Larix laricina*), hobblebush (*Viburnum alnifolium*), intermediate wood fern (*Dryopteris intermedia*), and bunchberry (*Cornus canadensis*). In nearby disturbed areas, pin cherry (*Prunus pensylvanica*), quaking aspen (*Populus tremuloides*), and balsam poplar (*Populus balsamifera*) are found as early-successional species (Thompson and Sorenson 2005).

Northern Hardwood Forest

The Northern Hardwood Forest is the most extensive forest habitat type within Vermont, and is part of a larger community formation that ranges from Wisconsin east to Maine, and into southeastern Canada. These forests are characterized by moderate soil moisture levels, broad-leaved deciduous trees, and ephemeral springtime species at the herbaceous level. Variations in species composition are caused by differences in climate, topography, bedrock, and past land use (Thompson and Sorenson 2005). Characteristic species include sugar maple (*Acer saccharum*), yellow birch, American beech (*Fagus grandifolia*), eastern hemlock (*Tsuga canadensis*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), hobblebush, Christmas fern (*Polystichum acrostichoides*), intermediate wood fern, and sarsaparilla (*Aralia nudicaulis*). Invasive exotic species are often prevalent in areas of disturbed hardwood forest and include Tartarian honeysuckle (*Lonicera tatarica*), Japanese barberry (*Berberis thunbergii*), and common buckthorn (*Rhamnus cathartica*).

Alder Swamp

Alder shrub swamps have over 25 percent shrub canopy cover and little to no presence of trees, and can occur in various environments including basins with high soil moisture content and lake margins. This is the most common shrub-dominant wetland that is found in Vermont. These communities are often found on areas once used for agriculture. Though some alder swamps may persist as a stable community, evidence suggests that many are mid-successional stages of the conversion of land from agricultural fields to forested wetlands (Thompson and Sorenson 2005). Speckled alder (*Alnus incana*) is the dominant canopy species of alder swamps, with associated shrub or small tree species including pussy willow (*Salix discolor*), black willow (*Salix nigra*), red-osier dogwood (*Cornus sericea*), red maple, smooth alder (*Alnus serrulata*), and poison sumac (*Toxicodendron vernix*). The herbaceous layer is a variable mixture of sedges (e.g., tussock sedge [*Carex stricta*]), grasses (e.g., bluejoint grass [*Calamagrostis canadensis*]), and fern species such as cinnamon fern (*Osmunda cinnamomea*). Sphagnum moss (*Sphagnum* spp.) species are commonly found within these swamps.

Dwarf Shrub Bog

This habitat type is one of a number of bogs or peatlands found in northern Vermont that are characterized by highly acidic and nutrient-poor soils, near-permanent or permanent saturation of the upper soil layer, and dominance of sphagnum mosses, as well as other moss species. Peat is a soil type that consists of partially decomposed organic matter, and is present in wetlands with anaerobic conditions where plant growth rates are greater than decompositional rates. Dwarf shrub bogs have particularly acidic soils and the conditions within these bogs cause significant buildup of peat layers over time. They occur in both isolated basins with poor drainage and as part of larger wetland complexes (Thompson and Sorenson 2005). Sphagnum mosses (e.g., *Sphagnum capillifolium*, *Sphagnum fuscum*, *Sphagnum magellanicum*) cover much of the area of these bogs, with few scattered tree and shrub individuals found throughout. Woody vegetative cover is typified by low-growing, dense but scattered areas of heath shrubs. Associated species include black spruce (*Picea mariana*), tamarack, leatherleaf (*Chamaedaphne calyculata*), bog laurel (*Kalmia polifolia*), and small cranberry (*Vaccinium oxycoccus*), as well as rare species such as the white-fringed orchid (*Habenaria blephariglottis*).

The dominant tree and shrub species found within the project area during 2015 and 2016 surveys by Gulf South Research Corporation (GSRC) were steeplebush (*Spiraea tomentosa*), sugar maple, balsam fir, white cedar (*Thuja occidentalis*), red spruce, and speckled alder. Though varied across the project corridor, the species composition of the vegetative understory was characterized by New York fern (*Thelypteris noveboracensis*), tawny cottongrass (*Eriophorum virginicum*), Virginia strawberry (*Fragaria virginiana*), hairy cat ear (*Hypochaeris maculatum*), and white clover (*Trifolium repens*).

3.5.1.2 Wildlife

The communities that exist around the project corridor provide habitat for a wide variety of animal species. Typical mammal species in this region include the eastern cottontail (*Sylvilagus floridanus*), snowshoe hare (*Lepus americanus*), mink (*Mustela vison*), red squirrel (*Tamiasciurus hudsonicus*), northern flying squirrel (*Glaucomys sabrinus*), North American deer mouse (*Peromyscus maniculatus*), eastern chipmunk (*Tamias striatus*), masked shrew (*Sorex cinereus*), northern bog lemming (*Synaptomys borealis*), beaver (*Castor canadensis*), porcupine

(*Erethizon dorsatum*), black bear (*Ursus americanus*), eastern bobcat (*Lynx rufus*), and white-tailed deer (*Odocoileus virginianus*) (Thompson and Sorenson 2005).

Bird species found within the habitat types around the project corridor reflect the boreal nature of the region. Ravens (*Corvus corax*) and peregrine falcons (*Falco peregrinus*) may be found nesting on open rock outcrops and cliff faces. Species found within the alder shrub swamps and dwarf shrub bogs include the alder flycatcher (*Empidonax alnorum*), rusty blackbird (*Euphagus carolinus*), Lincoln's sparrow (*Melospiza lincolnii*), swamp sparrow (*Melospiza georgiana*), veery (*Catharus fuscescens*), gray catbird (*Dumetella carolinensis*), common yellowthroat (*Geothlypis trichas*), yellow warbler (*Setophaga petechial*), and American woodcock (*Scolopax minor*). Common loons (*Gavia immer*) are rare in Vermont, but could be present on Line Pond. Additionally, the various wetlands along the project corridor offer suitable habitat for the state-endangered spruce grouse (*Falcapennis canadensis*), as well as the gray jay (*Perisoreus canadensis*) and black-backed woodpecker (*Picoides arcticus*).

Birds of the northern Vermont hardwood forests are generally considered common boreal species, or are dispersed across the entire Northern Hardwood Forest formation of the northeastern United States and Canada. These species include rose-breasted grosbeak (*Pheucticus ludovicianus*), hermit thrush (*Catharus guttatus*), ovenbird (*Seiurus aurocapillus*), red-eyed vireo (*Vireo olivaceus*), eastern wood-pewee (*Contopus virens*), scarlet tanager (*Piranga olivacea*), black-and-white warbler (*Mniotilta varia*), black-throated blue warbler (*Setophaga caerulescens*), and blue jay (*Cyanocitta cristata*). The black-backed woodpecker and gray jay also nest in the interiors of these forests. The northern conifer forests contain many of the same species, as well as supporting yellow-bellied flycatchers (*Empidonax flaviventris*), blackpoll warblers (*Setophaga striata*), ruby-crowned kinglets (*Regulus calendula*), and, less commonly bay-breasted warblers (*Setophaga castanea*) and boreal chickadees (*Poecile hudsonicus*).

