



National Telecommunications
and Information Administration

Environmental Assessment

**Nome to Homer Express Middle Mile & Hooper Bay
Network Fiber Optic Cable Project**
(NTIA No. EAXX-006-60-02D-1764761874)

Southwestern Alaska

April 2026

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**US Army Corps
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ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
ADEC	Alaska Department of Environmental Conservation
ADEH	Alaska Department of Environmental Health
ADF&G	Alaska Department of Fish and Game
ADL	Alaska Department of Law
ADLWD	Alaska Department of Labor and Workforce Development
ADNR	Department of Natural Resources
ADOE	Alaska Department of Health
ADOT	Alaska Department of Transportation
AGO	Alaska Geoportal Office
AHPA	Alaska Historic Preservation Act
AK	Alaska
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ANTHC	Alaska Native Tribe Health Consortium
APDES	Alaska Pollutant Discharge Elimination System
AVEC	Alaska Village Electrical Cooperative
BBB	Bristol Bay Borough
BBHC	Bristol Bay Health Center
BBSD	Bristol Bay School District
BGS	Below Ground Surface
BMH	Beach Manhole
BMP	Best Management Practice(s)
BSAI	Bering Sea and Aleutian Islands
BU	Branching Unit(s)
CAA	Clean Air Act
CAI	Community Anchor Institution(s)
BLM	Bureau of Land Management
CCP	Comprehensive Conservation Plan
CDC	Center for Disease Control and Prevention
CFR	Code of Federal Regulations
CGP	Construction General Permit
CLS	Cable Landing Station
Councils	Fishery Management Councils

CWA	Clean Water Act
dB	Decibel(s)
dBA	A-weighted decibel(s)
dBht	Decibel hearing threshold sounds level
DOI	Department of Interior
DOT-PF	Department of Transportation and Public Facilities
DPS	Distinct Population Segment
DRO	Diesel Range Organic Compounds
DWPA	Drinking Water Protection Area(s)
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EMS	Emergency Management Service(s)
EO	Executive Order
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy Management Act
FMP	Fishery Management Plan
FOC	Fiber Optic Cable
ft	foot/feet
GOA	Gulf of Alaska
GRO	Gasoline range organic(s)
HAPC	Habitat Area(s) of Particular Concern
HDD	Horizontal Directional Drilling
HTL	High Tide Line
ICPC	International Cable Protection Committee
in.	inch(es)
IPaC	Information for Planning and Consultation
IPN	Indigenous Place Name
KPBSD	Kenai Peninsula Borough School District
LPSD	Lake Peninsula School District
LYSD	Lower Yukon School District
LOC	Letter of Concurrence
LUP	Land Use Plan(s)

MBTA	Migratory Bird Treaty Act
MCH	Mulchatna Caribou Herd
MHW	Mean High Water
mi.	mile(s)
mi ²	square mile(s)
MLW	Mean Low Water
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NJUS	Nome Joint Utility Services
NLURA	National Land Use Research Alaska, LLC
NRCS	Natural Resources Conservation Service
NTHE	Nome to Homer Express
NTIA	National Telecommunications and Information Administration
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Marine Fisheries Service, <i>also NMFS</i>
NoPS	Nome Public Schools
NM	nautical mile(s)
NMFS	National Marine Fisheries Service
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSRH	Norton Sound Regional Hospital
NTHE	Nome to Homer Express Network
NTIA	National Telecommunications and Information Administration
NVFD	Nome Volunteer Fire Department
NWA	Navigable Waters Act
NWP	Nationwide Permit
OHA	Office of History and Archaeology
OHWM	Ordinary High Water Mark
PFE	Power Feeding Equipment
PID	Photoionization Detector
PLGR	Pre-lay Grapnel Run
PM	Particulate matter

ppm	part(s) per million
Project	Nome to Homer Express Middle Mile Network Fiber Optic Cable Project
Proposed Action	Nome to Homer Express Fiber Optic Cable
PRPA	Paleontological Resources Preservation Act
PSD	Prevention of significant deterioration
RMP	Resource Management Plans
ROV	Remotely Operated Vehicle
RUS	Rural Utility Service
SHPO	State Historic Preservation Office(s)
TTWG	Transportation Technical Working Group
SWPPP	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Office
U.S.	United States of America
USACE	United States Army Corps of Engineers
USCB	United States Census Bureau
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WOTUS	Waters of the United States
WQC	Water Quality Certification
WSDOT	Washington State Department of Transportation
WSR	Wild and Scenic River
WSRA	Wild and Scenic River Act of 1968
YK	Yukon-Kuskokwim Delta
YDNWR	Yukon Delta National Wildlife Refuge
YKHC	Yukon-Kuskokwim Health Corporation
μPa	Micropascal(s)

1 Introduction

Quintillion is proposing to expand its fiber optic cable (FOC) connectivity in Alaska (AK) with the Nome to Homer Express (NTHE), the Proposed Action (**Figure 1**). Quintillion would install the NTHE submarine and terrestrial FOC system in western AK, interconnecting existing fiber telecommunication networks in Nome, with competitive fiber networks in Homer (the Proposed Action; **Appendix A**). This would extend Quintillion's existing subsea and terrestrial network south from Nome to Emmonak and Hooper Bay, continuing along the Yukon-Kuskokwim (YK) Delta coast through the Yukon Delta National Wildlife Refuge (YDNWR) to Naknek, and crossing terrestrially to Igiugig, where it would connect into an existing cable network owned by GCI Communications to reach Homer.

The Proposed Action is primarily federally funded by middle mile grants awarded by the National Telecommunications and Information Administration (NTIA) and the U.S. Department of Agriculture's Rural Utility Service (RUS). The planned branching unit off the NTHE subsea route to construct a dedicated subsea middle mile extension reaching the Native Village of Hooper Bay is a connected action funded under a RUS Reconnect Grant.

The Proposed Action would cross approximately 76.7 miles (mi.) of U.S. Fish and Wildlife Service (USFWS)-managed and 14.5 mi. of Bureau of Land Management (BLM)-managed federal lands, for a total of 91.2 mi., respectively. An Application for Transportation, Utility Systems, and Telecommunication and Facilities on Federal Lands and Property (SF 299) was submitted to USFWS on February 24, 2026, and accepted on March 9, 2026. Similarly, an SF 299 was submitted to BLM on November 7, 2024, and accepted on January 30, 2025. It has the potential to affect the human and natural environment; therefore, it is subject to legislative requirements with the purpose of minimizing those impacts.

The utilization of federal funding and access to federal lands for this project necessitates an Environmental Assessment (EA) under National Environmental Policy Act (NEPA) of 1969, as amended. In addition to NTIA, this EA will serve as a NEPA analysis for all cooperating agencies, in particular RUS, BLM, and the U.S. Army Corps of Engineers (USACE). While the USFWS was engaged early for Section 7 Endangered Species Act (ESA) purposes, the agency was not engaged as an early Cooperating Agency due to discovery of the marine boundary of the YDNWR during later project development.

NEPA requires federal actions to be assessed for their potential environmental impacts. This EA describes the environmental, technical, and economic factors of the Proposed Action to inform the public, decision-makers, and other stakeholders about the Quintillion NTHE. This action requires federal agencies to review reasonably foreseeable environmental effects, including any reasonably foreseeable adverse environmental effects, a reasonable range of technically and economically feasible alternatives that meet the purpose and need of the proposal, including any negative environmental impacts of not implementing the proposed agency action.

Quintillion is committed to ensuring that its proposed middle-mile project would comply with NEPA, National Historic Preservation Act (NHPA), ESA, and other applicable federal, state, and local-level laws and regulations of the involved agencies. This includes those of the cooperating agencies, such as BLM's Federal Land Policy Management Act of 1976 (FLPMA; 43 USC 1701) and the USFWS' National Wildlife Refuge System Administration Act, as amended by the National Wildlife Refuge System Improvement Act (16 USC 3101, 664, 668dd and 668ee and 43 USC 666) to respond to Quintillion's application for right-of-way (ROW) across public lands.



Figure 1. NTHE Overview Map

1.1 Purpose and Need

There is a need to connect underserved Alaskans to reliable, high-speed internet service, enabling access to distance learning, telehealth, public safety communications, and providing opportunities for economic development. AK ranks in the bottom 10 of the 50 United States (U.S.) in broadband availability, facing challenges due to having many remote rural communities lacking connections by roads or fiber backbones.

The purpose of the Proposed Action is to provide direct fiber access and communications facilities for the communities of Emmonak (population 858), Hooper Bay (1375), Naknek (464), and Igiugig (61). The project would provide broadband service to tribally- and AK Native Claims Settlement Act- (ANCSA-) owned land (pursuant to the AK Native Claims Settlement Act of 1971) and facilities. The Proposed Action would also bring new resilient middle-mile capacity to the vicinity of military bases including Fort Wainwright, Fort Greely, and Eielson Air Force Base, several AK U.S. Army National Guard bases, and U.S. Coast Guard stations.

In the case of NTIA, the need for this action is established by the NTIA's responsibility under the Enabling Middle Mile Broadband Infrastructure (MM) Grant Program, authorized by the

Infrastructure Investment and Jobs Act of 2021, Division F, Title IV, Section 60401, Public Law 117-58, 135 Stat. 429 (November 15, 2021) (Infrastructure Act or Act), also known as the Bipartisan Infrastructure Law. The MM program provides funding to encourage the expansion and extension of middle mile infrastructure to reduce the cost of connecting unserved and underserved areas to the backbone of the internet (commonly referred to as the “last mile”) and to promote broadband connection resiliency through the creation of alternative network connection paths that can be designed to prevent single points of failure on a broadband network.

In the case of RUS, the need for this action is established by the RUS’s responsibility under the Rural Electrification Act of 1936, as amended, and through the 2018 Consolidated Appropriations Act (Title III) Rural eConnectivity Program (ReConnect Program).

In the case of the BLM, the need established by the BLM’s responsibility is under Title V of the Federal Land Policy and Management Act (FLPMA) of October 21, 1976 (90 Stat. 2776; 43 United States Code [USC] 1761), as amended, to respond to requests for ROWs across public lands.

In the case of the USFWS, the need is to respond to applications for transportation and utility systems (TUS) in and across, and access into conservation system units under Title XI of the Alaska National Interest Lands Conservation Act (ANILCA) (16 USC §§3161-3173) and the National Wildlife Refuge System Administration Act as amended by the National Wildlife Refuge System Improvement Act (16 USC 3101, 664, 668dd and 668ee and 43 USC 666).

As part of their responsibilities, BLM and USFWS will determine whether to authorize a ROW Grant for Quintillion to install a fiber optic cable on both USFWS-managed YDNWR and BLM-managed lands, respectively, and if so, under what terms and conditions. Their decisions will be based on established criteria to assess whether the proposed use aligns with the public interest.

While the larger NTHE includes additional FOC components in federal lands and waters, AK waters and State and private lands, those segments are not direct actions under BLM or USFWS. The BLM and USFWS direct actions considered in this document are the 14.5-mi. and 76.7-mi. portions of the FOC proposed on both BLM-managed and USFWS-managed YDNWR lands, respectively; the remaining project components are connected actions but are not subject to BLM or USFWS permitting.

1.2 Decision to be Made

The decision to be made by NTIA is to authorize the release of MM Grant funds to deploy the Proposed Action.

The decision to be made by RUS is to authorize the release of their ReConnect Grant funds to deploy the Proposed Action.

The decision to be made by BLM and USFWS is whether to authorize grants for the installation and construction of a fiber optic cable network and associated structures, long-term operations of the network, maintenance and repairs of the network, and decommissioning of the project.

The NTIA, RUS, BLM, and USFWS are required to evaluate the potential effects on the natural and human environment of the proposed action and alternatives. This EA provides the technical analysis needed for each agency to independently make an informed decision regarding approval or rejection of the financial or ROW applications received, and if approved, the appropriate

terms and conditions under which such approval would be granted. The findings of impacts will first be documented by NTIA, RUS, USFWS, and BLM in this EA, and then NTIA, RUS, USFWS, and BLM will develop the appropriate decision document(s) regarding the NEPA process.

1.3 Relationship to Statutes and Regulations

The Proposed Action is consistent with federal environmental laws and regulations, Executive Orders, and U.S. Department of Interior policies. It is compliant with state laws and local ordinances and plans, including the following:

- FLPMA of 1976: Title III, Sec. 302. [43 USC 1732] (b) “the Secretary shall... regulate, through easement, permits, leases... the use, occupancy, and development of public lands...”
- NHPA (1966): Title I, Section 106. [16 USC 470f] “The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register.”
- Clean Water Act (CWA) of 1987 establishes objectives to restore and maintain the chemical, physical, and biological integrity of the nation’s water.
- ESA was established to conserve and protect threatened and endangered species. Section 7 of the ESA requires each federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of critical habitat for such species.
- Marine Mammal Protection Act (MMPA) prohibits takes of all marine mammals in the U.S. with few exceptions. For threatened and endangered marine mammals, any activities that may affect ESA-listed species must be consistent with the ESA as well.
- Title XI of ANILCA (16 USC §§3161-3173).
- Title IX of ANILCA Section 906K. State selections and conveyances – Interim provisions.
- National Wildlife Refuge System Administration Act as amended by the National Wildlife Refuge System Improvement Act (16 USC 3101, 664, 668dd and 668ee and 43 USC 666).
- Land use authorizations include various authorizations and agreements to use BLM lands such as ROW grants, temporary use permits under several different authorities; leases, permits, and easements under Section 302 of FLPMA; airport leases under the Act of May 24, 1928; and Recreation and Public Purposes leases.

1.4 Conformance with the Land Use Plan

1.4.1 BLM

The Proposed Action is in conformance with applicable BLM Land Use Plans (LUP) because it is clearly consistent with the following LUP decisions, (objectives, terms, and conditions) provided for the Bay Resource Management Plan (RMP), November 2008.

I-2: Land Use Authorizations: Land use authorizations include various authorizations and agreements to use BLM lands for special purposes under several different authorities; leases, permits, and easements under section 302 of FLPMA of 1976; airport leases under the Act of May 24, 1928; and leases under the Recreation and Public Purposes Act as amended.

I-5-d: ROWs: Title V of FLPMA authorizes the issuance of ROW for other uses, such as transportation systems (roads and trails), water pipelines and reservoirs, systems for generation and transmission of electric energy, and various types of communication sites. According to 43 CFR 2800 and ANILCA, the BLM may grant such ROW provided that:

- The natural resources located on public lands administered by a government agency, where the public lands are adjacent to private or other lands, are protected.
- Undue or unnecessary environmental damage to the lands and resources is prevented.
- The utilization of ROW in common with respect to engineering and technological compatibility, national security and land use plans compatibility are promoted.
- Coordination, to the fullest extent possible, takes place with the State, local governments, interested individuals and appropriate non-governmental entities.

1.4.2 USFWS

The YDNWR encompasses approximately 19.16 million acres, extending from the Bering Sea, covering the YK delta. The islands of Nelson and Nunivak are also located within the refuge.

USFWS authorizes requests for ROWs in accordance with the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 USC 3101, 664, 668dd and 668ee and 43 USC 666) and Title XI of ANILCA (16 USC 3161 et seq.); and ensures conformance with applicable Comprehensive Conservation Plans (CCP).

Title XI of (16 USC 3161 et seq.) and the implementing regulations in 43 CFR Part 36 established procedures for approval or disapproval of Transportation and Utility System authorizations in conservation system units in AK. In deciding on authorization, USFWS will follow those procedures.

The proposed action would occur completely within lands currently designated by the CCP as Minimal Management (USFWS 1988). Minimal Management is designed to maintain the refuge environment with minimal or no evidence of human modifications or changes. Habitats are allowed to change and function through ecological processes. Public uses, economic activities or uses, and facilities should minimize disturbance to habitats and resources. Generally, no roads or permanent structures are allowed (except cabins). Compatible economic activities may be allowed where the evidence of those activities does not last past the season of use, except as noted in the prior cabin discussion. Authorization of a ROW across lands designated for Minimal Management does not require a redesignation of those lands in the CCP because the CCP allows TUSs “in all management categories.” (USFWS 1988).