Amphibians are relatively prevalent in the areas around the project corridor compared to other boreal ecosystems, due to the numerous wetland communities and complexes present, as well as vernal pools that exist within the large expanses of hardwood forest. Vernal pools are ephemeral

wetlands that rapidly inundate and dry out after spring rains in the northeast. They support unique plant and animal species that are adapted to this brief period of soil saturation and inundation. Species found in these forests and along creeks include the redback salamander (*Plethodon cinereus*), spotted salamander (*Ambystoma maculatum*), northern two-lined salamander (*Eurycea bislineata*), dusky salamander (*Desmognathus fuscus*), spring salamander (*Gyrinophilus porphyriticus*), eastern newt (*Notophthalmus viridescens*), and wood frog (*Lithobates sylvaticus*). Within the various wetland communities, commonly found species include the spotted salamander, wood frog, pickerel frog (*Lithobates palustris*), and gray treefrog (*Hyla versicolor*), as well as the rare four-toed salamander (*Hemidactylium scutatum*). Reptiles potentially found in the habitats intersected by the project corridor include the northern red-bellied snake (*Storeria occipitomaculata*) and less commonly, the spotted turtle (*Clemmys guttata*).

3.5.1.3 Threatened and Endangered Species

The ESA requires that a discretionary Federal action not put into jeopardy the continued existence of a listed species and not destroy or adversely modify its critical habitat. A review of the USFWS Information, Planning, and Conservation (IPaC) System report two mammals and a bivalve that are threatened and have the potential to occur in the project area, Canada lynx (*Lynx canadensis*), northern long-eared bat (*Myotis septentrionalis*), and dwarf wedgemussel (*Alasmidonta heterodon*) (USFWS 2017a and 2017b). Table 3-3 provides a description of the species listed in Essex and Orleans counties and their preferred habitat.

Table 3-3. Federally Listed Threatened or Endangered Species Known to Occur in Essex and Orleans Counties, Vermont

Species	Federal Status	State Status	Habitat
Dwarf wedgemussel <i>Alasmidonta heterodon</i>	Endangered	Endangered	Connecticut River – main channel
Canada lynx <i>Lynx canadensis</i>	Threatened	Endangered	Conifer and mixed forests with high snowshoe hare densities
Northern long-eared bat <i>Myotis septentrionalis</i>	Threatened	Endangered	Various forest habitats; winter in caves and abandoned mines

Source: VFWD 2015

These species are also state-listed as endangered (VFWD 2015). In addition, there are a total of six fishes, two amphibians, six reptiles, eight mammals, 13 birds, one amphipod, 10 freshwater mussels, three beetles, and three bees listed as threatened and endangered by the VFWD that have the potential to occur within Essex and Orleans counties. A more detailed description of the three Federally listed species is given below.

The Canada lynx is a medium-sized cat that ranges across the United States and Canada and is Federally listed as threatened in both Orleans and Essex counties (USFWS 2017a, USFWS 2017b). Canada lynx is commonly associated with boreal forests habitats, where snowshoe hares (prey species; *Lepus americanus*) are in abundance (NatureServe 2015a, USFWS 2017c). They are characterized by having large paws, long ear tufts, long legs, a black-tipped tail, and grizzled brownish-gray (winter coat) to reddish gray-brown (summer coat) pelage (Meaney and Beauvais 2004, NatureServe 2015a, USFWS 2017c). Threats to the Canada lynx are habitat loss and fragmentation, decline in snowshoe hare populations, and overharvesting (NatureServe 2015a). The Canada lynx is an endangered species that may occur in the project area, with anecdotal reports of sightings by USBP agents.

The northern long-eared bat (also known as the northern myotis), is a small bat that is light brown and has a longer tail, larger wings, and a longer tragus (NatureServe 2015c, USFWS 2017e) than other species at this genus. Its range includes the majority of the eastern United States and Canada. During hibernation, the northern long-eared bat roosts in caves and abandoned mines and moves to boreal forests during the spring and summer where it roosts in decaying hardwood trees and artificial structures (Arroyo-Cabrales and Álvarez- Castañeda 2008, Caceres and Barclay 2000, NatureServe 2015c, 2017 USFWS 2017e). The northern long-eared bat's diet is primarily focused on moths, but it may also eat other insects and can vary with the geographic locations (Caceres and Barclay 2000). This bat uses a gleaning technique to capture food items and has been shown to use echolocation calls that are short in duration, high in frequency and low in intensity (Faure 1993). The major threats to this species are timber harvesting, insecticides, and disturbance in caves while hibernating (Arroyo-Cabrales and Álvarez- Castañeda 2008).

The dwarf wedgemussel is found strictly in the United States in Atlantic coast drainages (Cummings and Cordeiro 2011, NatureServe 2015b, USFWS 2017d). It is Federally listed and state-listed in Essex County, east of the project corridor. The dwarf wedgemussel is characterized as a small freshwater mussel that is sutrapezoidal in shape, has reversed lateral hinge teeth, and has a brown or yellowish-olive color (Cummings and Cordeiro 2011, NatureServe 2015b, USFWS 2017d). It is found in a variety of creeks and rivers of moderate current that have mixed sand, pebble, gravel, and clay or silty sand substrates (Cummings and Cordeiro 2011, NatureServe 2015b, USFWS 2017d). This mussel is a long-term brooder and uses fish as host species, as is typical of most mussels (NatureServe 2015b, USFWS 17d). Declines in population are due to damming and channelization of rivers, siltation, destruction of habitat, and pollution (USFWS 1993).

No Federally protected species were observed during the surveys; however, the area does support suitable habitat for the Canada lynx. Some small communities of mature trees were observed adjacent to the Slash that could potentially provide resting habitat for northern long-eared bats. The streams/creeks that traverse the Slash do not provide suitable habitat that would support the dwarf wedgemussel. In addition, there is no designated critical habitat for any Federally protected species occurring within the Project Area.

3.5.2 Environmental Consequences

3.5.2.1 *Alternative 1. No Action Alternative*

There would be no impacts on vegetation, wildlife, or protected species within the project area, as the Proposed Action would not be implemented.

3.5.2.2 *Alternative 2. Full Build Alternative*

Native vegetation may have to be cleared on the edges of the two-track access routes to allow for equipment access and could be considered permanent impacts. The primary habitat type that would be impacted would be Northern Hardwood Forest. Although the vegetation clearing along the two-track access routes would slightly increase the width of the routes, the increase would not exacerbate habitat fragmentation near the project corridor. Since the proposed activities would occur primarily within the Slash, negligible to minor impacts would occur on vegetative

communities. The Slash is routinely maintained by IBC to demarcate the International boundary and, thus, no forest communities occur within the corridor. Some bogs and emergent herbaceous communities do occur within the Slash. Cable installation activities may impact these communities; these communities would be expected to naturally recover to pre-project conditions within 1 to 2 years. Specialized ground protection matting would be deployed during installation activities conducted in bogs to minimize disturbance to these communities (see Appendix A).

There is a potential for mortality of individual wildlife found in the project corridor during cable installation activities. These mortalities are most likely to involve slow-moving animal species that take cover in leaf litter or upper soil layers, such as the masked shrew, spotted turtle, and various salamander species. However, the small number of individuals that would potentially be lost during installation activities would not affect the population viability of any species. Prior to implementation of the construction activities, surveys for nesting birds would occur in compliance with the MBTA. Any active nests identified would be avoided or permits would be obtained to transfer the eggs/chicks to a rehabilitation center. Noise generated by the project equipment could disturb some wildlife species and disrupt breeding rituals, particularly for birds. These effects would be temporary and would last only a few days within each segment. Once cable installation activities are completed, ambient noise levels would return to pre-installation levels. The Proposed Action would have no adverse impacts on long-term sustainability of populations of the boreal species of northeastern Vermont.

Of the three Federally listed species listed in the counties of Essex and Orleans, only the northern long-eared bat and Canada lynx have the potential to be impacted by the Proposed Action. No additional habitat loss or habitat fragmentation that would affect Canada lynx would occur as a result of the proposed cable installation. Individual lynx would avoid the project corridor during cable installation. Any potential effects would be further minimized since the installation activities would occur during daylight hours only.