1.5 Scoping and Issues

A public notification of the project and development of the environmental analysis was initiated by BLM on August 19, 2025, and posted on the BLM NEPA Register website: [EplanningUi](#). A list of those community members that received the scoping notice are listed in **Appendix B**.

On August 22, 2025, AK Department of Natural Resources (ADNR) responded with the following issues:

- Issue 1: Are there maps with more detail than what is provided in the scoping notice?

On August 27, 2025, U.S. Environmental Protection Agency (EPA) responded with the following issues:

- Issue 2: Has a programmatic NEPA analysis been considered for the overall project? Can this section fully operate on its own without the 900-mi. segment, and what is the timeline for the larger project?
- Issue 3: Will digging/trenching take place within jurisdictional waters? What permits are being considered?

On September 5, 2025, the Bristol Bay Native Corporation (BBNC) raised the following issues:

- Issue 4: Although no cultural resources in their subsurface of the Project Area were identified, full due diligence should be conducted.
- Issue 5: After review of the list of stakeholders in the scoping notice, BBNC identified two more contacts for scoping comments:
 - a) Levelock Village Council
 - b) AK Heritage Resources Survey (AHRs) for archeological sites.

The project was sent for internal scoping by the Anchorage Field Office. Based on the results of an internal scoping meeting and review by BLM specialists on September 26, 2025, the following issues were identified for further analysis (**Table 1-1**).

Table 1-1. Issues Analyzed in Detail

Resource	Issue Statement
Vegetation and Wetlands	• Would authorization of the ROW affect the structure, composition, or ecosystem functions of native plant communities? • Would authorization of the ROW affect soils and wetlands?
Wildlife (Birds and Terrestrial Mammals)	• Would authorization of the ROW affect the distribution, seasonal habitat use (e.g., insect relief, calving, denning, winter, etc.), movement and/or migration of large mammals in the Project Area especially the Mulchatna Caribou Herd (MCH)? • Would authorization of the ROW affect populations or migratory birds in the Project Area?
Special Status Species	• Would authorization of the ROW affect populations of BLM Sensitive Plant Species in the Project Area? • Would authorization of the ROW affect Threatened and Endangered species listed under ESA and their habitats, marine mammals protected under MMPA, and species listed on the 2019 BLM Sensitive Species List?
Subsistence	• Would authorization of the ROW affect the access, abundance, and availability of subsistence in the Project Area, including ungulates, furbearers, or edible vegetation?
Cultural Resources	• Would authorization of the ROW affect cultural resources and any tribally significant resources within the area of potential effect?

Resource	Issue Statement
	• Would authorization of the ROW affect significant paleontological resources within the Project Area?
Fisheries and Aquatics	• Would authorization of the ROW affect fisheries resources? • Would authorization of the ROW affect streams and other water bodies?

After consideration of the anticipated impacts of the proposed action and other alternatives, the following resources summarized in **Table 1-2** were identified as not having potential for impacts and are dismissed from further consideration.

Table 1-2. Issues Not Included in Further Detail in this EA

Resource	Issue Statement
Non-Native Invasive Species	BLM AK IM 2025-013 Policy on Invasive Species guides development of authorization specific stipulations to prevent the introduction and spread of priority invasive plants in Alaska. Due to project design features (Section 2.3.1) and Required Operating Procedure Veg-1e (Bay Resource Management Plan), the potential for invasive species to degrade native plant community structure, composition, and ecological functions is mitigated. The grantee would commit to washing all equipment to remove any plant seed or propagule before traveling on the ROW, using weed-free gravel and/or erosion control material, and treating priority invasive plants and noxious weeds if they become established. There would be minimal potential to affect the native plant community structure, composition, and ecological functions and therefore, no need to further analyze impacts to native plant communities caused by invasive species. This project design feature has proven to be both effective and implementable. When implemented consistently, washing vehicles and equipment before traveling into a Project Area has been demonstrated as an effective method to prevent the introduction of invasive species (U.S. Department of Interior, Bureau of Reclamation. 2021. Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species). Before traveling onto the proposed ROW, the applicant would commit to washing all equipment and vehicles to remove any seeds or plant material, due to invasive species' presence in King Salmon and Igiugig areas. If priority invasive plants do become established, the applicant would commit to treating infestations. Effective and implementable methods to treat priority invasive plants have been developed and tested in Alaska. The applicant would be able to access online material providing detailed information on how to implement integrated pest at https://www.uaf.edu/ces/invasives/ipm/index.php and/or contacting the University of Alaska Cooperative Extension Service.
Minerals	There are no active mine sites in the Project Area and therefore mineral resources are not impacted by the Proposed Action or alternative.
Visual Resources (BLM only)	Project falls within BLM lands managed to Visual Resource Management Class 4, which allows for modification of the character of the landscape. This project would not affect the Visual Resource Management Class in the area.
Recreation	The Project Area is managed for dispersed, semi-primitive motorized recreation. This project would not impact the public's opportunity to achieve this objective.

1.6 Summary of Public Comments

On December 16, 2025, NTIA published notice and the Draft EA for a 30-day public comment opportunity at: https://broadbandusa.ntia.gov/funding-programs/documentation-and-reporting/Draft_EA_NTHE_Hooper_Bay. Concurrently, the BLM also published notice on the BLM's National NEPA Register project website, pointing to the project lead's (NTIA) comment opportunity <https://eplanning.blm.gov/Project-Home/?id=28A430F6-A7F2-F011-8407-001DD803D067>. Quintillion published notices of availability and comment in local news publications throughout the project area. Public notices were published in the Anchorage Daily News, Alaska Journal of Commerce, and Bristol Bay Times on December 14, 2025, and January 7, 2026, the Nome Nugget on December 18, 2025, and the Peninsula Clarion on December 19, 2025. The EA was made available to the public for review for 30 days on these platforms from December 17, 2025, through January 16, 2026. A total of 7 unique comments were received.

On January 13, 2026, EPA responded with the following summarized comments:

- Comment 1: How was the nature of the habitats along the submarine portions of the route determined?
- Comment 2: What specific BMPs are being used to protect the Alagnak River, and why will the proposed crossing not impact the sensitive area downstream?
- On January 16, 2026, a joint letter from the Paug-Vik Inc., Limited, Levelock Natives Limited, Igiugig Native Corporation, and BBNC responded with the following summarized comments:
 - Comment 3: The Draft EA should provide a more thorough identification and discussion of the potential consequences of winter construction to the environment and the residents who rely on these lands for subsistence.
 - Comment 4: The Draft EA is mostly silent on noise impacts to the wildlife that are targeted by subsistence activities.
 - Comment 5: The Draft EA does not acknowledge and needs to better address the risk to snowmachine users caused by surface lay fiber.
 - Comment 6: The commentors ask Quintillion to consider burying the terrestrial segment of the fiber due to potential subsistence impacts and snowmachine safety.
 - Comment 7: The commentors have previously asked Quintillion to shallow-bury the cable utilizing 12-18-inch (in.) trenching where the stakeholders prefer burial.

These comments have been responded to in the project decision document (see Appendix B, Table B-3).

2 Proposed Action and Alternatives

This chapter considers two alternatives: the Proposed Action Alternative and the No Action Alternative. The Proposed Action Alternative is intended to fulfill the project's purpose and need, including the authorization of a ROW Grant by the BLM and USFWS, and represents the preferred approach based on technical, environmental, and economic considerations. The No Action Alternative reflects the outcome of not proceeding with the proposed project, including receiving a denial of the ROW Grant by the BLM and USFWS, and assumes that existing conditions and management practices would remain unchanged. These alternatives are assessed in Chapter 3 and evaluated in Chapter 4.

No additional action alternatives beyond the Proposed Action were considered. Other alternatives that were considered and dismissed are also discussed below. Altogether, the following discussion of alternatives supports transparent decision-making by providing a comprehensive understanding of the potential trade-offs.

2.1 No Action Alternative

The No Action Alternative would not conduct any activities, nor would BLM or USFWS ROWs be issued. This would not accomplish the project's purpose and need but is useful as a comparison tool with the Proposed Action.

The No Action Alternative serves as a baseline for comparing the potential impacts of the Proposed Action. Under the No Action Alternative of this project, the Proposed Action would not be implemented. As a result, the AK communities of Nome, Emmonak, Naknek, and Igiugig would continue to rely on the existing telecommunications network. This network includes a single FOC.

2.2 Alternatives Considered but Eliminated from Further Discussion

Quintillion considered an additional route to transverse around the YDNWR and two routes from Naknek to Igiugig. For any route, the term of years needed would have been indefinite, as the fiber optic cable and related infrastructure would remain in place for the entirety of its lifespan, providing continuous advanced broadband service to the nearby communities. The average lifespan of FOC is approximately 25 years.

2.2.1 YDNWR: Alternative Route Around Nunivak Island

In the design phase, an alternative marine route circumventing Nunivak Island to avoid Etolin Strait and the YDNWR was considered but eliminated. In 2022, Quintillion completed a routing feasibility study, which identified the west side of Nunivak Island (Bering Sea) as a shipping lane. Shipping lanes are typically avoided for subsea cable installation, as slow-moving cable laying vessels pose a safety risk to other vessels traversing through the lanes. Routing around Nunivak Island would also substantially lengthen the cable route, increase the duration of installation vessel operations, and expand the overall cable footprint in the marine environment. The Proposed Alternative (Section 2.3) would cross approximately 130 mi. of the YDNWR through Etolin Strait. Routing around Nunivak Island would extend the marine cable by an additional 66 mi. to approximately 196 mi. Routing through Etolin Strait and the YDNWR would provide the most direct, operationally efficient, and cost-effective path, limiting the time the cable-lay vessel must be active in the area and minimizing associated seafloor disturbance. Reducing vessel operating time would also lessen potential temporary environmental effects linked to vessel activity, including underwater noise generation, the probability of marine mammal encounters, and potential to disturb seabirds on the water surface. Shorter operations further reduce fuel use, air emissions, and the likelihood of minor operational discharges.

2.2.2 Naknek to Igiugig: Alternative Route through the National Park Service Alagnak Wild and Scenic River (East Route)

In the design phase, an alternative (East) route for the segment connecting Naknek and Igiugig was considered but eliminated (**Figure 2**). This alternative crossed the National Park Service (NPS) Alagnak Wild and Scenic River (WSR). This wild and free-flowing section of the

Alagnak River was designated as a WSR in 1980 because of its pristine, wild ecosystem that contained critical salmon habitat and a rich diversity of wildlife habitat. This route was designed with the intention of being as direct as possible to minimize cable length and thus decrease latency between FOC end points. The proposed installation would have included shallow burial across shallow channels and vegetated areas in winter, and armored cable laid in the riverbed's main channel. The cable would have been anchored to minimize drift and damage from ice.

The long-term project components within the WSR would have been fiber optic cable and stakes. Based on preliminary investigations, approximately 3.4 mi. of the NTHE cable route would have crossed the WSR corridor. This includes crossing approximately 0.7 mi. of the Alagnak River from bank to bank, of which 0.53 mi. would have been in-water. Staging of equipment and materials would have occurred entirely outside of NPS boundaries to minimize impacts within the WSR corridor. All staging would have been compliant with local construction permits obtained at each location. These temporary staging areas would have been utilized to transit construction machinery and serve as temporary storage areas for excavated materials.

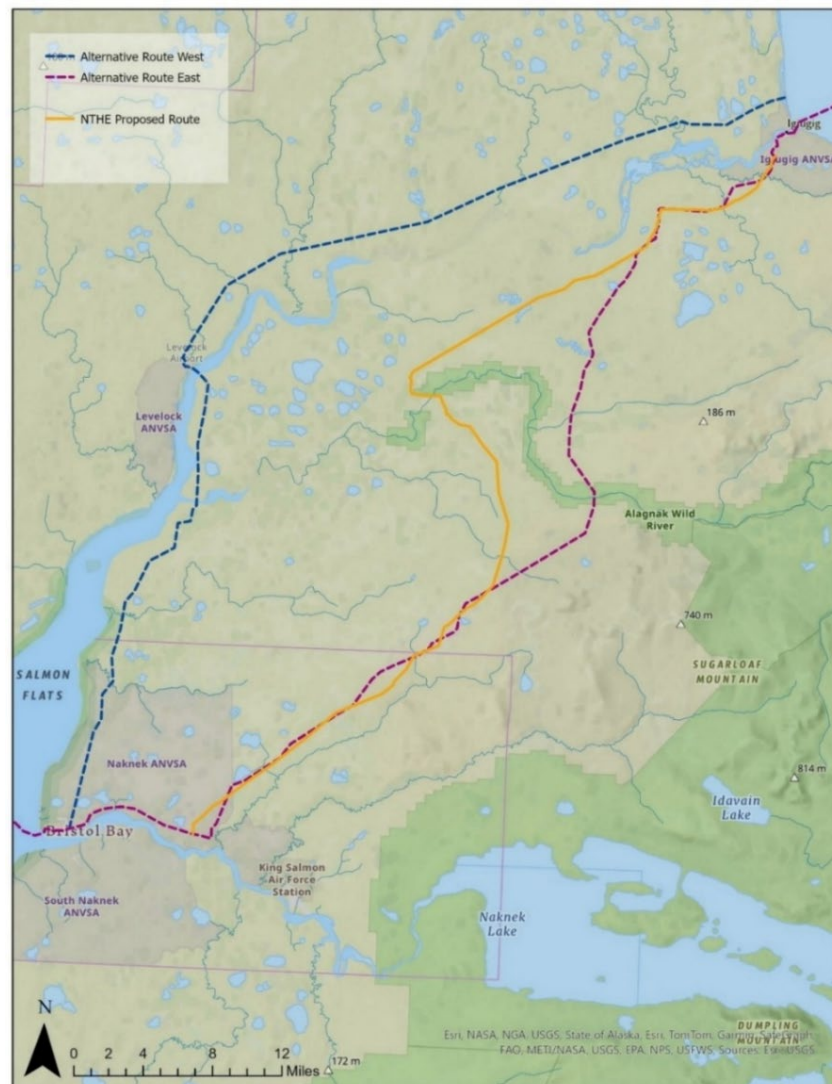


Figure 2. Proposed NTHE Route and Eliminated Alternatives

After consultation with NPS to investigate the route's plausibility and challenges, this route was eliminated because NPS determined that approving the project's construction activities inside of the boundaries of the Alagnak WSR would not align with the agency's responsibility to administer Section 7 of the Wild and Scenic Rivers Act (WSRA) of 1968 (NPS 2015). Section 7 of the WSRA aims to protect the free-flowing condition and outstanding values of designated rivers from adverse impacts. The proposed route would now avoid the WSR section of the Alagnak River (see Section 4.4.1 for more detail).

2.2.3 Naknek to Igiugig: Alternative Route Across the Kvichak River (West Route)

In the design phase, a second alternative (West) route for the segment connecting Naknek and Igiugig was considered but eliminated (**Figure 2**). This route would require the greatest number of aquatic crossings (88 crossings; 40 more than the East alternative route and 42 more than the Proposed Action alternative), including 15 fish-bearing stream crossings (11 more than the East alternative route and 12 more than the Proposed Action alternative). Consequently, this alternative would have impacted the greatest amount of sensitive aquatic habitat to complete the project's construction activities. For this reason, the West route was eliminated from further consideration.

2.3 Alternative 1: Proposed Action Alternative

Quintillion's NTHE project proposes constructing approximately 933 mi. of middle-mile FOC from Nome to Igiugig (**Table 2-1**), followed by connecting into an existing third-party installation to provide service to Homer (see **Appendix A** for a full Project Description). The cable route was selected after thorough site documentation in a desktop study and a marine route survey, conducted in 2023 and 2024, respectively (Acteon 2023, Benthic GeoScience 2024). These engineering and field studies assisted in the route selection process by providing information about environmental and anthropogenic conditions, which are crucial considerations for preventing future faults in the cable system. Shore-end segments of the marine route were identified to avoid high energy areas such as outfalls or developed shorelines with vessel anchorages. Geophysical surveys were also conducted for the route, and considerations were made to avoid areas prone to sediment slumping, fast currents, and other geological hazards.