The northern long-eared bat roosts in dead trees within boreal forest ranges during the summer months and is inactive during most of the day. Surveys of mature trees adjacent to the two-track

access routes would be conducted to ensure that no potential roost trees are felled. No such trees were recorded during previous surveys. Cable installation activities would be temporary and occur during daylight hours only. Therefore, CBP has determined that both of these species may be affected, but not adversely affected, under the Alternative 2.

3.5.2.3 *Alternative 3. Limited Build Alternative (Preferred Alternative)*

Under the Limited Build Alternative, the Remote Radio Link Pilot Project would stop on the west side of Line Pond. Impacts on vegetation communities, wildlife, and protected species would be similar to those described under the Full Build Alternative, but at even less magnitude. Under the Limited Build Alternative wildlife populations within the Bill Sladyk WMA would not be affected.

3.6 SOCIOECONOMICS

3.6.1 Affected Environment

3.6.1.1 *Socioeconomics*

This socioeconomics section provides a brief overview of the socioeconomic environment in the area around the Proposed Action. The ROI for socioeconomics includes Essex and Orleans counties in Vermont.

Population data, shown in Table 3-4, provide an overview of the socioeconomic environment in the ROI. The estimated 2016 population in Essex and Orleans Counties was 6,176 and 26,863, respectively. The only U.S. community in the vicinity of the Proposed Action is the town of Norton, in Essex County, which has an estimated population of 147. The populations in Vermont, Essex and Orleans counties, as well as the town of Norton, declined from 2010 to 2016, compared to an average annual increase of 0.7 percent for the United States during the same time period. Minorities account for a relatively low percentage of the population within the ROI, and the region has a much lower minority population than the United States.

Table 3-4. Population in ROI

Geographic Area	2016 Population*	Average Annual Growth Rate 2010 to 2016 (Percent)	Minority Population (Percent)
Essex County	6,176	-0.3%	4.1
Orleans County	26,863	-0.2%	4.3
Norton, Vermont	147	-2.2%	0.7
Vermont	624,594	-2.7%	6.4
United States	323,127,513	0.7%	37.7

Source: U.S. Census Bureau 2010, 2016a, and 2017a;

*As of July 1, 2016; except the population of Norton, Vermont, which is the 2011-2015 five-year American Community Survey estimate

The median household income for Vermont is slightly greater than the United States median household income; however, the median household income in the ROI counties is well below the United States and Vermont (Table 3-5). The percentage of the population living in poverty (15.0 percent and 15.5 percent for Essex and Orleans Counties, respectively) is greater than the poverty rate for Vermont (11.5 percent) and similar to the U.S. poverty rate, which is also 15.5 percent (Table 3-5).

Table 3-5. Income, Labor Force, and Unemployment in ROI

Geographic Area	Median Household Income	Median Household Income as a Percent of U.S.	All Ages in Poverty (Percent)	Civilian Labor Force	Unemployment Rate (2016 Annual Average)
Essex County	\$36,599	68	15.0	2,962	5.9
Orleans County	\$42,831	79	15.5	12,889	5.2
Norton, Vermont	\$32,500	60	11.6	70	NA
Vermont	\$55,176	102	11.5	345,689	3.3
United States	\$53,889	100	15.5	158,897,824	4.9

U.S. Census Bureau 2016b and Bureau of Labor Statistics 2017a and 2017b

Bureau of Labor Statistics (BLS) data show that the 2016 annual average unemployment rates for Essex and Orleans Counties (5.9 and 5.2 percent, respectively) are well above the average annual unemployment rates for Vermont (3.3 percent) and the United States (4.9 percent) (BLS 2017a and 2017b).

3.6.1.2 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by President Clinton on February 11, 1994. It was intended to ensure that proposed Federal actions do not have disproportionately high and adverse human health and environmental effects on minority and low-income populations and to ensure greater public participation by minority and low-income populations.

Analysis of demographic data on race and ethnicity and poverty provides information on minority and low-income populations that could be affected by the proposed actions. Minority populations include those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or Other. Poverty status is used to define low-income. Poverty is defined as the number of people with income below poverty level, which was \$24,755 for a family of four in 2016, according to the U.S. Census Bureau (U.S. Census Bureau 2017b). A potential disproportionate impact may occur when the minority in the study area exceeds 50 percent or when the percent minority and/or low-income in the study area are meaningfully greater than those in the region.

Table 3-6 presents U.S. Census data showing minority population and poverty rates for the ROI.

Table 3-6. Minority and Poverty in ROI

	Minority Population (Percent)	All Ages or Races in Poverty (Percent)
Essex County	4.1	15.0
Orleans County	4.3	15.5
Norton, Vermont	0.7	11.6
Vermont	6.4	11.5
United States	37.7	15.5

Sources: U.S. Census Bureau 2016a and 2016b

3.6.1.3 Protection of Children

EO 13045 requires each Federal agency “to identify and assess environmental health risks and safety risks that may disproportionately affect children” and “ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental

health risks or safety risks.” This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults. The potential for impacts on the health and safety of children is greater where projects are located near residential areas. There are no residential areas or schools in the vicinity of the Proposed Action. The closest residences to the project corridor are approximately 0.4 mile away.

3.6.2 Environmental Consequences

3.6.2.1 Alternative 1: No Action Alternative

Under the No Action Alternative, there would be no project activity or changes to the land. As a result, there would be no socioeconomic impacts, and no disproportionately high adverse human health, economic, or social effects on minority or low-income populations or children.

3.6.2.2 Alternative 2: Full Build Alternative

The Full Build Alternative would have negligible adverse impacts on socioeconomic conditions in the region. The project region is remote and very sparsely populated. The closest residence to the project corridor is approximately 0.4 mile south of the eastern end of the project corridor. There is a golf course located north of the international boundary in Canada. While parts of the fairways are adjacent to the Slash, the clubhouse and other structures are approximately 0.4 mile north of the project corridor.

Other than the golf course and the Bill Sladyk WMA, there are no sensitive noise receptors close enough to the project corridor to be impacted by the temporary cable installation noise or the minimal additional traffic that could be associated with the project. Minor beneficial impacts may occur if fuel or materials are purchased from nearby towns or if local workers are hired.

3.6.2.3 Alternative 3: Limited Build Alternative (Preferred Alternative)

Potential socioeconomic effects expected under Alternative 3 would be similar to those described for Alternative 2. Because of the reduced length of the project corridor under Alternative 2; however, the magnitude of any beneficial or adverse effects would be reduced as well.

The ROI counties and the town of Norton are neither high minority nor high poverty, and there are no residences near the proposed project. As a result, there would be no disproportionately high adverse human health, economic, or social effects on minority or low-income populations. With no children living in the vicinity of the Proposed Action, there would be no environmental health or safety risks that could disproportionately affect children.

3.7 CUMULATIVE IMPACTS

This section of the EA defines cumulative impacts, identifies past, present, and reasonably foreseeable projects relevant to cumulative impacts, and analyzes the potential cumulative impacts associated with the implementation of the Preferred Alternative and other projects/programs planned within the ROI of Orleans and Essex counties.

3.7.1 Definition of Cumulative Impacts

The CEQ defines cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR § 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time by various agencies (Federal, state, or local) or individuals. CEQ guidance on cumulative effects requires the definition of the scope of the other actions and their interrelationship with the Preferred Alternative (CEQ 1997). The scope must consider geographic and temporal overlaps with the Preferred Alternative and all other actions occurring within the ROI. Informed decision making is served by consideration of cumulative impacts resulting from activities that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

This cumulative impacts analysis summarizes expected environmental effects from the combined impacts of past, current, and reasonably foreseeable future activities affecting any part of the human or natural environments impacted by the Preferred Alternative. Activities were identified for this analysis by reviewing CBP and USBP documents, news/press releases, and published

media reports, and through consultation with planning and engineering departments of local governments and state and Federal agencies.