Table 2-1. Submarine and Terrestrial Segments

Segment ID	From	To	Length (mi)*	Area (acres)	Associated Facilities
T1	Nome CLS	Nome BMH	0.0	0.0	Existing CLS, New Power Hut, and existing BMH
S1	Nome BMH	Emmonak BMH	113.53	688.06	Existing BMH and CLS
S2a	Emmonak BU	Emmonak BMH	35.65	216.06	New BU and BMH
S2b	Hooper Bay BU	Hooper Bay BMH	32.33	195.94	New BU and BMH
T2	Emmonak BMH	Emmonak CLS	9.46	57.33	New BMH and CLS
S3	Emmonak BU	Naknek BMH	656.48	3,978.67	New BMH
T3	Naknek BMH	King Salmon	10.33	62.61	New BMH and CLS
T4	King Salmon	Igiugig BMH	68.89	417.52	New BMH
T6	Hooper Bay BMH	Hooper Bay CLS	6.12	37.09	New BMH and CLS
TOTAL			932.79	5,653.27	
*Current/approximate estimates and final linear length may vary.					
Notes: BMH = Beach Manhole, BU = Branching Unit, CLS = Cable Landing Station.					

2.3.1 Project Components

The NTHE project is a hybrid system consisting of both submarine and terrestrial cables, components, and facilities. This system would have a 25-year life span, although cables can operate for longer periods. A ROW application to both the USFWS and BLM would be for a 30-year ROW term. These agencies would decide whether to authorize a ROW for this term, with the opportunity for renewal, for installation, operation, and maintenance of the proposed fiber optic cable, and under what stipulations to ensure compliance with applicable laws, regulations, and land use plans. A variety of equipment and construction methods would be used to achieve successful installation across the cable route (**Table 2-2**).

Table 2-2. Construction Equipment

Equipment	Construction Method(s)
Excavator	HDD/directional bore, BMH installation, PFE hut installation, FOC burial (all), CLS installation, communication hut installation
Drill Rig	HDD/directional bore
Shallow Trencher (6-12")	PFE hut installation, cable burial (shallow)
Snow Machine	FOC ground lay, aerial FOC installation, and conduit bridge attachment
Bucket Truck	Aerial FOC installation, conduit bridge attachment
Auger (Handheld)	Aerial FOC installation
Trencher	FOC terrestrial burial (standard)
Crane	CLS installation, communication hut installation
Cable-Lay Ship	Submarine FOC installation
Notes: BMH = Beach Manhole, CLS = Cable Landing Station, FOC = fiber optic cable; HDD = horizontal directional drilling; PFE = Power Feeding Equipment; Shallow = up to 12" burial; Standard = 36"- 48" burial.	

2.3.1.1 Construction Methods

The following subsections describe the construction and installation techniques that would be employed throughout the NTHE project. These methods have been selected based on environmental conditions, engineering requirements, and logistical considerations to ensure safe, efficient, and minimally disruptive deployment of the FOC.

Marine Installation

The marine route is defined as components taking place below the Mean Low Water Mark (MLW). The subsea segments, including that segment through the YDNWR, would be installed during the summer (June to September; mid-July to late August in the YDNWR). Installation would be conducted using a single, slow moving (approximately 3 knots) cable-laying vessel, approximately 300 feet (ft.) long, equipped with lightweight submarine cable. Submarine cables are engineered to endure the harsh conditions of the ocean floor, including high pressure and saltwater corrosion. The cables, measuring up to approximately 2 in. in diameter, are constructed from nontoxic materials including steel, copper, and polyethylene (plastic). Terrestrial segments of the route would use a single or double armor cable constructed with added levels of protection from damage.

Submarine FOC would connect Nome to Naknek, with branching units (BU) to Emmonak and Hooper Bay. A BU allows a single subsea fiber optic cable to connect to multiple destinations. It is typically placed on the ocean floor and acts as a junction point, where the main cable can split into two or more separate paths. Additionally, signal repeaters are placed along the cable to maintain signal strength over long distances. This setup is useful when a cable needs to serve more than one region from a single route.

To better protect the cable, all marine segments of the NTHE, including the segment through the YDNWR, would be buried targeting approximately 3 ft. depth. Burial at water depths greater than 40 ft. would be conducted using a cable plow. The cable plow would be pulled along the seafloor by a tow wire connected to the cable-laying vessel. The cable would be guided through the share blade of the plow, which creates a trench up to 5 ft. deep and approximately 1 ft. wide in the seafloor sediments. As the cable exits the lower rear of the plow, the surrounding sediments naturally collapse back into the trench, filling it and burying the cable.

In shallower waters, trenching would protect the FOC from environmental conditions such as surf action and ice scour. At these depths, trenching would be conducted by a jet sled, which is a self-propelled machine that uses water pressure to bury the cable. The pressurized water liquifies the seabed and turns it into a slurry, allowing the cable to sink into the temporary trench. The water used for jetting is supplied from the surface by high pressure hoses. The jet sled would be accompanied by divers to monitor trenching performance and assist in operations.

Prior to cable plow operations on the seabed, a pre-lay grapnel run (PLGR) may be deployed along all marine segments of the cable-laying route. The objective of the PLGR operation would be to clear any identified seabed debris (e.g., wires, rope, fishing gear) existing along the route. PLGR is conducted by pulling a grapnel device across the seabed. Any debris recovered by the grapnel would be safely disposed of ashore upon completion of the operations. If debris cannot be recovered, then a local re-route would be planned to avoid it.

When the installation is complete, a post-lay inspection would be conducted using a remotely operated vehicle (ROV). The inspection reviews areas where cable-laying activities may have experienced challenges, such as plow failure, cable repairs, placing a branching unit or joint, or unforeseen events. If burial corrections are necessary, the ROV would perform jet burial, like the method used by the jet sled. The ROV would be remotely operated by crew aboard the cable-laying ship.

Shore End Operations

Horizontal directional drilling (HDD) is a trenchless method of installing FOC underground while minimizing surface disturbances. The process involves a large drill rig that bores a guided path beneath the surface and installs a steel conduit through which the cable would be pulled. This creates a small, protected tunnel for the cable. The burial depth is determined based upon local conditions (e.g., soil type, anticipated activities in the area, environmental conditions, and operational needs). When conducting HDD operations, it is also common to use excavators. These machines use an approximately 2-3 ft bucket to dig out the bore entry which would subsequently be filled with a beach manhole (BMH). These machines would also move equipment and transport material around the operations site. HDD operations are proposed to occur at Nome and between Naknek and King Salmon (**Table 2-3**). For the Emmonak and Hooper Bay landings, a 4-in. articulate conduit would be buried no deeper than 36 in. from the BMH to below the MLW. The FOC would be fed through the conduit from the marine environment to the BMH.

Table 2-3. HDD at Each Segment

Location	Length (miles)
Nome	0.28
Naknek-King Salmon	7.49
King Salmon-Igiugig	0.24

Each marine cable segment would begin and terminate in a BMH. The BMH serves as the physical and functional transition between the marine environment and the land-based infrastructure, where the submarine cable connects to the terrestrial cable that continues to a nearby cable landing station (CLS). **Table 2-4** identifies the distances between the BMH and CLS (referred to as the “Front Haul”). The BMH is a pre-cast concrete chamber (approximately 6 ft. x 4 ft. x 4 ft. in dimension) installed underground in an excavated pit, located above the high tide line. It would be sealed from water and soil intrusion, with a lockable vault cover at-grade. The new BMHs would be installed at the Nome, Emmonak, Hooper Bay, and Naknek landing points.

A CLS is a secure facility where a submarine FOC comes ashore and connects to the land-based telecommunications network. The station ensures that the transported data can be efficiently routed to regional networks. A new CLS would be constructed for the cable landings at Emmonak, Hooper Bay, and Naknek; an existing CLS would house the newly installed cable in Nome. This construction would occur predominantly in summer.

Table 2-4. Front Haul for Each Landing

Landing Location	Infrastructure	Length (miles)
Nome	Existing BMH and CLS	0.0
Emmonak	New BMH and CLS	9.11
Hooper Bay	New BMH and CLS	3.20
Naknek	New BMH and CLS	1.95

Terrestrial Surface Lay

Surface laid cables would be installed along segments reaching the communities of Emmonak and Hooper Bay, and between Naknek to Igiugig (**Table 2-5**). Near Emmonak, a section of the route would also require new utility poles, while Hooper Bay would utilize existing poles (**Section 2.3.1** for more details). The FOC between Naknek and Igiugig would be a combination of aerial and surface laid. **Figure 3**, **Figure 4**, and **Figure 5** indicate different construction methods along the terrestrial routes.

Table 2-5. Surface Lay Along Each Segment

Location	Length (miles)
Emmonak	6.13
Hooper Bay	0.98
King Salmon-Igiugig	59.82



Figure 3. Construction Methods to Emmonak



Figure 4. Construction Methods to Hooper Bay



Figure 5. Construction Methods in Segment T4 (Naknek to Igiugig)

Surface lay is a method of installing the terrestrial FOC on top of the ground during winter. In remote areas of AK, surface lay is a safe and effective cable installation method due to the minimal risk of damage and its reduced impact on the natural environment. This approach has been successfully implemented in other regions of AK, including the Arctic Slope Telephone Association Cooperative's North Slope Fiber Optic Project and the GCI Communications Airraq Fiber Optic Project and is proposed for the NANA Region Middle Mile Fiber Optic Project (ASTAC 2019, 2024, BLM 2019, NTIA 2024a, 2025). A machine called a cable plow is used to pull the FOC along the path. This machine places the cable safely on the surface. To keep the cable from moving around or getting damaged, it may be secured with small anchors or ties, such as duckbill anchors installed using a hammer and drive pin where required.

Employees tasked with mainline fiber installation would be lodged in the community nearest to active construction and transiting via snowmachine to the work area and back each day. Items left at the construction site would be secured and waste would be removed at the end of each working day, to reduce wildlife attractants. Interactions with subsistence users are anticipated to be most likely to occur during transit to and from the work site.

Terrestrial cable segments between Naknek and Igiugig would cross streams and wetlands, while avoiding the WSR segment of the Alagnak River (see **Sections 3.5.1** and **3.5.5**, respectively). FOC in these habitats would be laid on the surface during winter months, when the ground is frozen and covered with at least 6 in. of snow and the ground is frozen to a depth of at least 12 in. to minimize environmental disturbances. This would minimize disturbance of stream banks and due to the frozen nature of the waterbodies, reduce erosive impacts of machinery crossing streams and rivers, such as the Alagnak River (see **Section 2.3.1.4**).

These segments would be installed with lightweight submarine cables, coiled inside of containers that are towed to the site using lightweight tracked vehicles. Additional slack would be provided when laying the cable to allow it to settle on the vegetation and conform to changing surface features and environmental conditions.

When constructing on soft and unstable sediments, heavy equipment would be placed on mats to avoid additional damage to the terrestrial surface. The position of the laid cable would be recorded with Global Positioning System. Terrestrial post-lay inspections would be conducted after any snow and ice melts. Any cable left suspended after the snow melts would be safely repositioned.

FOC repositioning would be done manually by moving the cable as needed. Natural processes such as erosion and deposition would bury the cable over time. FOC left on the vegetation would sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Additionally, the cable would be armored to avoid ice buildup. Helicopter and/or walking inspections would be conducted on an annual basis to monitor erosion.

Terrestrial Burial

There are segments of the route where the cable cannot be surface laid, such as busy areas where the cable would be at risk of damage from other activities, or where the cable route is close to trails or crosses streambanks and riverbanks. In these instances, the FOC would be buried underground (**Table 2-6**). Burial operations would occur in winter using varying methods, including excavation, trenching, and drilling.

Table 2-6. Burial Along Each Segment

Location	Shallow Burial Length (mi.)	Standard Burial Length (mi.)
Emmonak	0.93	0.0
Hooper Bay	0.0	0.85
Naknek-King Salmon	0.0	7.21
King Salmon-Igiugig	6.74	3.07

Where burial would be required, the cable would be shallow buried to the greatest extent feasible by trenching within the upper 6-12 in. of the surface. This method reduces environmental impacts compared to traditional excavation, using lighter equipment and disturbing a smaller area. Standard (conventional) burial of up to 48 in. would occur along existing ROWs in Hooper Bay, Naknek, and King Salmon to enhance cable protection in busier areas where the environment has already been disturbed. Shallow burial is preferred in areas where additional development is not expected, and it requires a less impactful process than standard burial. Standard burial is preferred in areas of development, as the deeper depth of the cable provides protection from road improvements and other utility work.

Trenching may be conducted differently depending on the environment. Winter trenching activities would be completed with a rock saw (a rotating metal saw that can cut through rock, concrete, and other hard materials). If permafrost (any soil, sediment, or rock that has been frozen for at least two years without thawing) is present during any trenching, the trench would stay within the vegetative mat above the permafrost, and the permafrost would be left intact. Permafrost is not likely to be present along the cable route (see **Section 3.5.7**).

Along streams and riverbanks, trenching would be done using a backhoe type excavator. Buried cable segments in wetlands would be trenched at a shallower target depth of 8 in., varying with terrain. When crossing streams and rivers, the in-water FOC would be spliced with terrestrial FOC and buried into each streambank below the ordinary high water mark (OHWM). This mark is defined by changing water levels and is indicated by features such as a natural line on the bank, changes in soil characteristics, or the presence of terrestrial vegetation. Split pipe articulated armor and driven cable anchors may be deployed in stream crossings for extra stabilization and protection. The crossing of anadromous waters would be conducted during winter. The FOC would be surface-laid and anchored by driven stakes to secure the cable within the river flow.

Aerial

Aerial installation would occur on existing and new poles in Emmonak and from Naknek to King Salmon, and on existing poles at Hooper Bay during spring/summer (**Table 2-7**). Aerial installation along poles is a cost-effective way to extend fiber optic internet service to rural or remote areas. These common poles are typically made of wood, approximately 10-15 in. in diameter and 40 ft. in length, buried approximately 6 ft deep when installed.

Table 2-7. Aerial Installation Segments

Location	Existing Poles (mi.)	New Poles (mi.)
Emmonak	2.03	0.03
Hooper Bay	4.49	0.0
Naknek-King Salmon	0.0	0.06

Aerial FOC installation is the process of deploying cables above ground, typically by attaching them to utility poles or other elevated structures. This method is commonly used in both urban and rural areas to create high-speed communication networks without the need for extensive underground construction.

Installation starts with the placement of a strong support wire which is strung between poles. The FOC is then attached to the support wire. In some cases, self-supporting cables with built-in tensile strength are used, eliminating the need for a separate support wire.

Throughout the installation, slack loops are added at regular intervals and near splice points. These loops provide extra cable length to accommodate future maintenance or repairs. Splicing is done in weatherproof enclosures mounted on the poles, where individual fibers are carefully joined to ensure signal continuity.

2.3.1.2 Operations and Maintenance

Throughout operations, no routine discharges, fuels, or emissions would occur during service. The FOC operation would be monitored remotely following compliance with federal and state maintenance stipulations to ensure long-term service.

For maintenance, both the marine and terrestrial segments would be continuously monitored via a Network Operations Center. Routine maintenance is primarily preventive and condition based. Terrestrial facilities would be inspected periodically (i.e., semi-annually) to verify the cable's integrity, access vault condition, and general system performance at landing sites and along the ROW. FOC outages that could occur during that period may necessitate emergency repairs and field visits, including helicopter access. If an outage occurs, response would be tiered: terrestrial faults would be handled by regional field technicians using equipment like that used for cable installation, while marine faults use a cable repair vessel (see **Appendix C**). If in summer, targeted overflights using helicopters could be as needed to access the cable segment needing repaired.

2.3.1.3 Cable Decommissioning

A Decommissioning Plan would be submitted to all relevant regulatory agencies. The decommissioning FOC at the end of its service is guided by the principles of safety, environmental protection, and minimal seabed disturbance. While complete removal is technically feasible, the most common method—particularly for cables installed in stable seabed environments—is in-place decommissioning, where the retired cable is left buried and inert under regulatory oversight.