3.7.2 Past Impacts Within the Region of Influence

The ROI is predominantly rural, although there are a few larger population centers located along Interstate 91 and U.S. Highway 3. The predominant land use is timber production and agriculture (including maple syrup production), and while the land in the ROI is generally not developed, it has been disturbed. The ecosystems within the ROI have been impacted by historical and ongoing activities, such as maintenance of the Slash, agricultural development and construction and maintenance of roads and recreational areas, including snowmobiling trails and ski resorts. All of these actions have, to a greater or lesser extent, contributed to several ongoing impacts to the ecosystem, including loss and degradation of habitat for both common and rare wildlife and plants.

3.7.3 Current and Reasonably Foreseeable DHS and Reasonably Foreseeable DHS Projects Within and near the Region of Influence

USBP has conducted law enforcement actions along the border since its inception in 1924 and has continuously transformed its methods as new missions, modes of operations of illegal intruders, agent needs, and national enforcement strategies have evolved. Development and maintenance of CBP station and sector facilities, detention facilities, and the use of roads and trails have impacted wildlife habitat, with synergistic and cumulative impacts on soil, wildlife habitats, water quality, and noise. Beneficial effects, too, have resulted from the construction and use of these facilities, including, but not limited to, increased employment and income for border regions and its surrounding communities and increased knowledge of the biological communities and prehistory of the region through numerous biological and cultural resources surveys and studies.

Recent, ongoing, and reasonably foreseeable proposed actions would result in cumulative impacts; however, the cumulative impacts would not be significant. CBP is currently planning, is conducting, or has completed several projects in the USBP Swanton Sector, including the following:

- Construction of a new Swanton Border Patrol Station in Highgate, Vermont
- Installation of dynamic light-emitting diode signage at the LPOE in Highgate Springs, Vermont
- Renovations of the Norton LPOE and the USBP Norton Station

According to the Regional Plan for the Northeast Kingdom (Northeastern Vermont Development Association 2015), there are a few major development plans anticipated within the ROI including a new hotel and resort complex at Burke Mountain, a new biotechnology facility in Newport, an \$8.8 million expansion of the Northeast Kingdom International Airport in Coventry, a new 15,000-square-foot indoor recreation center at the Jay Peak ski resort. Each of these projects would occur primarily within areas that are currently developed.

A summary of the anticipated cumulative impacts relative to the Preferred Alternative is presented below. The discussion is presented for each of the resources described previously. Impacts on each resource were analyzed according to how other actions and projects within the ROI might be affected by the Proposed Action under both action alternatives. Impacts can vary in degree or magnitude from a slightly noticeable change to a total change in the environment.

3.7.4 Cumulative Analyses

3.7.4.1 Cultural Resources

A major impact could occur if an action resulted in adverse effects on cultural resources, specifically historic properties. The Full Build Alternative and the Limited Build Alternative (Preferred Alternative) would not affect cultural resources or historic properties in the region. The developments proposed by CBP and the local governments would be anticipated to occur within areas that have been previously disturbed or developed, as mentioned above. Therefore, neither alternative, when combined with other existing and proposed actions in the region, would result in major cumulative impacts on cultural resources or historic properties.

3.7.4.2 Geology and Soils

A major impact on soils would occur if the action exacerbates or promotes long-term erosion, if the soils are inappropriate for the proposed project and would create a risk to life or property, or

if there would be a substantial reduction in agricultural production or loss of prime farmland soils. The action alternatives and other CBP actions would not substantially reduce prime farmland soils or agricultural production regionally, since there is no prime farmland along the project corridor and other CBP activities in the region have not previously developed or disturbed prime farmland soils. Other developments within Orleans and Essex counties would also disturb soils; most of these would be expected to occur on soils that have also been previously disturbed since they are expansion projects or adjacent to other developments. There would not be a permanent loss of soils or geological features associated with either of the action alternatives; therefore, the minor disturbances associated with the proposed action, when combined with past and proposed actions in the region, would not be considered a major cumulative adverse effect.

3.7.4.3 Groundwater, Surface Water, Waters of the U.S., and Floodplains

A major impact on water resources would occur if an action causes a substantial reduction in groundwater or surface water availability or quality, loss of waters of the U.S., including wetlands, or changes to flows within a floodplain. Although the other developments within the ROI would be expected to increase demands on groundwater or surface water supplies, no groundwater withdrawals are expected to result from either of the action alternatives; therefore, there would be no additional cumulative effects. Drainage patterns of surface waters would not be impacted by the Full Build Alternative or Limited Build Alternative, and water quality would be temporarily affected during project activities. Some temporary impacts on potentially jurisdictional waters of the U.S. and wetlands would occur; however, Section 404/401 permits would be obtained prior to any impacts on these resources, if necessary, and that process could involve mitigation or compensation. Therefore, a no net loss of wetlands would be achieved and no cumulative impacts would occur on waters of the U.S. and wetlands. As mentioned previously, specific BMPs would be in place during the project as standard operating procedures. Neither the Full Build Alternative nor the Limited Build Alternative would have impacts on flows within the floodplain. Other state, local, or private developments would require applicable permits that would prevent cable installation within floodplains, or provide mitigation. Thus, no cumulative impacts would occur on floodplains. Therefore, neither alternative, in conjunction

with other past, ongoing, and proposed regional projects, would have a major cumulative effect on water resources in the region.

3.7.4.4 Air Quality

A major impact would occur if emissions from the project, combined with emissions generated by other regional activities, created a violation of NAAQS or caused the airshed to be designated as non-attainment. The emissions generated during the installation and all associated two-track access route improvements would not exceed Federal *de minimis* thresholds and would be short-term and negligible. There would be no long-term increase in vehicular traffic in the region's airshed. While other construction activities in the ROI would contribute to air emissions, these activities are 20 to 30 miles from the project corridor and would be temporary, and the region is within attainment for all priority pollutants. Therefore, neither the Full Build Alternative nor the Limited Build Alternative, when combined with other past, ongoing, and proposed actions in the region, would result in major adverse cumulative impacts on the region's air quality.

3.7.4.5 Wildlife and Habitat

A major impact on natural resources would occur if a substantial reduction in ecological processes, communities, or populations would threaten the long-term viability of a species or result in the substantial loss of a sensitive community that could not be offset or otherwise compensated. Vegetative habitat disturbance would be negligible and occur primarily along the three two-track access routes. Any disturbance within the Slash would be short-term and the extant vegetation would be expected to re-establish. The wildlife habitat present in the project corridor is both locally and regionally common. Noise effects on wildlife populations would be temporary and negligible, occurring only during the installation activities. Temporary and discountable effects on Canada lynx and northern long-eared bats could occur. These potential effects would be further reduced by limiting installation activities to daylight hours only and ensuring that no potential roosts trees are removed along the two-track access routes. Development proposed throughout the remainder of the ROI would occur primarily within areas that are currently developed. Thus, neither alternative would create an adverse cumulative effect on vegetation communities, wildlife populations, or protected species in the region.

3.7.4.6 Socioeconomics and Environmental Justice

No adverse direct impacts would occur on socioeconomics or environmental justice issues as a result of the Full Build Alternative or Limited Build Alternative. Installation of the cable would have temporary cumulative beneficial impacts on the region's economy due to temporary employment and sales taxes generated through the purchase of project-related items such as fuel and food. The other developments in the ROI would create beneficial effects such as temporary and permanent employment, increased sales taxes, and increased land value, as well as negative effects such as increased traffic or greater demand on schools, police, and fire protection services. When combined with the other currently proposed or ongoing projects within the region, either alternative would have negligible cumulative impacts.