For in-place decommissioning of the marine segments, the cable would be isolated, and the system would be secured physically at the BMHs by cutting and capping the ends to avoid any exposure hazards. The cable would remain buried in areas where it is stable and non-reactive in the marine environment. FOCs are made of inert materials such as polyethylene, steel, and glass, which do not degrade or leach contaminants. A survey of the remaining FOC would be conducted to confirm burial integrity and verify no sections are exposed, creating potential navigation or fishing hazards.

At the cable landings, where physical exposure is possible due to coastal processes, the shore-end segments would be excavated and removed. All BMHs, conduits, and ancillary infrastructure would be sealed and backfilled (see **Appendix C**).

2.3.1.4 Best Management Practices

A series of Best Management Practices (BMPs) –and Required Operating Procedures on BLM-managed lands– would be employed to mitigate the effects from the Proposed Action on protected species and the surrounding environment. The USFWS would also require BMPs across the project segments crossing refuge waters. All workers associated with the Proposed Action, irrespective of their employment arrangement or affiliation (e.g., employee, contractor), would be fully briefed on these measures and the requirement to adhere to them for the duration of their involvement in this project. BMPs and ROPs that would be implemented for this project are provided in **Appendix D**.

3 Description of the Affected Environment

3.1 Noise

The acoustic environment consists of mainly natural sounds like wind, water, and wildlife, and human-produced sounds from transportation in more populated areas. When sounds disrupt and impact the natural acoustic environment, they are considered “noise”. Noise impacts occur when sound level intensity or frequency interferes with typical activities or quality of life.

The proposed Project Area covers uninhabited landscapes in terrestrial and marine environments and small communities. Approximately 100 mi. of terrestrial FOC and approximately 830 mi. of marine FOC would be installed. Both the surrounding terrestrial and marine environments can be influenced by noise.

3.1.1 Terrestrial

The terrestrial component comprises five (5) distinct communities and their overland routes, including Nome, Emmonak, Hooper Bay, Naknek, and Igiugig. These communities are small and remote. **Table 3-1** provides common noise sources and levels within these communities. Noise restrictions are not published within the communities of Nome, Emmonak, Naknek, and Igiugig.

Table 3-1. Common Noise Sources and Typical Levels

Noise Source	Noise Level (dB)
Snowmachines	60 - 79
All-terrain Vehicles	Varies
Small Airplane Overhead Transit	<91 at 150 m (500 ft)
Passenger Vehicles (idling)	58
Passenger Vehicles	< 80 depending on distance
Construction Vehicles / Equipment	80 – 120
Single-engine Boats	65 - 90
Notes: dB = decibel Source: EPA 1971; DEOHS 2004; Kuyek 2015; PAME 2019; USFWS 2021; Przydatek et al. 2023	

3.1.2 Marine

The marine acoustic environment varies by season. During ice-covered months, ice cracking, shearing, ridging, and fracturing create sounds that can dominate the soundscape (Kinda et al. 2013). During ice-free months, noise sources are primarily wind and breaking waves (Menze et al. 2017). Wind noise near the Proposed Action have increased over 25 years due to changes of the Beaufort High and the Aleutian Low systems (Pickart et al. 2013).

The proposed project installation would occur during ice-free months when underwater anthropogenic noise is primarily produced by fishing and transit vessels. Vessels generate noise during normal operations (maximum source level of less than 195 dB re 1 μ Pa at 3.3 ft, combined average of 173 ± 7 dB re 1 μ Pa at 3.3 ft (Veirs et al. 2016)), from non-impulse sounds generated by the collapse of air bubbles (cavitation) created when propeller blades move through the water.

3.2 Fire Management

Wildland fire management and response are coordinated through the Alaska Interagency Coordination Center. Management options are defined through four fire management options, including: “critical,” “full,” “modified,” and “limited.” Critical have highest priority, Full response are aggressive initial attack, Limited are allowed to burn while protecting human life and site-specific values. The Modified option is treated as Full during the peak of fire season, then switches to Limited when large fire growth is less likely.

3.3 Air Quality

Ambient air quality is characterized by comparing the concentration of pollutants in the air to standards set by federal and state agencies. The Clean Air Act (CAA) requires EPA to set National Ambient Air Quality Standards (NAAQS). These standards apply to outdoor air throughout the country. Areas with pollutant levels above the NAAQS are considered non-attainment areas.

The Proposed Action is within a remote area of the Northern AK Intrastate Air Quality Control Region and the South-Central AK Intrastate Air Quality Control Region, where few major pollutant emission sources exist. Typical emissions in these regions are generally constrained to residential and not located within non-attainment areas (EPA 2025).

3.4 Geology and Soils

The Proposed Action is situated across three physiographic regions of AK including Seward Peninsula, the YK Delta, and the Bristol Bay Lowlands (ADF&G 2004).

Nome is located on the Seward Peninsula between the Bering Sea and Chukchi Sea. The landscape features a mix of coastal plains, convex hills, and isolated glaciated mountain ranges reaching elevations up to 4,600 ft (ADF&G 2004). This topography is shaped by glacial activity, marine influences, and volcanic processes (ADF&G 2004). Soils are predominantly derived from glacial till, marine sediments, and tundra-associated materials. The dominant classification is Kuskokwim silt loam, known for poor drainage and a thick organic surface layer (Dorava 1995). These soils are shallow and saturated due to the persistent presence of continuous permafrost. Permafrost occurs at shallow depths throughout much of the Seward Peninsula, severely limiting water infiltration from precipitation and snowmelt (Dorava 1995). This results in widespread

wetland conditions and influences both hydrology and vegetation. Ice-related geomorphological features, like patterned ground and thermokarst depressions, are common across the landscape.

Emmonak is located along the north bank of Kwiguk Pass, a distributary of the Yukon River, within the expansive YK Delta. This region is defined by low-lying terrain, braided river channels, and wetlands shaped by fluvial and coastal dynamics. The landscape experiences active channel migration and frequent seasonal flooding (Overbeck and Kennedy 2018). The flat coastal plains feature abundant thermokarst lakes, meandering streams, and highly productive brackish marshes and wet meadows (ADF&G, 2004). Soil conditions are influenced by discontinuous permafrost, which restricts drainage and contributes to the development of shallow, organic-rich soils (ADF&G 2004).

The Bristol Bay Lowlands are located on the northwest coast of the AK Peninsula and encompass the communities of Naknek, King Salmon, and Igiugig along the proposed project corridor. This region is characterized by low topographic relief, wet tundra, and a sediment-rich river system (ADNR 2013). The landscape has been shaped by a glacial, fluvial, and coastal processes, resulting in wetlands and braided river channels, such as the Naknek River which drains into Kvichak Bay (ADNR 2013). Soils in the region primarily consist of organic Histosols and young Inceptisols. These soils are typically deep, poorly drained, and formed from mossy organic material overlying alluvial parent deposits (USDA 2024a).

3.5 Water Resources

There are several federal and state regulations that protect Water Resources in the U.S., including Section 404 of the CWA regulates the discharge of fill into all federally jurisdictional waters of the U.S. (WOTUS), thus protecting surface waters and wetlands. The water resources included in WOTUS are subject to USACE jurisdiction. These include rivers, streams, lakes, wetlands, and marine waters.

3.5.1 Surface Water

The proposed Project Area construction occurs within four (4) major watersheds, as defined by the U.S. Geological Survey (USGS): Naknek HUC 19030204, Nome HUC 19050104, Yukon Delta HUCs 19040805 and 19090305 (USGS 2024a). The following named waterbodies intersect the proposed project corridor: Norton Sound, Etolin Strait (YDNWR), Bering Sea, Bristol Bay, and Kvichak Bay. The FOC would cross 46 surface bodies of water (e.g., rivers and streams; see **Appendix E** for full list of crossings).

3.5.2 Groundwater

Groundwater in AK plays a crucial role in supporting ecosystems, communities, and industries, especially in rural and remote areas. It is primarily stored in aquifers beneath permafrost or in unfrozen zones called “taliks”. Due to AK’s cold climate and complex geology, groundwater availability and movement can vary widely across the state.

The region between Naknek and Igiugig is characterized by a complex groundwater system shaped by glacial deposits, unconsolidated sediments, and dynamic hydrologic conditions. As the landscape transitions toward Igiugig, geology continues to support groundwater availability, with aquifers composed of glacial and fluvial sediments. The absence of continuous permafrost in this region allows for relatively unrestricted groundwater movement. Recharge is primarily driven by

snowmelt and precipitation, and groundwater discharge supports surface water bodies such as lakes, streams, and wetlands.

3.5.3 Coastal Zone, Estuary, and Intertidal Areas

The Coastal Zone Management Act of 1970 is intended to protect both freshwater and marine coastal areas from environmental degradation. It applies to all lands on the boundary of any ocean or arm thereof, and the Great Lakes. As of July 1, 2011, AK withdrew from the voluntary National Coastal Zone Management Program.

The marine waters within the Proposed Action area include Bering Sea, Norton Sound, Etolin Strait (YDNWR), Bristol Bay, and Kvichak Bay. Coastal, estuary, and intertidal components lie at landing stations in Nome, Emmonak, Hooper Bay, and Naknek. The coastline consists of beaches, ocean spits, tidal mud flats, coastal salt marshes, and coastal wetlands. Due to reduced sea ice along the coasts, in conjunction with rising sea levels, there is a rapid erosion of coastal soils. Also, with rising sea levels and storm surges, there are more frequent intrusions of marine waters into coastal wetlands, moving saltwater inland and promoting erosion (USDA 2023). Coastal areas provide important habitat for many species such as brown bears (*Ursus arctos*), migrating waterfowl, the American mink (*Neovison vison*), Steller sea lions (*Eumetopias jubatus*), and fishes (ADF&G 2024).

The Yukon River enters the Bering Sea near Emmonak where it forms one of the largest river deltas in North America. It also makes key contributions to the Bering Sea by providing freshwater runoff, sediments, and dissolved solutions to the ecosystem. Most of the flow occurs in the summer months from snowmelt, rainfall, and glacial melt, and the annual mean discharge of near the river mouth is more than 200,000 cubic feet per second. Additionally, the river transports about 60 million tons of suspended sediment annually into the Bering Sea, and an annual 20 million tons is deposited on floodplains and reaches of the river. The waters are predominately calcium magnesium bicarbonate waters (Brabets et al. 2000). Due to increasing temperatures, changes to the river are expected to continue as variations in proportions of glacial runoff, ranges of permafrost distribution, and as the movement of carbon and nutrients evolve (Brabets et. al. 2001). The Naknek River flows westward from Naknek Lake for approximately 21 mi. into Kvichak Bay. The lower at least 6 mi. portion of the river is an estuary that is influenced by brackish water and the tides (Waythomas 1994).

3.5.4 Floodplains

Much of the Project Area is unmapped by the Federal Emergency Management Agency (FEMA) Flood Map Service center, including the community of Naknek and Hooper Bay, and most of the inland route between Naknek and Igiugig. Severe flooding at the Naknek River is rare due to a lake occupying a significant portion of the drainage basin (Waythomas 1994). Emmonak, Nome, and Igiugig, as part of the Lake and Peninsula Borough, are communities within the Project Area that participate in the National Flood Insurance Program and have mapped flood zones, while Naknek (a part of Bristol Bay Borough [BBB]) is not a participant (FEMA 2023a).

Flood frequency data from the Natural Resources Conservation Service is available for most communities along the Proposed Action area, including Nome, Emmonak, and the coast of Naknek (USGS & ESRI 2024). These communities all have a flood frequency of *Frequent*, which means that “flooding is likely to occur often under usual weather conditions; more than a 50 percent chance of flooding in any year (i.e., 50 times in 100 years), but less than a 50 percent

chance of flooding in all months in any year” (USGS & ESRI 2024). USGS does not have any active stream gauge monitoring areas within the Proposed Action area (FEMA 2023b, USGS 2024b). National Oceanic and Atmospheric Administration (NOAA) does have three gauges in the project vicinity including one tidal gauge in Naknek and two stream gauges at the Kvichak River at Igiugig (ESRI 2023).

According to the Native Village of Hooper Bay (NVHB) Multi-Jurisdictional Hazard Mitigation Plan Update (NVHB 2015), the city is susceptible to primary flooding occurrences of rainfall-runoff, snowmelt, ice jam, storm surge, and ice override floods. ADNR’s Division of Geological & Geophysical Surveys produced color-indexed elevation maps for Hooper Bay with water levels ranging from 9.8 to 13.1 ft above sea level. This data was established, however, prior to September 2022 when extra-tropical storm Merbok struck Hooper Bay flooding the entire community. High watermarks and debris were identified throughout the community and well east of the airport, with floodwater from the storm surge reaching approximately 18 mi. inland. According to other data, Merbok was a major storm that likely exceeded a 100-year occurrence. Generally, the YK region is susceptible to flooding due to the low relief of the landscape and prevalence of permafrost. Flooding typically occurs during spring ice break-up and in late fall with intense precipitation and storm-driven flood tides.

3.5.5 Wetlands

The YK Delta is the largest area of wetlands on North America’s western coast. The delta includes streams, rivers, lakes, and wetlands that span over 42,000 square miles (mi²), with intertidal mudflats comprising approximately 768,500 acres. The region is primarily shrub wetlands and riparian landscapes. Dwarf shrub cover is found within most of the region’s peat lowlands. Wet graminoid communities are found within lowland wet areas surrounding lakes, drained basins, water tracks, and floodplains where wetlands form in wet depressions, oxbows, and abandoned channels. Freshwater emergent marshes are also closely linked to lakes and wet areas of floodplains. These diverse wetlands provide essential habitat for regional fauna, including waterfowl, shorebirds, and large mammals (Reid and Fehringer 2018). USFWS’ National Wetland Inventory maps were available for some but not all areas of the proposed project corridor. Where not available, wetlands were assumed to be present in all undisturbed, vegetated areas above OHWM.

3.5.6 Ice

The subarctic climate of western AK is largely influenced by the Bering Sea and the Gulf of Alaska. The circulation of the Alaskan Current carrying warmer waters northward and westward following the Aleutian Islands is a primary climactic driver. When these waters enter the Bering Sea, they mix with local cold waters and create an atmospheric low-pressure zone called the Aleutian low. Precipitation levels can vary significantly by location, ranging from approximately 10 to 100 in. annually. Ice, sea ice, and permafrost are characteristics of the region.

Winter weather in AK lasts up to half of the year in some regions and is dominated by large quantities of ice in the landscape (NPS 2024b). When ice breaks into icebergs, it can move within a body of water and damage subsea cables placed there (**Figure 6**). Ice forms over rivers, lakes, and the ocean. **Figure 7** depicts the 2023 monthly ice extent changes in AK (NOAA 2024). Sea ice forms in Nome waters by mid-late December, and shore ice is melting by early May (Kettle et al. 2017).