4.0 MITIGATION AND BEST MANAGEMENT PRACTICES

This chapter describes those measures that would be implemented to reduce or eliminate potential adverse impacts on the human and natural environments. Many of these measures have been incorporated as standard operating procedures by CBP on past projects. It should be emphasized that these are general BMPs, and the development of specific BMPs will be required for certain activities implemented under the action alternatives. The proposed BMPs would be coordinated through the appropriate agencies and land managers/administrators, as required.

It is Federal policy to reduce adverse impacts through the sequence of avoidance, minimization, and, finally, compensation. Compensation varies and includes activities such as restoration of habitat in other areas, acquisition of lands, etc., and is typically coordinated with the USACE, USFWS, and other appropriate Federal and state resource agencies.

4.1 GENERAL PROJECT PLANNING CONSIDERATIONS

- CBP will avoid lighting and noise impacts during the night by conducting installation and maintenance activities during daylight hours only.
- CBP will avoid the spread of non-native plants by not using natural materials (e.g., straw) for on-site erosion control. If natural materials must be used, the natural material would be certified as free of weed and weed-seed.
- CBP contractors will place drip pans under parked equipment and establish containment zones when refueling vehicles or equipment.
- The area of disturbance will be minimized by limiting deliveries of materials and equipment to only those needed for effective project implementation.
- To prevent entrapment of wildlife species, CBP will ensure that excavated, steep-walled holes or trenches are either completely covered by plywood or metal caps at the close of each workday or provided with one or more escape ramps (at no greater than 1,000-foot intervals and sloped less than 45 degrees) constructed of earthen fill or wooden planks.
- Each morning before the start of installation or maintenance activities and before such holes or trenches are filled, ensure that they are thoroughly inspected for trapped animals.

Ensure that any animals discovered are allowed to escape voluntarily (by escape ramps or temporary structures), without harassment, and before project activities resume, or are removed from the trench or hole by a qualified person and allowed to escape unimpeded.

- The MBTA (16 USC 703-712, [1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986 and 1989]) requires that Federal agencies coordinate with the USFWS if an activity would result in the take of a migratory bird. If installation or clearing activities are scheduled during the nesting season (May through August) within potential nesting habitats, surveys will be performed to identify active nests. If project activities would result in the take of a migratory bird, then coordination with the USFWS and VDWF would be required, and applicable permits would be obtained prior to cable installation or clearing activities.
- In the event that unanticipated archaeological resources are discovered during any project-related activities, or should known archaeological resources be inadvertently affected in a manner that was not anticipated, the project proponent or contractor shall immediately halt all activities in the immediate area of the discovery and take steps to stabilize and protect the discovered resource until it can be evaluated by a qualified archaeologist.
- Avoid contaminating natural aquatic and wetland systems with runoff by limiting all equipment maintenance, staging, and laydown and dispensing hazardous liquids, such as fuel and oil, to designated upland areas.
- Erosion control measures and appropriate BMPs, as required and promulgated through a site-specific SWPPP and engineering designs, will be implemented before, during, and after soil-disturbing activities.

5.0 LIST OF PREPARERS

Name	Agency Organization	Discipline/ Expertise	Experience	Role in Preparing EA
Chris Ingram	GSRC	Biology/Ecology	42 years of EA/EIS preparation and environmental planning studies	Project Manager; EA preparation (Description of Proposed Action and Alternatives, vegetation, wildlife)
Ann Guissinger	GSRC	Socioeconomics	38 years of economic planning and assessment	Socioeconomic analyses
Josh McEnany	GSRC	Forestry/Wildlife	18 years of environmental planning and NEPA studies	Wetlands and T&E species
Ross Hackbarth	GSRC	Botany	6 years of environmental planning studies	Vegetation and wildlife
Cragin Knox	GSRC	Geology	32 years of environmental planning studies	Geology, soils, and water quality

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7.0 LIST OF ACRONYMS AND ABBREVIATIONS

amsl	Above Mean Sea Level
ANR	Agency of Natural Resources
AOR	Area of Responsibility
APE	Area of Potential Effect
AQCD	Air Quality and Climate Division
BLS	Bureau of Labor Statistics
BMP	Best Management Practice
CAA	Clean Air Act
CBP	U.S. Customs and Border Protection
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
DHS	Department of Homeland Security
DOE	Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FR	Federal Register
GSRC	Gulf South Research Corporation

IPaC	Information, Planning, and Conservation
LPOE	Land Port of Entry
NAAQS	National Ambient Air Quality Standards
NACD	Native American Consultation Database
NEPA	National Environmental Policy Act
NH	Northeastern Highlands
NHPA	National Historic Preservation Act
NO ₂	Nitrogen Dioxide
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTIA	National Telecommunications and Information Administration
NVP	Northern Vermont Piedmont
O ₃	Ozone
ORC	Online Resource Center
OSHA	Occupational Safety and Health Administration
Pb	Lead
PEIS	Programmatic Environmental Impact Statement
PM-2.5	Particulate Matter Diameter Less Than or Equal to 2.5 Micrometers
PM-10	Particulate Matter Diameter Less Than or Equal to 10 Micrometers
POE	Port of Entry
ppb	Parts per Billion
ppm	Parts per Million
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROI	Region of Influence

S&T	Science and Technology Directorate
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SPCCP	Spill Prevention, Control, and Countermeasures Plan
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USBP	U.S. Border Patrol
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
IBWC	International Boundary Commission
VDEC	Vermont Department of Environmental Conservation
VFWD	Vermont Fish and Wildlife Department
WMA	Wildlife Management Area

APPENDIX A
DESCRIPTION OF THE METHODS AND EQUIPMENT

INSTALLATION METHODS FOR DIRECT BURIED FIBER OPTIC CABLES

Executive Summary:

The overall technical goal is to directly bury fiber optic cable for a communications network with as little disruption of native soils as possible. This technical goal is naturally aligned with both State and Federal environmental preservation objectives and considerations. Whenever an installation is contemplated, an extensive pre-installation survey is conducted that nominates a primary and alternate method of installation and provides a mitigation plan if needed for each individually identified area. The cable to be installed is less than one inch in diameter with no conduit planned, in most cases. Installation employs the least invasive methods possible starting with a vibratory cable plow, and moving onto Rock Saw, mini-Horizontal Directional Drill (without high pressure fluids), small trenching machine and hand digging when needed. When heavy equipment is used in delicate or sensitive areas specialized ground protection matting should be used. The installation should have limited environmental impacts and those effects should be very temporary in nature. In most cases, General Permitting for Utility is applicable.

Survey and Pre-installation planning:

A very deliberate and detailed pre-installation survey and planning phase is essential to project success. The process starts with walking every inch of the project site with installation and logistics representatives. The route is marked with the primary and alternate means of installation that will be used in the project. Soil types and terrain are considered as the survey team nominates a method of installation (heavy vehicle, light machines, HDD, or hand digging) that is most suitable for the specific location. At that point the impacts of the nominated method are discussed with the Government project lead. In most cases, General Purpose Utility permitting is applicable to the process because of the small nature of our soil disruption.

Fiber Optic Cable:

Armored jacket single mode fiber optic cable will be installed directly in the ground. Single mode fiber cable (Synonyms mono-mode optical fiber, single-mode fiber, single-mode optical waveguide, uni-mode fiber) is a single strand of glass fiber with a diameter of 8.3 to 10 microns that has one mode of transmission. Single mode fiber has a relatively narrow diameter, through which only one mode will propagate typically 1310 or 1550nm wavelengths. Single mode fibers carry higher bandwidth than multimode fiber, but require a light source with a narrow spectral width.

Figure 1 on page 2 represents a typical breakdown of the type of fiber used. There is no liquid or gel (nothing to leak out) and the cable is water tight. The total diameter of the cable installed is under one inch. When the cable is small in diameter, and if there is no conduit planned, the area of ground disturbance will be small.

Dry Stranded Loose Tube

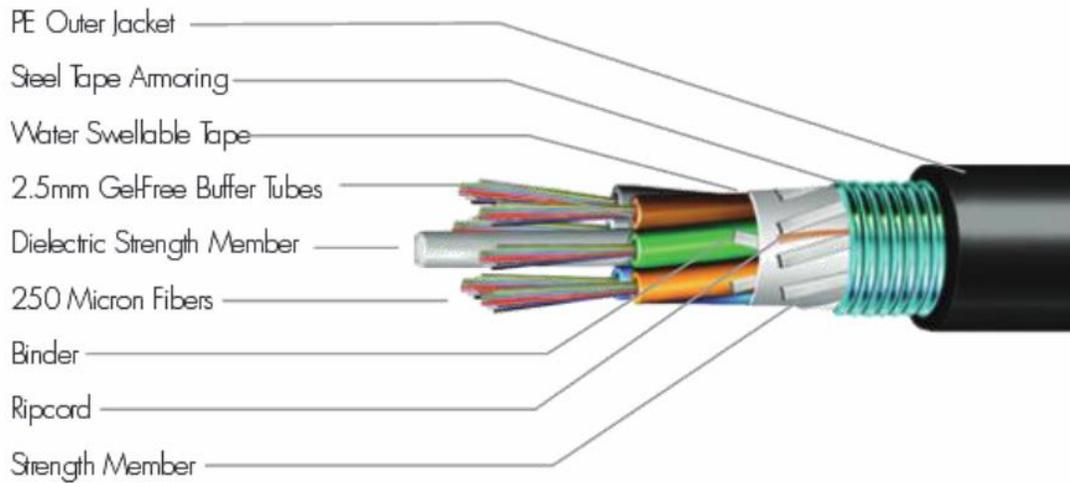


Figure 1: Cross section of typical fiber.

Direct burial armored fiber optic cables are ideal for installations that require a fiber cable to be buried directly in the ground. There is a corrugated steel tape that has excellent water blocking abilities, providing a protective barrier between the fiber cable and the elements surrounding it. With an operating temperature range of between -40°C and 85°C the armored direct burial fiber cable will be well protected in harsh conditions.

Figure 2 is a view of the cable spooled on a wooden reel. This is how the cable is delivered and carried by the vibratory cable plow.



Figure 2: Example of spooled cable.

Hand Holes:

Along the length of the fiber, approximately once per mile, a hand hole will need to be installed. A hand hole is a manufactured box that allows access to the cable and holds splice points.

In Figure 3: The left is an example of one style of hand hole used and the right is an example of an installed handhold that is flush with the ground.



Figure 3: Hand holes

Coyote Splice Enclosures:

Inside the hand holes, there will be splice enclosures as pictured below in Figure 4. These enclosures provide a sealed environment to protect the spliced fiber optic cable from the elements while keeping it accessible. Figure 4 shows a closed box on the left and an example of trays to hold the splices and fiber optic cable on the right.



Figure 4: Coyote splice enclosures

Vibratory Cable Plow (quad rubber tracks):

The primary installation method is a vibratory cable plow like the one pictured on left in Figure 5. This machine pulls a 42 inch long vibrating plow blade through the soil and inserts the cable directly into the ground. The plow blade is approximately one inch wide and the vibrating motion keeps the disturbed soil localized with very little collateral damage. The right side of Figure 5 shows the typical tract of a vibratory plow directly burying fiber optic cable. When operating the plow a laborer walks along the back side and feeds the fiber optic cable into the plow hole. In the final step another laborer walks behind the plow and pushes the spoils back into the small cut and compacts it back to near original condition.



Figure 5: Vibratory Cable Plow.

The quad rubber tracks minimize the ground impact by spreading the weight of the equipment over a larger contact area. This contact area will be further spread by the use of temporary protective matting being placed under the machine while it crawls through softer soils.

The following link is a video of a vibratory cable plow being used in the same manner as we will employ. https://www.youtube.com/watch?v=H2IU-z_Yigo

Large Trenching/Rock Saw (quad rubber tracks):

In locations with near surface rock a vibratory cable plow will not be able to operate. In those conditions, a large Rock Saw such as the one pictured in Figure 6 on page 5 will be used. A quad rubber track variants of this vehicles may be used (just like the plow) to reduce ground impact.

Rock slurry disposal. Muck piles (rock slurry) shall be managed in a manner to reduce the potential for contamination by implementing the following measures:

- a. Remove the muck pile from the installation area as soon as reasonably possible.
- b. Manage the interaction of rock slurry and storm water to prevent contamination of water supply wells or surface water. If not removed immediately from installation areas, all slurry material removed should be stored and covered with a non-permeable tarp to prevent water contamination to rain water and surface runoff.



Figure 6: Rock Saw

The following video shows the wheel saw in action: <https://www.youtube.com/watch?v=8jvBhR10mqc>

Ground Protection Matting:

Whenever heavy vehicles are used in delicate or sensitive areas specialized matting should be employed to distribute the weight of the vehicles over a greater surface area. Figure 7 shows a picture of the type of matting used for bogs and wetlands protection.



Figure 7: Example of ground protection matting

This matting is designed to distribute the weight of heavy vehicles across wet conditions. Plywood should not be used as it gets saturated with water and breaks apart and does not offer consistent pressure distribution. A link to more information about wetland and bog protection matting we will use can be found here: <https://www.newpark.com/environments/>

If ground conditions will not support heavy vehicle traffic even with the matting, another option would be to wait until the ground is frozen and then install with a plow as seen in Figure 8 (for northern areas).



Figure 8: Using a plow in frozen conditions

Small trenching attachment:

When it is not possible to use the larger equipment because of soil conditions or space limitations a trenching attachment on a small tractor should be employed. The tractor is 35 HP size and can fit into tight spaces and maneuver more easily than the vibratory plow. Figure 9 is a picture of a 35 HP tractor with trenching attachment.



Figure 9: Trenching attachment on a small tractor

The following link shows the trenching attachment in action:

https://www.youtube.com/watch?v=nYtc_FZWcro

Mini HDD Rig:

When surface obstacles such as streams are encountered, a small Horizontal Directional Drilling machine like the one pictured in Figure 10 should be used.



Figure 10: Horizontal Directional Drilling Machine

This directional boring, commonly called horizontal directional drilling or HDD, is a steerable trenchless method of installing underground pipes, conduits and cables in a shallow arc along a prescribed bore path by using a surface-launched drilling rig, with minimal impact on the surrounding area. Directional boring is used when trenching or excavating is not practical. It is suitable for a variety of soil conditions and jobs including road, landscape and river crossings. Installation lengths up to 2000 m are capable, and diameters up to 1200 mm have been installed. Additionally, for runs up to 400 ft and a hole of 2" diameter, a very small machine may be used. Once a pilot hole is made the fiber optic cable can be pulled through the drilled hole. This is depicted graphically in Figure 11.

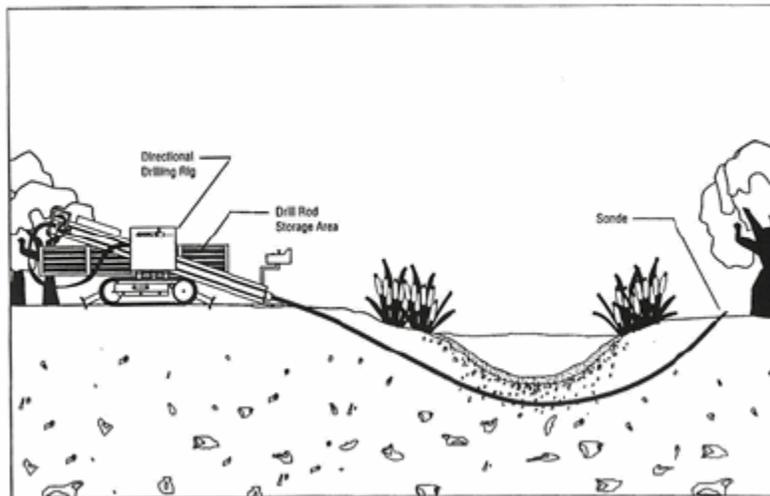


Figure 11: Horizontal Directional

The following link is to a video that shows the process in action. Drill rig size may vary, as well as the size of the conduit coming through the pilot hole, but the concept is the same:

<https://www.youtube.com/watch?v=GI-vVLRZdg>

Directional boring is not practical if there are voids in the rock or incomplete layers of rock. The best material is solid rock or sedimentary material. Soils with cobble stone are not recommended. There are different types of heads used in the pilot-hole process, and they depend on the geological material.