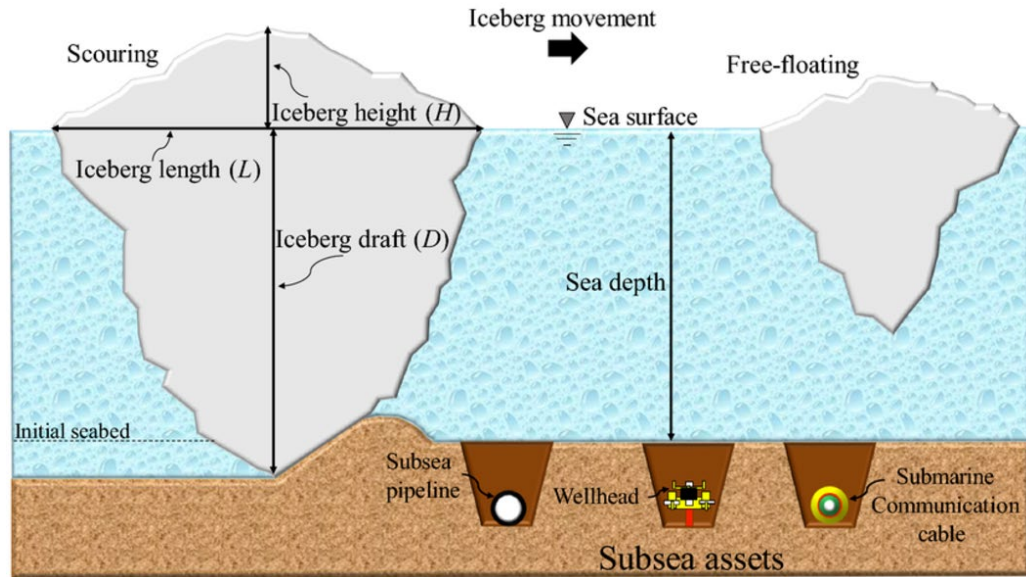


Figure 6. Iceberg Scouring Mechanics

Source: Azimi et. al 2023

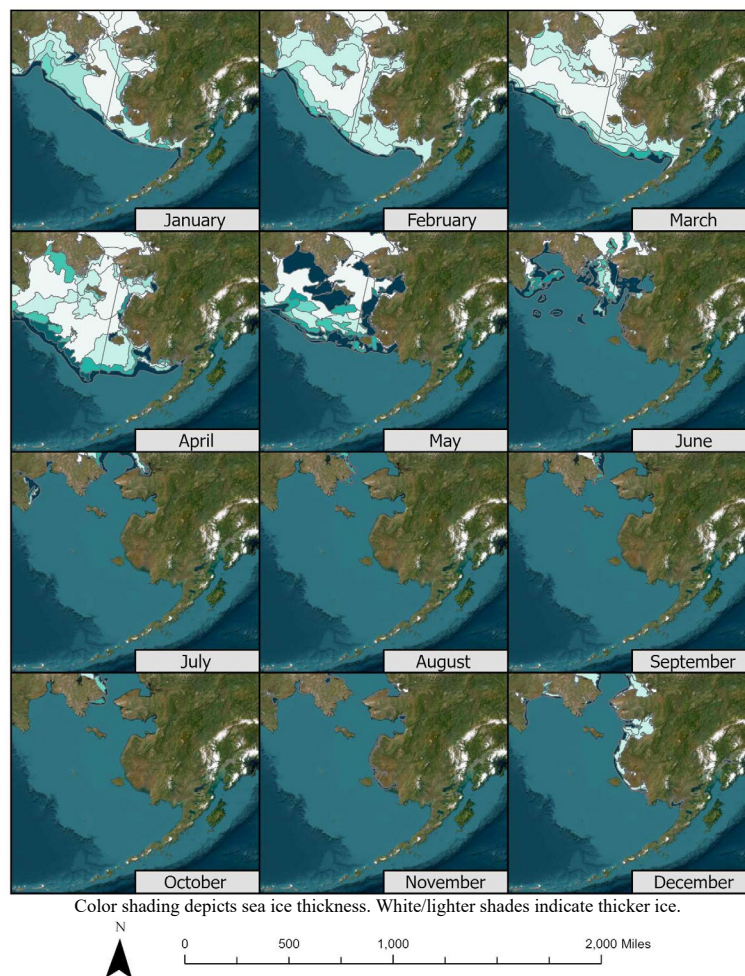


Figure 7. 2023 Monthly Sea Ice Extent in AK

3.5.7 Permafrost

Permafrost includes any ground (i.e. soil, sediment, rock) that has been frozen for at least two years without thawing (Denchak 2018). In AK, about 85 percent of the land has permafrost. It also freezes decaying matter, which reduces the amount of carbon dioxide, methane, and other gases entering the atmosphere (Denchak 2018). During the summer months, the active layer above the permafrost thaws and creates a wet landscape with runoff (NPS 2024c). This additional runoff can create pits, ponds, and landslides (NPS 2024c). Melted or damaged permafrost can reintroduce those gases into the atmosphere, so efforts exist to protect it from deterioration (Denchak 2018).

Isolated permafrost (0 to 10 percent frozen) exists in areas of the proposed project corridor, including near Emmonak (**Figure 8**), and from King Salmon to Igiugig (**Figure 9**) (Jorgenson et. al. 2008). Permafrost in Hooper Bay is not adequately mapped but is reported as being discontinuous (50 to 90 percent frozen), with only one site near the airport that is frozen at a depth of 3.3 ft. to 6 ft. (NVHB 2015; Osterkamp & Lachenbruch 1990). In this area, surface water percolates into the soils and flows along the surface of the permafrost until more permeable material is encountered. Soil summaries from the USDA Web Soil Survey mapper are not available for Hooper Bay.



Figure 8. Permafrost Along Emmonak FOC Route



Figure 9. Permafrost Along the Naknek to Igiugig FOC Route

3.6 Biological Resources

3.6.1 Terrestrial Vegetation and Wildlife

3.6.1.1 Vegetation

AK's plant communities are managed by the BLM across seven ecoregions: Southeast, Aleutian Islands, South-Central, Southwest, Northwest, Arctic, and Interior AK (BLM 2024a). The proposed project takes place in the Northwest (Nome) and Southwest (Emmonak, Hooper Bay, Naknek, and Igiugig) ecoregions (BLM 2024a).

The Northwest ecoregion includes the Polar Tundra ecoregion. This area is north of the Y-K Delta all the way to Cape Lisburne. It consists of Norton Sound, Seward Peninsula, Kotzebue Sound, Kobuk, and Noatak River drainages (Viereck et al. 1992). Nome is within the Seward Peninsula (Nowacki et al. 2001). This region is the transition between Arctic and sub-Arctic tundra. With a continuous permafrost layer, vegetation is largely based on elevation and terrain, ranging from tidal marsh in low areas to willows, birch, and shrub tundra, or barren at higher elevations (Viereck et al. 1992; Nowacki et al. 2001).

The Southwest ecoregion includes the Bristol Bay Lowlands, Kuskokwim Bay, and much of the YK Delta region (Viereck et al. 1992). Due to wet organic soils throughout the ecoregion, wetland vegetation is common (Viereck et al. 1992, Nowacki et al. 2001). Low and dwarf shrub communities of willow, birch, and alder characterize the wetlands with spruce and birch along rivers and streams. From King Salmon, the route goes to Igiugig in the Lime Hills ecoregion in the southwest end of the Alaska Range (Nowacki et al. 2001). This ecoregion has mixed low-lying vegetative cover, varying by location. Grasslands cover extensive areas with pockets of

brush, tundra, coarse grass, and peat moss interspersed with open woodlands. Open woodlands consist of thin stands of stunted deciduous tree species such as white birch and balsam poplar. Balsam poplar grows well in floodplain areas of Alaska and plays a critical role in riparian ecosystems by providing habitat and food for species.

3.6.1.2 Wildlife

If the Proposed Action is implemented, wildlife habitat would be affected. Habitat impact can be measured by acres of human disturbance, seasonality, timing, and duration. This landscape supports rich populations of large mammals such as caribou, moose, brown bear, and wolves, along with migratory birds (see **Section 3.6.2**), shorebirds, and seabirds. Many of the terrestrial species occupying this terrestrial habitat are migratory with habitat use varying year-to-year. Caribou and moose calving, wintering, and rutting areas have changed over time. For example, the location of caribou wintering varies throughout this range from year to year and within years and does not exhibit the same concentrated pattern that is characteristic of moose wintering areas (ADNR 2013).

The Mulchatna Caribou Herd (MCH) was considered in this assessment. The terrestrial segment of the proposed Project Area lies at the periphery of the species' known range; namely, there is a relatively small east winter range that would be crossed by the proposed cable route (ADF&G 2025a). However, the MCH is unlikely to be concentrated in this area, especially in winter, due to the geographic and ecological characteristics of the area and the herd's seasonal movement patterns. While the herd's range does extend broadly across southwest Alaska, including parts of the Nushagak and Kuskokwim drainages, the Naknek–Igiugig corridor is not known to be a concentrated area or a major migration route (Van Lanen et al. 2018).

Moose occur at low densities throughout the Project Area with locally higher densities occurring in riparian areas and other areas with abundant tall shrubs, especially willow (Joly et al. 2016). Moose uses low elevation riparian habitat more during moderate and severe winters but higher elevations during mild winters.

Wolves and brown bears occur in the Project Area at low densities. Brown bears of both sexes den during most of the winter and pregnant females give birth in the den. Brown bears often select moderately steep slopes and high snow load potential areas for denning (Sorum et al. 2019).

None of the terrestrial mammals in the Project Area are listed under ESA.

3.6.2 Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA). In 1972, supplemental treaties expanded the MBTA scope to include bald eagles and other raptors. As such, the MBTA prohibits the taking of any migratory bird, their nests, or their eggs. USFWS' Information for Planning and Consultation (IPaC) identifies 31 species of migratory birds that are of particular concern and are known to occur in the Project Area (**Table 3-2**).

Table 3-2. Avian Species That May Be Present Within the Project Area

Common Name (<i>Scientific Name</i>)	Elevated Probability of Presence (USFWS)	Breeding Season Across Entire Range
Eagles		
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Undetermined	Mar. 1 to Aug. 31
Golden Eagle (<i>Aquila chrysaetos</i>)	Undetermined	Mar. 1 to Aug. 31
Migratory and Seabirds		
Aleutian Tern (<i>Onychoprion aleuticus</i>)	Mid-May to Late-Aug.	May 1 to Aug. 31
American Golden-plover (<i>Pluvialis dominica</i>)	Mid-May to Late-Aug.	May 20 to Aug. 15
Bar-tailed Godwit (<i>Limosa lapponica</i>)	Mid-May to Early-Sep.	May 15 to Aug. 15
Black Guillemot (<i>Cephus grylle</i>)	Mid-May to Mid-Jun.	May 15 to Sep. 10
Black Scoter (<i>Melanitta nigra</i>)	Late-Mar. to Early-Jul.; Late-Aug. to Early-Oct.	Breeds elsewhere
Black Turnstone (<i>Arenaria melanocephala</i>)	Early-May to Mid-Aug.	May 15 to Jul. 31
Black-legged Kittiwake (<i>Rissa tridactyla</i>)	Mid-Apr. to Mid-Nov.	Breeds elsewhere
Bristle-thighed Curlew (<i>Numenius tahitiensis</i>)	Early-Jun. to Mid-Jun.	May 15 to Aug. 15
Common Eider (<i>Somateria mollissima</i>)	Early-May to Late-Dec.	Jun. 1 to Sep. 30
Common Loon (<i>Gavia immer</i>)	Late-May to Late-Aug.	Apr. 15 to Oct. 31
Common Murre (<i>Uria aalge</i>)	Mid-May to Late-Jun.; Mid-Aug.	Apr. 15 to Aug. 15
Double-crested Cormorant (<i>Phalacrocorax auritus</i>)	Early-Jun. to Mid-Jun.	Apr. 20 to Aug. 31
Hudsonian Godwit (<i>Limosa haemastica</i>)	Early-May to Mid-May; Mid-Jul. to Late-Aug.	May 15 to Jul. 31
Kittlitz's Murrelet (<i>Brachyramphus brevirostris</i>)	Mid-Jun. to Late-Jun.	May 15 to Aug. 31
Long-tailed Duck (<i>Clangula hyemalis</i>)	Late Mar. to Mid-Dec.	Breeds elsewhere
Marbled Godwit (<i>Limosa fedoa</i>)	Early May; Late-Jul. to Late-Aug.	May 1 to Jul. 31
Northern Alaska Dunlin (<i>Calidris alpina arctica</i>)	Late Apr. to Early-Oct.	May 20 to Jul. 20
Pomarine Jaeger (<i>Stercorarius pomarinus</i>)	Mid-May to Late-Jul.	Breeds elsewhere
Red Knot (<i>Calidris canutus roselaari</i>)	Early-May to Early-Sep.	Jun. 2 to Aug. 20
Red Phalarope (<i>Phalaropus fulicarius</i>)	Mid-May to Mid-Aug.	Breeds elsewhere
Red-breasted Merganser (<i>Mergus serrator</i>)	Mid-Apr. to Mid-Jul.	Breeds elsewhere
Red-necked Phalarope (<i>Phalaropus lobatus</i>)	Early-May to Mid-Aug.	Breeds elsewhere
Red-throated Loon (<i>Gavia stellata</i>)	Late-Apr. to Early-Oct.	Breeds elsewhere
Short-billed Dowitcher (<i>Limnodromus griseus</i>)	Late-Apr. to Late-May; Mid-Jul. to Late-Aug.	Jun. 1 to Aug. 10
Surf Scoter (<i>Melanitta perspicillata</i>)	Mid-May to Late-Jun.; Mid-Aug. to Early-Sept.	Breeds elsewhere
Thick-billed Murre (<i>Uria lomvia</i>)	Early-Jun. to Late-Jun.; Mid-Aug.	Apr. 15 to Aug. 15
Wandering Tattler (<i>Tringa incana</i>)	Late-May to Mid-Jun.; Early-Aug.	May. 15 to Aug. 15
White-winged Scoter (<i>Melanitta fusca</i>)	Mid-May to Late-Jul.; Early-Oct. to Mid-Oct.	Breeds elsewhere
Yellow-billed Loon (<i>Gavia adamsii</i>)	Mid-May to Mid-Jul.	Jun. 1 to Sep. 20

3.6.3 Bald and Golden Eagles

Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the Bald and Golden Eagle Protection Act of 1940 as amended (16 U.S. Code [USC] 668–68d) and the MBTA (16 USC 703–12). Both sets of regulations control activities that have the potential to harass, disturb, or kill eagles, and limit the trade and trafficking of eagles and eagle parts. Eagles prefer to nest near coastlines, rivers, large lakes, or streams with an abundant supply of food (e.g., fish). Eagles mostly nest within mature or old-growth forests, in trees with branches capable of supporting a nest weighing up to 1,000 pounds (lbs). Nests are often located in the tallest tree within 600 ft. of a waterbody. Both bald and golden eagle ranges overlap with terrestrial components of the proposed Project Area.

3.6.4 BLM Sensitive Species

The BLM Sensitive Species have been included in this EA to ensure that potential impacts to species of conservation concern are adequately evaluated. These species, while not federally listed under ESA, are recognized by BLM as requiring special management attention to prevent population declines and future listing. The species presented in **Table 3-3** have geographic ranges that overlap with the proposed Project Area, but this assessment does not determine the likelihood of their presence. Their inclusion supports proactive conservation and aligns with BLM Manual 6840 guidance.

Table 3-3. BLM Sensitive Species in Southwestern Alaska

Common Name	Scientific Name
Birds	
Kittlitz's Murrelet	<i>Brachyramphus brevirostris</i>
Dunlin arcticola	<i>Calidris alpina arcticola</i>
Red Knot	<i>Calidris canutus</i>
Buff-breasted Sandpiper	<i>Calidris subruficollis</i>
Olive-sided Flycatcher	<i>Contopus cooperi</i>
Rusty Blackbird	<i>Euphagus carolinus</i>
Yellow-billed Loon	<i>Gavia adamsii</i>
Red-throated Loon	<i>Gavia stellata</i>
Marbled Godwit	<i>Limosa fedoa</i>
Hudsonian Godwit	<i>Limosa haemastica</i>
Bar-tailed Godwit	<i>Limosa lapponica</i>
Whimbrel	<i>Numenius phaeopus</i>
Bristle-thighed Curlew	<i>Numenius tahitiensis</i>
Invertebrates	
Ashton Cuckoo Bumble Bee	<i>Bombus bohemicus</i>
Northern/Great Yellow Bumble Bee	<i>Bombus distinguendus</i>
Confusing Bumble Bee	<i>Bombus perplexus</i>
Mayfly	<i>Acentrella feropagus</i>
Alaska Sallfly	<i>Alaskaperla ovibovis</i>
Alaska Endemic Mayfly	<i>Rhithrogena ingalik</i>

Common Name	Scientific Name
Fish	
Alaskan Brook Lamprey	<i>Lampetra alaskensis</i>
Arctic Char	<i>Salvelinus alpinus</i>
Plants	
Weak Sedge	<i>Carex laxa</i>
Parry Sedge	<i>Carex parryana</i>
Jointed Rush	<i>Juncus articulatus</i>
Drummond's Bluebells	<i>Mertensia drummondii</i>
Saxifrage	<i>Micranthes nelsoniana</i> ssp. <i>insularis</i>
Bostock's Minerslettuce	<i>Montia vassilievii</i> ssp. <i>vassilievii</i>
Naked Broom-rape	<i>Orobanche uniflora</i>
Locoweed	<i>Oxytropis arctica</i> var. <i>barnebyana</i>
Arctic Poppy	<i>Papaver gorodkovii</i>
Hairy Lousewort	<i>Pedicularis hirsuta</i>
Seashore Bluegrass	<i>Poa macrantha</i>
Sheathed Alkaligrass	<i>Puccinellia vaginata</i>
Pacific Buttercup	<i>Ranunculus pacificus</i>
Alaska Mistmaiden	<i>Romanzoffia unalaschcensis</i>
Bering Sea Dock	<i>Rumex beringensis</i>
Krause's Sorrel	<i>Rumex krausei</i>
Pygmy Aster	<i>Symphyotrichum pygmaeum</i>

3.6.5 Threatened and Endangered Species

The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. Federal agencies are required to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any listed species or result in the destructive or adverse modification of critical habitat of such species. The ESA defines an “endangered species” as a species that is in danger of extinction throughout all or a major portion of its range, and a “threatened species” is any species that is likely to become an endangered species within the foreseeable future throughout all or a major portion of its range.