For small diameter fiber optic cable installation, only a small pilot hole of approximately 2" is required. No reaming or widening of the hole is needed because larger pipe will not be pulled through. Further, small HDD rigs do not require high pressure fluids like the larger ones. The absence of high pressure fluids removes the risk of borehole failure and the resulting leakage of fluids into the environment.

When solid rock is encountered, special rock drilling heads can be used. The following link shows a rock penetration with a small HDD rig: <https://www.youtube.com/watch?v=xLfOEYLJCo0>

Hand Digging:

Finally, hand digging (seen in figure 12) using manual labor is used when vehicles can't or shouldn't access a particular area. Shovels may be used to dig down 3 feet by hand. In soft or wet soil conditions the use of boards or prefabricated sidewalls will be used to keep the trench from collapsing upon itself. The trench should be one shovel length wide (approx. 8 inches) and completed in small sections so that the soil can go directly back from where it came. This is the old-fashioned way and takes a bit more time but it's good exercise for someone.



Figure 12: Hand digging with shovels

Cable Sink for lakes/ponds

Sometimes when a relatively large body of permanent water (lake, pond, etc.) is encountered it is not practical or environmentally safe to bypass or directionally drill because of unconsolidated soils. In these situations, it is possible to sink the cables with lead-free weights. The cable would be put in conduit for the first 3-6 feet (length is determined by low water line and expected conditions) from both banks to make sure the cable does not become exposed or damaged in shallow water. Then lead free weights may be attached to the cable at 3' intervals and place the cable and weight on the bottom of the lake/pond bed. The cable and weights will sink into the unconsolidated bottom and provide a secure resting place.

Environmental Considerations of the proposed methods:

Consideration should be given to how the cable can be installed while minimizing impacts to wetlands and streams, and ensuring that post-construction recovery of wetlands and streams from impacts is complete and as rapid as possible. Taking impact avoidance and minimization steps will directly address the concerns of the permitting agencies.

The Vermont project will be a cable installation along the border Slash, an area that has been previously disturbed via vegetation clearing and maintenance activities. (The border Slash is an approximate 20 foot wide clearing maintained by the U.S. and Canada under the existing Treaty). Equipment access routes are logging skidder trails. Therefore, it is unlikely that new clearing of woody vegetation (shrubs and trees) will be necessary.

APPENDIX B
CORRESPONDENCE



**U.S. Customs and
Border Protection**

DEC 07 2018

Wally Miller, Chairman
Stockbridge Munsee Community, Wisconsin
N. 8476 Mo He Con Nuck Road
Bowler, Wisconsin 54416

RE: Section 106 Consultation for Northern Border Remote Radio Link Pilot Project, Essex and Orleans Counties, Vermont

Dear Chairman Miller:

The Department of Homeland Security (DHS), Science and Technology Directorate (S&T), has developed a prototypical Remote Radio Link Project to enhance the communications capability and safety of U.S. Border Patrol (USBP) agents who are conducting enforcement activities in remote areas. The Proposed Action includes the installation, operation, and maintenance of prototype radio link project along the U.S./Canada International border west of Norton, Vermont. The project consists of the installation of a buried fiber-optic communication system within the International boundary, known as the Slash. DHS Customs and Border Protection (CBP) is preparing an Environmental Assessment (EA) to address potential impacts on sensitive resources, including cultural resources, from the installation and operation of the Remote Radio Link Project.

Cable installation activities would be temporary and occur during daylight hours only. The cable is proposed to be installed using a cable plow, trenchers, rock cutters, and directional drilling equipment and would extend for approximately 7 miles westward beginning about 1.5 miles west of the Norton Port of Entry (see Figure 1). Three existing two-track access routes currently used as skidder trails would be improved to provide project access. Equipment and material would be staged during the installation phase at the existing Sugar Barn in a disturbed area that is routinely used for logging and syrup production equipment. In addition, electrical power is available at the Sugar Barn and would be used to power the fiber optic cable.

DHS prepared an Archaeological Resource Assessment (ARA) for the proposed project, which was submitted to the Vermont Division of Historic Preservation (VDHP) for review on January 26, 2018. The ARA found that the proposed project area was archaeologically non-sensitive and, as a result, recommended no additional archaeological investigations be conducted for this project. The VDHP concurred with the findings of the ARA in a letter dated March 12, 2018.

As part of their ongoing consultation under Section 106 of the National Historic Preservation Act, DHS is gathering data and input from Native American tribes that may claim a cultural affinity to the project area. DHS CBP respectfully requests that you provide information regarding any potential sites of cultural or religious significance that may be present in the area and affected by the proposed project. As part of the consultation process, we intend to provide your tribe with a copy of the Draft EA once the document is completed. Please inform us if

Chairman Miller
Page 2

additional copies are needed and/or if someone else within your government other than you should receive the Draft EA.

Your prompt attention to this request would be greatly appreciated. If you have any questions, please contact me via telephone at 949-643-6392 or via email at joseph.zidron@dhs.gov. Thank you in advance for your assistance.

Sincerely,

A handwritten signature in blue ink, appearing to read "Joseph Zidron". The signature is fluid and cursive, with the first name "Joseph" and last name "Zidron" clearly distinguishable.

Joseph Zidron
Real Estate and Environmental Branch Chief
Border Patrol & Air and Marine PMO
U.S. Customs and Border Protection



Figure 1. Project Vicinity Map



**U.S. Customs and
Border Protection**

DEC 07 2018

U.S. Army Corps of Engineers
New England District
Vermont Project Office
Attn: Mr. Mike Adam
11 Lincoln Street, Rm 210
Essex Junction, VT 05452

RE: Northern Border Remote Radio Link Pilot Project, Essex and Orleans Counties, Vermont

Dear Mr. Adam:

The Department of Homeland Security (DHS), Science and Technology Directorate (S&T), has developed a prototypical Remote Radio Link Project to enhance the communications capability and safety of U.S. Border Patrol (USBP) agents who are conducting enforcement activities in remote areas. The Proposed Action includes the installation, operation, and maintenance of prototype radio link project along the U.S./Canada International border west of Norton, Vermont. The project consists of the installation of a buried fiber-optic communication system within the International boundary, known as the Slash.

Cable installation activities would be temporary and occur during daylight hours only. The cable is proposed to be installed using a cable plow, trenchers, rock cutters, and directional drilling equipment and would extend for approximately 7 miles westward beginning about 1.5 miles west of the Norton Port of Entry (see Figure 1). Three existing two-track access routes currently used as skidder trails would be improved to provide project access. Equipment and material would be staged during the installation phase at the existing Sugar Barn in a disturbed area that is routinely used for logging and syrup production equipment. In addition, electrical power is available at the Sugar Barn and would be used to power the fiber optic cable.

A wetland delineation of the project corridor was completed in November 2017 and a wetland finding report was completed in May 2018. Approximately 21 acres (project area) was delineated in Orleans and Essex Counties, Vermont. The project area is located along the United States/Canada border in an area known as the Slash, beginning approximately 1-mile west of Nelson Road in Norton, Vermont. The project area continues west along the U.S./Canada border for approximately 6.5 miles. In addition to the portion of the project area that is along the U.S./Canada border, the project area also included approximately 3.1 miles of two-track access routes that are currently used as skidder trails. Based on the wetland delineation wetlands are present in the project area and may be impacted by the proposed project. However, impacts on these resources would be avoided or minimized by the use of ground protection matting and the use of directional drilling.

Mr. Adam
Page 2

DHS Customs and Border Protection (CBP) is developing an Environmental Assessment (EA) for the installation of the RRL Project. Wetland issues will be one of the many resources that will be addressed in the EA. CBP requests your review and comments of the enclosed wetlands findings report. The enclosed report contains descriptions of the sample plots, wetland maps, USACE approved data sheets, and photographs of the sample plots. Your review will support the planning efforts of this proposed project.

Your prompt attention to this request would be greatly appreciated. If you have any questions, please contact me via phone at 949-643-6392 or via email at joseph.zidron@dhs.gov. Thank you in advance for your assistance.

Sincerely,

A handwritten signature in blue ink that reads "Joseph Zidron". The signature is written in a cursive style with a large, sweeping initial "J".

Joseph Zidron
Real Estate and Environmental Branch Chief
Border Patrol & Air and Marine PMO
U.S. Customs and Border Protection

Enclosure



**U.S. Customs and
Border Protection**

DEC 07 2018

Chester "Chet" Brooks, Chief
Delaware Tribe of Indians
5100 Tuxedo Boulevard
Bartlesville, Oklahoma 74006

RE: Section 106 Consultation for Northern Border Remote Radio Link Pilot Project, Essex and Orleans Counties, Vermont

Dear Chief Brooks:

The Department of Homeland Security (DHS), Science and Technology Directorate (S&T), has developed a prototypical Remote Radio Link Project to enhance the communications capability and safety of U.S. Border Patrol (USBP) agents who are conducting enforcement activities in remote areas. The Proposed Action includes the installation, operation, and maintenance of prototype radio link project along the U.S./Canada International border west of Norton, Vermont. The project consists of the installation of a buried fiber-optic communication system within the International boundary, known as the Slash. DHS Customs and Border Protection (CBP) is preparing an Environmental Assessment (EA) to address potential impacts on sensitive resources, including cultural resources, from the installation and operation of the Remote Radio Link Project.

Cable installation activities would be temporary and occur during daylight hours only. The cable is proposed to be installed using a cable plow, trenchers, rock cutters, and directional drilling equipment and would extend for approximately 7 miles westward beginning about 1.5 miles west of the Norton Port of Entry (see Figure 1). Three existing two-track access routes currently used as skidder trails would be improved to provide project access. Equipment and material would be staged during the installation phase at the existing Sugar Barn in a disturbed area that is routinely used for logging and syrup production equipment. In addition, electrical power is available at the Sugar Barn and would be used to power the fiber optic cable.

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As part of their ongoing consultation under Section 106 of the National Historic Preservation Act, DHS is gathering data and input from Native American tribes that may claim a cultural affinity to the project area. DHS CBP respectively requests that you provide information regarding any potential sites of cultural or religious significance that may be present in the area and affected by the proposed project. As part of the consultation process, we intend to provide your tribe with a copy of the Draft EA once the document is completed. Please inform us if

Chief Brooks
Page 2

additional copies are needed and/or if someone else within your government other than you should receive the Draft EA.

Your prompt attention to this request would be greatly appreciated. If you have any questions, please contact me via telephone at 949-643-6392 or via email at joseph.zidron@dhs.gov. Thank you in advance for your assistance.

Sincerely,

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Joseph Zidron
Real Estate and Environmental Branch Chief
Border Patrol & Air and Marine PMO
U.S. Customs and Border Protection

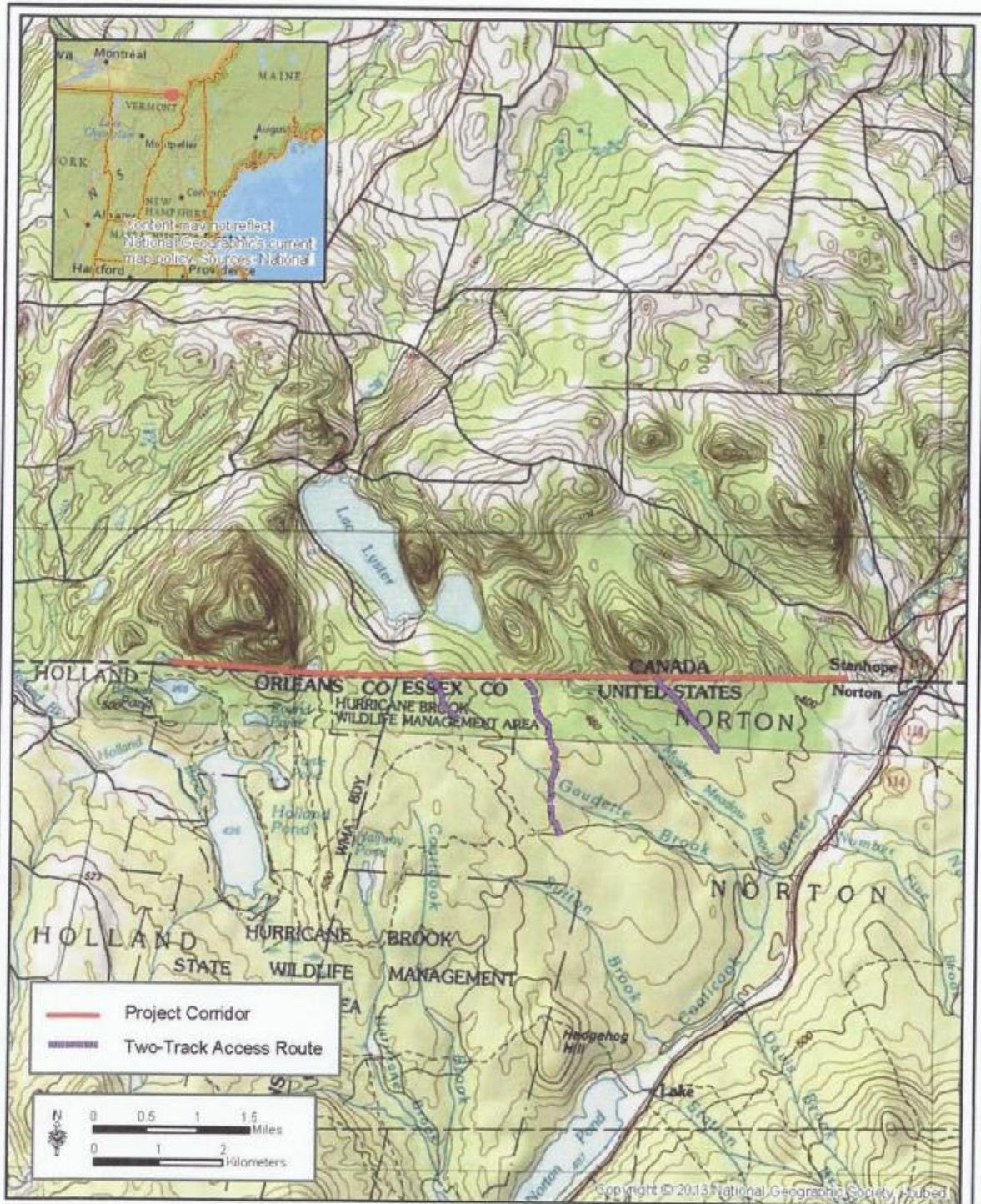


Figure 1. Project Vicinity Map