In accordance with Section 7(a)(2) of the ESA, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and proposed threatened or endangered species and designated critical habitat. Federal agencies are thus required to consult with USFWS and NMFS regarding species protected under this act. The USFWS has jurisdiction over freshwater fish species and all listed wildlife and terrestrial plant species, while NMFS oversees listed marine mammals, sea-based fish species, and several anadromous salmonid species.

Ten (10) species protected under the ESA were identified with potential presence in areas along the proposed route. Three (3) of these species have designated critical habitat that overlaps with the cable route (**Table 3-4**).

Table 3-4. ESA-listed Species and Critical Habitat that May Be Present in the Project Area

Common Name (<i>Species name</i>)	ESA Status	Critical Habitat Overlap	Jurisdiction
Mammals			
Arctic ringed seal (<i>Pusa hispida hispida</i>)	Threatened	Yes	NMFS
Bearded seal, Beringia DPS (<i>Erignathus barbatus nauticus</i>)	Threatened	Yes	NMFS
Fin whale (<i>Balaenoptera physalus</i>)	Endangered	No	NMFS
Humpback whale, Mexico DPS (<i>Megaptera novaeangliae</i>)	Threatened	No	NMFS
Humpback whale, Western North Pacific DPS (<i>Megaptera novaeangliae</i>)	Endangered	No	NMFS
North Pacific right whale (<i>Eubalaena japonica</i>)	Endangered	No	NMFS
Sperm whale (<i>Physeter macrocephalus</i>)	Endangered	No	NMFS
Steller sea lion, West DPS (<i>Eumetopias jubatus</i>)	Endangered	Yes	NMFS
Birds			
Spectacled Eider (<i>Somateria fischeri</i>)	Threatened	No	USFWS
Steller's Eider (<i>Polysticta stelleri</i>)	Threatened	No	USFWS
Notes: AK = Alaska; DPS = Distinct Population Segment; ESA = Endangered Species Act; N/A = Not Applicable; NMFS = National Marine Fisheries Service; USFWS= U.S. Fish and Wildlife Service			

Ringed Seal: Ringed seals exhibit a circumpolar distribution, occupying seasonally ice-covered marine environments across the Northern Hemisphere and some freshwater systems. Of the five recognized subspecies, only *P. h. hispida* (Arctic stock) is present in the Project Area. This subspecies is listed as threatened under the ESA (77 FR 76706) and depleted under the MMPA, qualifying it as a strategic stock. Ringed seals are highly dependent on sea ice for survival, remaining in contact with it through autumn, winter, and spring. Reproduction is closely tied to ice and snow availability: females construct snow-covered lairs on sea ice for pupping and nursing (late winter to early spring), which aid in thermoregulation and offer some predation protection (Muto et al. 2021). Impacts are not anticipated given the implementation of mitigation measures. Additionally, the seasonal occurrence of the species within the Project Area has limited overlap with project operations as habitat utilization is closely linked to the presence of sea ice.

Bearded Seal: Bearded seals are widely distributed throughout circumpolar Arctic and sub-Arctic marine ecosystems, predominantly occupying continental shelf regions with depths less than 650 ft. Within the North Pacific, this species is further classified into the subspecies *E. b. nauticus*, of which the Beringia DPS occurs (77 FR 76740) and is currently classified as threatened under the ESA and depleted under the MMPA, thereby meeting the criteria for a strategic stock. Bearded seal distribution is governed by sea ice dynamics, with seasonal migrations tracking ice recession and formation (Muto et al. 2021). Potential impacts to bearded seals are expected to be negligible, owing to mitigation strategies and the limited overlap between project activities and the seals' habitat requirements. Bearded seals depend heavily on sea ice for essential aspects of their life history. As such, their presence in the Project Area is generally confined to periods and locations where suitable ice conditions persist.

Fin Whale: Fin whales are widely distributed throughout deep pelagic waters in major ocean basins, with the highest concentrations occurring in temperate to polar regions. Occurrence in

tropical areas is uncommon. This species is currently classified as threatened under the ESA and depleted under the MMPA. Fin whales exhibit seasonal shifts in abundance, migrating from high-latitude Arctic and Antarctic feeding grounds during summer months to lower-latitude breeding and calving areas in winter; however, the exact locations of their winter habitats remain largely unknown. Habitat selection is influenced by sea surface temperature, prey availability, and oceanographic features including upwelling zones and shelf breaks (Muto et al. 2021). Available behavioral data suggests a preference for offshore, open-ocean environments over nearshore coastal habitats except during migration and in pursuit of prey aggregations (Muto et al. 2021). Within the Project Area, fin whale occurrence is therefore largely confined to deep-water habitats beyond the continental shelf. Given the spatial distribution of both the project footprint and fin whale core habitat, the potential for interaction is considered minimal.

Humpback whales (Western North Pacific DPS; Mexico DPS): Humpback whales undertake long-distance migrations, traveling over 4,971 mi. between summer feeding grounds in AK and winter breeding areas. High summer concentrations occur in Southeast AK, Prince William Sound, Kodiak, the Bering Sea, Aleutian Islands (Wild et al. 2023), and the Gulf of AK (Wade 2021). NMFS recognizes 14 DPS' globally under the ESA (81 FR 62259), with four in the North Pacific: Western North Pacific (endangered), Hawai'i (not listed), Mexico (threatened), and Central America (endangered), each defined by genetic studies and migration patterns (Young et al. 2024). Presence of the Western North Pacific DPS and the Mexico DPS occur within the Project Area; however, impacts are not anticipated due to implemented mitigation.

North Pacific Right Whale: Endangered under the ESA and depleted under the MMPA, right whale populations are extremely low, with main concentrations in the southeastern Bering Sea. Sightings outside this area is rare. Migration and breeding grounds remain unidentified. Critical habitat has been designated in the southeastern Bering Sea, adjacent to the Project Area (see **Section 3.6.6**). Ongoing monitoring and research highlight sporadic detections and uncertain population connectivity (Young et al. 2024). Presence of North Pacific right whales within the Project Area would most likely occur in mid-shelf waters of Bristol Bay (Shelden et al. 2005). Impacts on the species are negligible based on implemented mitigation and the low probability of presence within the Project Area.

Sperm Whale: Listed as endangered under the ESA and depleted under the MMPA, sperm whales are found throughout the North Pacific, including the Gulf of AK and Aleutian Islands. Both sexes occupy high latitudes during summer, with acoustic and tagging data indicating year-round regional presence and high population connectivity. Sperm whale distribution is primarily influenced by the spatial and temporal availability of prey, especially deep-water cephalopods, as well as breeding requirements and social structure within groups. These odontocetes exhibit pronounced foraging behaviors characterized by routine dives often exceeding 2,000 ft, resulting in much of their activity occurring within deep pelagic environments (Muto et al. 2021). Given the current mitigation strategies and the extent of project activities into deeper waters beyond the continental shelf, impacts on sperm whales are anticipated to be negligible.

Steller Sea Lion: Distributed from northern Japan to California, Steller sea lions exhibit seasonal migrations and genetic separation into Western and Eastern DPSs. The Western DPS originates from rookeries west of Cape Suckling, AK, extending into Asia. Natal site fidelity among breeding females leads to stock separation, while juveniles and males mix across boundaries outside the breeding season. Recent genetic studies and marked animal observations confirm long-term

reproductive isolation, with new rookeries in Southeast AK primarily established by Western stock females. Steller sea lions are commonly found in coastal waters along the continental shelf, but they can also be present and forage in deeper continental slope and pelagic waters, particularly during the non-breeding season. The Western DPS is listed as endangered under the ESA and depleted under the MMPA. The likelihood of impact on Steller sea lions is considered negligible as mitigation measures would be implemented (Young et al. 2024).

Spectacled Eider: Spectacled eiders are listed as threatened under the ESA and are a State species of special concern. This species exhibits distinct seasonal movements and habitat preferences. Pairs arrive at breeding sites in late May or June, typically choosing islands or peninsulas for nesting and initiating nests from May to July, largely influenced by latitude and weather conditions. During winter, large aggregations form in limited open water amid sea ice. Migration involves specific corridors through the Bering, Chukchi, and Beaufort seas, with males departing breeding grounds early in the incubation period and females and juveniles migrating later. Molting and staging occur at regional sites in Russia and AK, with final migration to Bering Sea wintering areas (ADF&G 2025b). Spectacled eider presence in the proposed Project Area is primarily limited to migration pathways.

Steller's Eider: The AK-breeding population is listed as threatened under the ESA and is a State species of special concern. Less than 1% of Steller's eiders breed in North America, the bulk nest in northeastern Siberia. Wintering aggregations occur mainly along the AK Peninsula and Aleutian Islands, with dispersal to adjacent Russian and North American coastal regions (ADF&G 2025c). Steller's eiders exhibit extensive annual migrations, traversing up to 2,983 mi. between Arctic breeding grounds and subarctic wintering habitats. Migration is characterized by low-altitude, linear formations along coastlines and ice openings. Arrival at tundra nesting sites occurs in late May to early June; males depart post-breeding for molting areas, while females remain until the young fledge. Breeding is solitary, with nesting sites selected on Arctic islands or peninsulas adjacent to tundra lakes (ADF&G 2025c). Steller's eider presence in the proposed Project Area would include migration pathways and wintering areas.

3.6.6 Critical Habitat

The ESA designates critical habitat as part of a listed species' conservation and recovery when prudent and determinable. Critical habitat is defined as:

1. Specific areas within the geographical area occupied by the species at the time it is listed, on which are found physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and
2. Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary of Commerce that such areas are essential for the conservation of the species" (16 USC § 1532). Critical habitat is designated by the USFWS and NMFS under the ESA.

Species with critical habitat overlapping with the proposed Project Area include the Beringia DPS of bearded seal, Arctic ringed seal, and West DPS of Steller sea lion.

Bearded Seal: Bearded seals of the Beringia DPS inhabit seasonally ice-covered waters of the Bering, Chukchi, Beaufort, and East Siberian seas. Critical habitat for the Beringia DPS of bearded seals encompasses marine habitat in AK and offshore Federal waters of the Bering, Chukchi, and Beaufort seas, within the geographical area presently occupied by the DPS.

Arctic Ringed Seal: Critical habitat is designated as a specific area of marine habitat in AK and offshore Federal waters of the Bering, Chukchi, and Beaufort seas, within the geographical area presently occupied by the Arctic ringed seal.

Steller Sea Lion: Critical habitat for the Steller sea lion includes haul-outs and rookeries. These rocky areas have an advised 20 mi. exclusion radius for vessels to limit stressors to the animals. Two areas exist at the north end of Bristol Bay: one encompasses Chagvan Bay, Security Cove, to Nanvake Bay; the other has its center point at Round Island and encompasses High Island, Crooked Island, Summit Island, to shore.

3.6.7 Essential Fish Habitat

Many marine and freshwater habitats are critical to the productivity and sustainability of marine fisheries. The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) set forth several new mandates for NMFS, eight (8) regional fishery management councils (Councils), and other Federal agencies to identify and protect important habitats of Federally managed marine and anadromous fish species. The Councils, with assistance from NMFS, are required to delineate essential fish habitat (EFH) for all managed species within the 200-NM U.S. Exclusive Economic Zone (EEZ).

Section 305(b)(2) of the amended MSA directs each Federal agency to consult with NMFS with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken by such agency that may affect EFH. Implementing regulations for this requirement are at 50 Code of Federal Regulations (CFR) 600 of the MSA.

EFH includes those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 USC 1801 et seq). For the purposes of this definition:

- “Waters” include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include areas historically used by fish where appropriate.
- “Substrate” includes sediment, hard bottom, structures underlying the waters, and associated biological communities.
- “Necessary” means the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem.
- “Spawning, feeding, and breeding” is meant to encompass the complete life cycle of a species (50 CFR Part 600).

EFH is determined by identifying spatial habitat and habitat characteristics that are required for each federally managed species through a cooperative effort by NMFS, Councils, and federal and state agencies. These descriptions provide the basis for assessing development and other activities in specified marine areas. Further, EFH is designated based on best available scientific information and the levels defined by the MSA:

- Level 1 information corresponds to distribution;
- Level 2 information corresponds to density or relative abundance;
- Level 3 information corresponds to growth, reproduction, or survival rates; and
- Level 4 information corresponds to production rates.

In addition to EFH, Habitat Areas of Particular Concern (HAPC) are also designated by the Councils. Designated HAPC are discrete subsets of EFH that provide extremely important ecological functions or are especially vulnerable to degradation (50 CFR. §600.805-600.815). Categorization of an area as an HAPC does not confer additional protection or restriction to the designated area. The Councils may designate a specific type or area of habitat as a HAPC based on one or more of the following:

- Importance of the ecological function(s) provided by the habitat.
- The extent to which the habitat is sensitive to human-induced environmental degradation.
- Whether, and to what extent, development activities are, or will, stress the habitat type.
- Rarity of the habitat type.

There is no HAPC present in or near the vicinity of the proposed project route. Therefore, HAPC will not be discussed further in this document.

While many fish species exist in AK waters, EFH is identified only for those species managed under a federal fishery management plan (FMP). The three main FMP groupings of species with EFH in the proposed project route are the Salmon FMP, Groundfish of the Bering Sea and Aleutian Islands (BSAI) FMP, and its sister FMP for the Gulf of AK (GOA) Groundfish.

There are multiple species of salmon, all of which are a vital part of the Alaskan economy and ecosystems. The Salmon FMP includes all five species of Pacific salmon: Chinook (*Oncorhynchus tshawytscha*), Coho (*O. kisutch*), Pink (*O. gorbuscha*), Sockeye (*O. nerka*), and Chum (*O. keta*). Salmon are an anadromous species, which return to spawn in freshwater rivers of AK after spending their time in the ocean feeding.

The Salmon FMP designates all waters offshore of AK as EFH for all five species of Pacific salmon. The salmon management area consists of the entirety of the U.S. Exclusive Economic Zone (EEZ) and all waters identified in the Catalog of Waters Important for the Spawning, Rearing, or Migration of Anadromous Fishes as EFH for Pacific salmon.

The marine segments of the proposed cable route would occur in areas where Pacific salmon migrate; however, the cable would be installed on the seafloor, at a small diameter of only 2 in. or less. EFH for the Pacific salmon fishery includes those waters and substrate necessary for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to a healthy ecosystem.

The GOA continental shelf and upper continental slope comprise diverse benthic habitats. The seafloor of the GOA is diverse, but much of the continental shelf is dominated by soft unconsolidated sediments. The shelf ranges in width from 12.4 mi. to greater than 124.3 mi., and the continental slope is steep and marked by gullies and submarine canyons extending. The AK Coastal Stream and AK Coastal Current flow from east to west (counterclockwise) around the GOA, from Dixon Entrance to the end of the Aleutian Islands. The oceanographic conditions along this coast result in surface waters being forced toward shore and circulating down, a pattern called downwelling. Seasonal increases in freshwater discharge from land result in a highly stratified water column in the summer, with limited nutrient availability in the photic zone.

The FMP governing groundfish fisheries of the BSAI encompasses the U.S. EEZ of the Bering Sea and that portion of the North Pacific Ocean adjacent to the Aleutian Islands which is between 170E W. longitude and the U.S.-Russian Convention Line of 1867. The FMP covers

fisheries for all stocks of finfish and marine invertebrates except salmonids, shrimps, scallops, snails, king crab, Tanner crab, Dungeness crab, corals, surf clams, horsehair crab, lyre crab, Pacific halibut, and Pacific herring.

The FMP governing groundfish fisheries of the GOA encompasses the U.S. EEZ of the North Pacific Ocean, exclusive of the Bering Sea, between the eastern Aleutian Islands at 170E° W. longitude and Dixon Entrance at 132E40' W. longitude. The FMP covers fisheries for all stocks of finfish except salmon, steelhead, Pacific halibut, Pacific herring, and tuna.

Groundfish, also known as demersal fish, include many species of rockfish, sablefish, flatfish, skates, and other species that are often, but not exclusively, found on or near the ocean floor. Information on the life histories and habitats of these species varies in completeness, so while some species are well-studied, there is relatively little information on other species.

AK's FMP groundfish fisheries comprise six major species or species complexes: AK pollock, Pacific cod, sablefish, Atka mackerel, the flatfish complex, and the rockfish complex. Pacific halibut is not managed as an FMP groundfish. The fisheries for these species (also known as complexes) are distributed across two regions: the Bering Sea, including Etolin Strait, and Aleutian Islands and the Gulf of AK. Each region can be broadly divided into two sectors: catcher vessels, which deliver their harvest to shoreside processors, and the at-sea processing sector, whose processed product sells directly to the first-wholesale market.

3.7 Historic and Cultural Resources

Section 106 of National Historical Preservation Act (NHPA) requires that a Federally funded agency consider the effects of any undertaking on historic properties and consider the input of interested parties and the public. The term "historic property" is defined in the NHPA as "*any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register of Historic Places (NRHP).*" The Project is subject to the provisions of Section 106 of the NHPA and its implementing regulations 36 CFR 800 regarding the protection of cultural and historic resources.

The Office of History and Archaeology (OHA) serve as AK's State Historic Preservation Office (SHPO) and is responsible for reviewing projects under Section 106 of the NHPA (36 CFR 800) and AHPA (A.S. 41.35.070). Section 106 of the NHPA requires federal action agencies to identify and assess the effects of its actions or actions it authorizes on historic properties. The NHPA also requires federal action agencies to allow the Advisory Council on Historic Preservation (ACHP) opportunity to comment on the Proposed Action. In AK, the NRHP program is administered by OHA, with NTIA seeking concurrence with the determinations from OHA.

A review under the AHPA is required if a project has state involvement, including any public construction or public improvement project undertaken by the state, or by a governmental agency of the state or by a private person under contract with or licensed by the state or agency of the state. For the purposes of review under the AHPA, the OHA works directly with the applicable state agency to review the proposed project and to determine if a cultural resource survey is necessary and/or if significant resources would be adversely affected.

Participants in consultation include the lead agency official, the State or Tribal Historic Preservation Officer (THPO), appropriate representatives of affected Native American tribes/Alaska Native organizations, representatives of local governments, the applicant/project

proponent, and the public. Historic preservation organizations and others with an interest in the preservation outcomes of the project or those with a legal or economic interest may also be invited to join consultation. Additional consulting parties may include certain individuals and organizations with a demonstrated interest in the undertaking's effect on historic properties.

The terrestrial portion of the Proposed Action intersects several communities, including the cities of Nome, Emmonak, Hooper Bay (on the YK Delta), and Naknek, as well as the Village of Igiugig, where both direct and indirect impacts to cultural and historic resources may occur. Beyond these population centers, the cable route traverses landscapes with deep cultural significance, some of which have been continuously occupied for over 10,000 years. Notably, the proposed cable centerline between Naknek and Igiugig follows a segment of a well-documented prehistoric and historic travel corridor that once connected Cook Inlet to Bristol Bay, highlighting the relevance of consultation under Section 106 of the NHPA.

3.7.1 Archaeological & Architectural Resources

A cultural resource desktop study for the proposed project was completed. This study encompassed the entirety of the proposed route and included a review of the Alaska Heritage Resource Survey (AHRS) database maintained by OHA, the R.S 2477 trail database maintained by ADNR, and NRHP database maintained by NPS, to find previously identified cultural resources within the Project Area. In addition, a review of the Bureau of Ocean Energy Management's AK Shipwreck Database and the NOAA Office of Coast Survey's Automated Wreck and Obstruction Information System was completed for information on known or potential shipwrecks and other cultural resources along the subsea portions of the project. Additionally, historic aerial photographs and USGS topographic quadrangle maps of the project corridor were reviewed to identify areas of potential historic use, assess previous disturbance within the Project Area, and identify possible historic roads, structures, and other resources. Records held by BLM, General Land Office were searched for early land patents, land surveys, surveyors' notes, and conveyances of land parcels within the area of potential effect (APE).

The APE for the NTHE is defined as a 50-ft. buffer extending out on all sides of the footprint of proposed ground disturbing activities. Where the FOC will be laid on the ground or shallow buried, the APE will be a 100-ft. wide corridor and 200-ft for the aerial FOC. The APE for the subsea portion of the NTHE is the 820-ft. wide route remotely surveyed for the Project. A review of the AHRS and NRHP databases identified 46 AHRS sites within the APE or within a 0.5-mi. buffer. Ten (10) AHRS sites intersect the APE and 36 AHRS sites are located within 0.5 mi of the APE.

Within the APE, site types include lithic sites (chert flakes, shatter, stone tools), an archaeological district, one building, two structures, two grave sites, and one village site. Four R.S. 2477 trails located within the Project Area do not have AHRS numbers and have not been evaluated for listing on the NRHP. All four of these trails would be crossed by the proposed cable centerline. A summary of all sites identified within and around the APE is presented in **Appendix H**. No known shipwrecks or other submerged cultural resources were identified along the proposed cable route.

3.7.2 Native American Traditional, Cultural, or Religious Resources

Consultation under Section 106 included outreach to multiple communities (**Table 3-5**). The Proposed Action would occur within communities that are populated by federally recognized tribes. Each of these tribal entities was invited to participate in the project as a Consulting Party

in developing a Programmatic Agreement (PA; **Appendix F**). This participation in the PA process included seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them regarding matters arising in the Section 106 process. Each consulting party has the opportunity to share their views, receive and review pertinent information, offer ideas, and consider possible solutions about any of the Section 106 plans laid out in the PA. Consulting parties and anticipated signatories to the PA are also presented in **Table 3-5**.

Table 3-5. Groups Consulted on the Programmatic Agreement

Segment	Entity	Entity Type	PA participant
All	Quintillion	Other	Yes
All	SHPO	State	Yes
All	ACHP	Federal	No
All	NTIA	Federal	Yes
All	USACE	Federal	Yes
All	EPA	Federal	No
All	Chickaloon Traditional Village Council	Tribal Entity	Pending
Hooper Bay	RUS	Federal	Yes
Hooper Bay	Native Village of Hooper Bay	Tribal Corporation	Pending
Hooper Bay	City of Hooper Bay	City	Yes
Hooper Bay	Sea Lion Corporation	Tribal Corporation	Pending
T1	Nome Eskimo Community	Tribal Entity	Pending
T2	Emmonak Village Council	Tribal Entity	Yes
T2	Chuloonawick Native Village	Tribal Entity	Pending
T2	Association of Village Council Presidents (AVCP)	Tribal Entity	Pending
T2	Calista Corporation	Corporation	Yes
T2	City of Emmonak	City Agency	Pending
T2	Emmonak Corporation	Corporation	Pending
T3	DOT & PF	State	No
T3	BBNC	Corporation	Yes
T3	NNVC	Tribal Entity	Yes
T3	BBB	City Agency	Pending
T3	Paug-Vik Incorporated Limited	Corporation	Pending
T4	King Salmon Tribe	Tribal Entity	No
T4	ADNR	State	No
T4	BLM	Federal	Yes
T4	Igiugig Native Corporation	Corporation	Yes
T4	Igiugig Village Council	Tribal Entity	Yes
T4	Levelock Native Corporation	Corporation	Yes
T4	Levelock Village Council	Tribal Entity	Pending
T4	Lake & Peninsula Borough	City Agency	No
Previously undefined acronyms: DOT-PF = Alaska Department of Transportation and Public Facilities, NNVC = Naknek Native Village Council			

The outreach effort is summarized in **Appendix B**. The Proposed Action received generally positive engagement, with several entities expressing strong support. Alaska Peninsula Corporation, BBNC, and Tyonek Native Corporation issued formal Letters of Support, while Levelock Native Corporation and Naknek Native Village Council confirmed participation in the PA. The City of Hooper Bay and Sealion Corporation acknowledged invitations and maintained communication, signaling cooperation. Organizations such as Iliamna Development Corporation, Seldovia Native Association, and Salamatof Native Association, engaged in meetings and discussions with Quintillion. A few entities, including Paug-Vik Incorporated Limited, indicated conditional interest, noting concerns that require further discussion. However, many groups, such as AVCP, Calista Corporation, and Chuloonawick Native Village, showed limited or no response to outreach attempts. Overall, the sentiment leans toward support and collaboration, though a subset of stakeholders remains neutral or hesitant, and continued engagement will be necessary to address outstanding concerns.

A review of the Alaska Native Place Names data hosted by BBNC (BBNC, n.d.) indicates eight Indigenous Place Names (IPN) along the proposed cable route from Naknek to Igiugig. These place names include locations for villages, localities, springs, lakes, and streams. While many place names are of Yup'ik origin, there is also one Dena'ina place name in Igiugig. Ongoing indigenous and community consultations continue to take place to identify areas of cultural significance.

3.7.3 Subsistence

Subsistence in AK is the traditional way of life through which residents of rural communities, most of which are majority AK Native, secure a significant portion of their food through hunting, trapping, and fishing. While serving as a vital source of food, subsistence is also essential to maintaining the social organizations and traditional beliefs and culture of Native communities. Harvest techniques, cooperative labor, and sharing the harvest all serve to pass skills and traditions to future generation of subsistence users.

Section 810 of the ANILCA requires the evaluation of potential effects on subsistence uses and needs, followed by specific notice and determination procedures should there be a possibility of a significant restriction of subsistence uses. The AK Land Use Council's definition of "*significantly restrict subsistence use*" is one guideline used in evaluation.

A Proposed Action shall be considered to significantly restrict subsistence uses, if after any modification warranted by consideration of alternatives, conditions, or stipulations, it can be expected to result in a substantial reduction in the opportunity to continue subsistence uses of renewable resources.

It should be noted that the term "significant" as used in this context does not have the same definition as used in the implementing regulation for NEPA.

In the region proposed for the FOC installation, wildlife subsistence hunting is very important. For example, caribou have been an important part of the ecology throughout this region, and a critical subsistence resource for residents, for at least several thousand years (ADF&G 2018). Per the Alaska Department of Fish & Game (ADF&G) Intensive Management Frequently Asked Questions (2023), the Mulchatna caribou herd reached 200,000 animals at its peak in 1997. At this time, it provided as many as 4,770 caribou per year for the subsistence needs of more than 48 local communities. In the late 1990s and early 2000s, the herd began to decline, and by 2009

it was down to about 30,000 animals. By 2019 the population estimate dropped to 13,500 animals (about a 94% decline from the peak). As of 2023, the population estimate remains stable but low at around 13,000 individuals. In recent years, hunting closures have been implemented to promote recovery of the herd.

3.7.3.1 Marine Environment (Nome to Naknek, including the YDNWR and BU to Emmonak & Hooper Bay)

Coastal communities rely on marine resources, especially fish species like salmon and herring. Subsistence fishing practices are deeply rooted in cultural heritage and seasonal cycles, with hunting areas extending from Cape Nome to the Aleutian Islands and beyond.

Etolin Strait is a marine passage in southeastern Alaska, characterized by its rich biodiversity and importance to local subsistence activities. The strait supports various fish and shellfish populations, marine mammals, and aquatic plants that are integral to the diet and culture of nearby communities. Many subsistence users from the villages of Mekoryuk, Tununak, Toksook Bay, Nightmute and Chefornak rely on fishing, shellfish harvesting, and hunting for food security and cultural practices.

In the spring, seal hunting occurs in the strait in which three types of seals, walrus, and beluga whale are hunted. Later in the spring to early summer the Pacific herring return to Nelson Island to spawn, bringing with them halibut, yellowfin sole and a host of other marine predators. At that time, fishermen use longlines in the strait (some lines reaching a quarter of a mi. in length) to pursue halibut, Pacific cod, and walleye pollock. During the lowest tides in summer, vast mud flats emerge providing the opportunity to harvest a variety of shellfish and other invertebrates (Fienup-Riordan 1983).

3.7.3.2 Terrestrial Environment (Naknek to Igiugig)

Inland communities including Naknek and Igiugig depend on terrestrial resources such as moose, caribou, waterfowl, and wild berries. Salmon remains a vital resource, harvested from rivers and lakes throughout the Bristol Bay watershed. These areas are accessed via traditional trails, rivers, and seasonal camps, forming a network of use areas that reflect generations of ecological knowledge and stewardship. Subsistence activities in both regions are important for food security, cultural continuity, and community well-being, and are closely tied to the land and sea.

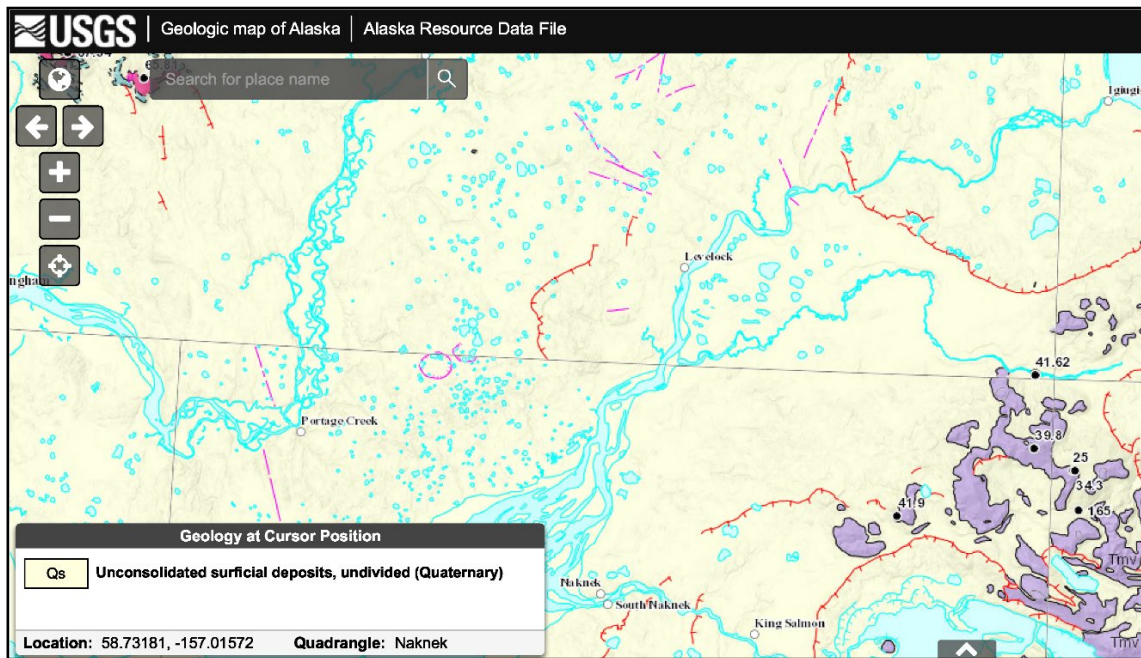
3.7.4 Paleontological Resources

The Paleontological Resources Preservation Act of 2009 (PRPA) and its implementing regulations (43 CFR 49) guides BLM's management of fossil resources on public lands. Under PRPA, BLM evaluates project areas for paleontological sensitivity and ensures that fossil-bearing geologic units are protected during land use activities. The Proposed Action involves ground disturbance, and BLM required a paleontological review to avoid impacts on significant resources.

The Potential Fossil Yield Classification (PFYC) system is a standardized framework used by the BLM to evaluate the likelihood that a geologic unit contains significant paleontological resources. It assigns classes from 1 (very low potential) to 5 (very high potential) based on factors such as lithology, age, and documented fossil occurrences. This classification helps prioritize resource management and compliance efforts. BLM developed the Rapid Assessment Tool, which applies PFYC rankings to geologic maps, allowing for quick identification of areas of high fossil sensitivity for planning and decision-making.

Geologic mapping (**Figure 10**) shows that the proposed cable route would cross Quaternary-aged (i.e., recent to 2.58 million years ago) surficial sediments, which in general are too young at the surface to have paleontological potential. Therefore, the area was classed as PFYC Class 2 (Low Potential) using the Rapid Assessment Tool.

There are no known paleontological resources in the vicinity of the proposed Project area. Based on the information available from the Alaska Paleontology Database and the USGS, the proposed Project area does not overlap with any known fossil localities.



The geologic landscape is mainly unconsolidated surficial deposits, undivided (Quaternary), indicated in pale yellow.

Figure 10. Geologic Map of Bristol Bay Lowlands, AK.

3.8 Aesthetic and Visual Resources

3.8.1 Visual Aesthetic

The visual aesthetic of both human-made and natural features is deemed important due to the value placed on the intrinsic properties of the landscape (FRA 2017). When modifications are made to scenery, its value may be impacted, thus it is important to consider potential impacts due to project-related visual aesthetic changes.

The proposed route passes through features such as sea ice, vegetation, coastlines, wildlife, soundscapes, glaciers, fjords, rivers, and mountain ranges (NPS 2024a). People travel to AK to experience these resources; approximately 2.7 million visitors from May 2022 to April 2023 spent approximately \$3.9 billion and supported 48,000 jobs (ATIA 2024).

Comparatively, the built environment along the proposed Project route is minimal. The visual landscape within these communities includes homes, businesses and community centers, powerlines, as well as cars, roads, sidewalks, and other means of transportation.

3.8.2 Light Aesthetic

Qualities of light such as the color, intensity, or the ambient or artificial quality of the light, all impact the visual appeal of an environment. Individuals have unique light preferences based on physical needs and priorities. Lux is a standard unit of measurement of light intensity and is equal to the illumination of a one square meter surface that is one meter away from a single candle. Common lux sources and levels include twilight (10 lux), inside a home (300 lux), overcast daylight (1,000 lux), and sunlight (100,000 lux) (Stevens 2001).

Much of the proposed FOC route transverses geographically isolated regions with no residential human populations. Light along the proposed FOC route would typically come from construction vessels.

3.9 Land Management Overview

The proposed route for the NTHE cable traverses a range of land ownership and management jurisdictions. The summary is presented in **Table 3-6**.

Table 3-6. Land Ownership Summary Along the Proposed NTHE Cable Route

Land Ownership	Length (miles)
Federal (Open Water)	769.12
ADNR	100.88
USFWS YDNWR	76.70
Private	14.85
BLM	14.45
Emmonak Corporation	10.28
Sea Lion Corporation	6.31
Paug-vik Incorporated, Limited	4.96
Levelock Natives, Limited	2.75
Igiugig Native Corporation	2.46
Alakanuk Corporation	2.28
Alaska Native Allotment	1.80
DOT-PF	1.60
Local Government (King Salmon)	0.76
Qinuyang, Limited	0.16
Sitnasuak Native Corporation	0.06

3.10 Infrastructure

3.10.1 Transportation

The roads within Nome, Emmonak, Naknek, Hooper Bay, and Igiugig are limited to intra-community travel. Water and air travel are used for inter-community travel (DOT-PF 2024).

Marine waters in the Project Area see varying amounts of vessel traffic which bring goods and services to the region including fuel, product delivery (building supplies, cars, dock freight), chartered barges, and fishing industry supplies (USACE 2009). Publicly owned harbors exist in Nome and Naknek (A Geoportal Office [AGO] 2021).

Emmonak does not have a public harbor, the river serves as the primary transportation route in the summer months, with shallow-draft barges and landing craft delivering cargo (Northern Economics 2011). Emmonak does not regularly receive commercial passenger boats. In winter months, snow machines become the primary mode of transportation (City of Emmonak 2024).

In Hooper Bay, there is no public harbor; however, the Naneng Boat Ramp was built between 2020 and 2024 on Napareayak slough and is open to the public for launching and removal of boats.

Nome is a regional center of transportation for surrounding communities, and the Port of Nome has been approved and received funding to become the first Arctic deep water port in the U.S. Transits through the Bering Strait to AK have more than doubled in the last 10 years, and the new port is due to be completed by 2030 to accommodate additional vessels (Port of Nome 2021).

Each community in the Project Area has a DOT-PF controlled public airport and runways (Transportation Technical Working Group 2021). Nome and Naknek have registered seaplane landing areas (FAA 2023).

3.10.2 Public Services/Utilities

Each community in the Project Area gets electricity from different companies. Nome gets electricity from Nome Joint Utility Services, Emmonak and Hooper Bay from the AK Village Electric Cooperative, Naknek from the Naknek Electric Association, and Igiugig from the Igiugig Electric Company which runs diesel generators and their RivGen river hydropower generator (AVEC 2024; Igiugig 2024b; NEA 2024; NJUS 2024).

According to the State of AK Geoportal, landfill sites and water treatment centers can be found in Nome, Emmonak, Naknek, and Igiugig (ADEC 2024d). Wastewater Treatment sites can be found in Nome, Emmonak, and Naknek (ADEC 2024e; ADEC 2024f).

Telephone and internet services are offered by several providers. According to the ACCESS BROADBAND Dashboard, 89.8 percent of households in the Nome Census Area, 70.0 percent in the Kusilvak Census Area (Emmonak), 76.5 percent in the BBB (Naknek), and 66.1 percent in the Lake and Peninsula Borough (Igiugig) have a broadband subscription (NTIA 2024b).

Despite the access to broadband subscriptions, lower percentages of the populations have access to broadband services of at least 25/3 megabits per second. There are 31.5 percent of the Nome Census Area, zero percent of the Kusilvak Census Area (Emmonak), zero percent of BBB (Naknek), and zero percent of the Lake and Peninsula Borough (Igiugig) with access to broadband services of at least 25/3 megabits per second (NTIA 2024b).

3.11 Socioeconomic Resources

This project spans across four (4) census areas: Nome Census Area (Nome), Kusilvak Census Area (Emmonak and Hooper Bay), BBB Census Area (Naknek), and Lake and Peninsula Census Area (Igiugig). **Table 3-7** includes an overview of key socioeconomic indicators for the communities that would be impacted by the Proposed Action.

3.11.1 Population Characteristics

There is great variance among the size of communities along the Proposed Action. As of 2022, the United States Census Bureau (USCB) estimates that the populations of the communities from largest to smallest are: Nome, Hooper Bay, Emmonak, Naknek, and Igiugig (**Table 3-7**).

Table 3-7. Selected Socioeconomic Indicators

Community	Population	Number of Households	Poverty	Median Household Income	American Indian or Alaska Native	Employment Rate
Emmonak	825	221	22.2 %	\$45,655	92.0%	55.8 %
Hooper Bay	1,375	314	21.3%	\$47,700	96.7%	57.9%
Igiugig	68	34	4.3 %	\$82,500	70.5%	57.7 %
Naknek	470	431	14.2 %	\$88,333	46.4%	56.4 %
Nome	3,699	1,491	6.1 %	\$103,542	51.5%	68.1 %

Source: USCB 2022b; USCB 2022c; USCB 2022f; USCB 2022h; USCB 2022i

3.11.2 Demographics

Each community along the Proposed Action has unique demographic characteristics. See **Table 3-8** for a comparison of Alaska Indian or Alaska Native population percentages along the project route.

3.11.3 Housing

The housing occupancy and value varies between the communities that the Project impacts, and key housing statistics can be found in **Table 3-8**. The last American Community Survey took place in 2022, so rates listed do not account for inflation.

Table 3-8. Selected Housing Indicators

Community	Median Gross Rent	Home Ownership Rate	Median Value of Owner Occupied Homes	Total Houses	Housing Occupied
Nome	\$1,626	46.7 %	\$333,300	1,491	83.6 %
Emmonak	\$967	70.0 %	\$107,200	221	96.4 %
Naknek	\$1,208	54.5 %	\$262,500	431	43.6%
Igiugig	ON	73.1 %	\$346,400	34	61.8 %
Hooper Bay	\$725	64.8%	~\$200,000	218	89.9%

Sources: USCB 2022b; USCB 2022c; USCB 2022f; USCB 2022h; ACS 2022a; ACS 2022b; ACS 2022c; ACS 2022d; ACS 2023e

3.11.4 Employment

The unemployment rates along the proposed route vary. The lowest rate is in BBB (Naknek) where the annual unemployment rate in 2023 was 3.7 percent, followed by the Nome Census Area (Nome) at 6 to 9 percent, then the Lake and Peninsula Census Area (Igiugig) at 14 percent, with the Kusilvak Census Area (Emmonak) the highest at 22 percent (ADLWD 2024). Employee class percentage are in **Table 3-9** and employment industries in **Table 3-10**.

Communities along the route predominantly work in natural resource industries (ADL 2024). Emmonak and Naknek include commercial fishing and processing. Naknek is home to six salmon processing plants and supports almost 70 percent of the global supply of wild sockeye salmon (City of Emmonak 2024). Much of the harvest caught during the summertime is processed in both Naknek and King Salmon (Travel Alaska 2024). Igiugig also partakes in the

fishing industry with its access to the Kvichak River and Lake Iliamna, and hunting as a source of revenue and food (Igiugig 2024c). Other than seasonal employment in Hooper Bay, the largest employers are within the private and public sector such as the Yukon-Kuskokwim Health Corporation and Lower Yukon School District (NOAA 2011).

Table 3-9. Class of Employed Workers

Measure	Nome	Emmonak	Naknek	Igiugig	Hooper Bay
Employee of private company workers	31.2%	46.0%	42.5%	0.0%	63.1%
Local, state, and federal government workers	34.6%	45.7%	30.7%	93.3%	27.0%
Private not-for-profit wage and salary workers	30.8%	6.2%	10.6%	6.7%	9.9%
Self-employed in own incorporated business workers	2.3%	0.0%	4.0%	0.0%	0.0%
Self-employed in own not incorporated business workers and unpaid family workers	1.1%	2.1%	9.5%	0.0%	0.0%
Sources: USCB 2022b; USCB 2022c; USCB 2022f; USCB 2022h; USCB 2022i					

Table 3-10. Industry of Employed Workers

Measure	Nome	Emmonak	Naknek	Igiugig	Hooper Bay
Agriculture, forestry, fishing, hunting, and mining	5.2%	4.7%	0.0%	0.0%	14.9%
Arts, entertainment, recreation, accommodation and food services	6.1%	3.0%	5.0%	0.0%	0.0%
Construction	2.7%	1.7%	6.0%	0.0%	0.0%
Educational services, health care and social assistance	37.6%	25.7%	14.1%	20.0%	20.3%
Finance and insurance, and real estate and rental and leasing	2.9%	0.0%	4.0%	0.0%	0.0%
Manufacturing	0.0%	24.7%	16.1%	0.0%	0.0%
Other services, except public administration	4.5%	0.0%	5.5%	0.0%	5.3%
Professional, scientific, and management, and administrative and waste management services	2.9%	1.7%	4.0%	0.0%	14.7%
Public administration	16.7%	15.3%	11.1%	73.3%	13.1%
Retail trade	6.6%	8.5%	5.0%	0.0%	14.7%
Transportation and warehousing, and utilities	10.7%	12.1%	21.6%	6.7%	1.8%
Wholesale trade	0.0%	2.1%	0.0%	0.0%	14.9%
Sources: USCB 2022b; USCB 2022c; USCB 2022f; USCB 2022h; USCB 2022i					

3.11.5 Income

The Project Area crosses four (4) census areas. The following data from the U.S. Census Bureau was compiled from the 2022 American Community Survey 1-Year Estimates. The median household income for the Nome Census Area was \$70,121 with 21.1 percent living in poverty (USCB 2022g). Median household income was higher in Nome at \$103,542 with only 6.1 percent

living in poverty (USCB 2022h). Nome and Naknek do not qualify as low-income communities, while Emmonak and Igiugig do qualify as low-income communities (USCB 2020).

In the Kusilvak Census Area, the median household income was estimated to be \$42,663 with 34.3 percent living in poverty. The median household income was lower in Emmonak at \$45,655 with a lower rate of 22.2 percent living in poverty (USCB 2022b). The median household income in Hooper Bay was \$47,000 with a rate of 21.3 percent living in poverty (USCB 2022i).

In the BBB Census Area, the median household income was \$94,167 with 7.9 percent living in poverty. The median household income was lower in Naknek at \$88,333 with a higher rate of 14.2 percent living below the poverty line (USCB 2022f).

The Lake and Peninsula Census Area had a median household income estimated to be \$61,607 with 15.2 percent living in poverty. The median household income was \$82,500 in Igiugig with 4.3 percent living in poverty (USCB 2022c).

3.11.6 Schools

In the Proposed Area, five of the five communities have school districts. There are four schools in Nome via Nome Public Schools (NoPS), one school in Emmonak and two in Hooper Bay via the Lower Yukon School District (LYSD), two schools in Naknek via the Bristol Bay School District (BBSD), and one school in Igiugig via the Lake and Peninsula School District (LPSD) (NoPS 2024; LYSD 2024; BBSD 2024; LPSD 2024).

3.12 Human Health and Safety

3.12.1 Hazardous Sites

Alaska Department of Environmental Conservation (ADEC) manages the Contaminated Sites Program, with the goal of protecting human health and the environment by overseeing and conducting timely, science-based, and defensible characterization, cleanup, redevelopment, and management of contaminated sites (ADEC 2023a). There is a total of nine (9) active contaminated sites that are within 1,500 ft of the proposed Project route (ADEC 2023b). No contaminated sites are in the proposed ROW. The contaminated sites are within Emmonak and Naknek (**Table 3-11**).

3.12.2 Public Health and Safety Facilities

Public health and safety facilities can be found throughout the communities along the proposed Project route in Nome, Emmonak, Naknek, King Salmon, and Igiugig.

The medical facilities in Nome consist of the Nome Public Health Center which, while centrally located in Nome, services 15 communities in its vicinity including: Brevig Mission, Elim, Gambell, Golovin, Koyuk, Little Diomed, St. Michael, Savoonga, Shaktoolik, Shishmaref, Stebbins, Teller, Unalakleet, Wales, and White Mountain (ADOH 2023). Additionally, the Norton Sound Regional Hospital is in Nome and offers a wide range of primary care, preventative care, specialists, and an Emergency Department (NSRH 2024). When it comes to emergency management, the Nome Police Department provides full-service support to the community, as does the Nome Volunteer Fire Department with fire protection, search and rescue, hazardous material (hazmat) response, and other related emergencies around the City of Nome and the Nome Airport (City of Nome 2024; NVFD 2024).

Table 3-11. Active Contaminated Sites within 1,500 ft of the FOC Route

File #	Site	Distance from FOC	Description
2413.38.004	Alaska Commercial Co. Store - Emmonak	425 ft.	In 1993, three areas of gasoline and arctic grade diesel #1 contamination were confirmed above ADEC cleanup levels. From 1997-1998 approximately 1,000 cubic yards of contaminated soil was removed and treated. In 2015, a site characterization report confirmed contaminants remained in soil and groundwater above DEC cleanup levels. The site was reopened to address the additional contamination (ADEC 2023c).
2413.38.013	Emmonak Old Bureau of Indian Affairs (BIA) School	180 ft	In 2011, the Environmental Management Plan for the Yukon River Inter-Tribal Watershed Council focused on asbestos levels main school building and in the siding material and joint compound inside the building. The building is not an imminent health concern as it stands today. The other concern identified is petroleum contamination across the former BIA School complex (ADEC 2020b).
2413.38.006	Emmonak School Tank Farm	65 ft.	Three samples were collected during a 2000 site reconnaissance and the sample with the lowest photoionization detector reading of the three (collected at 5 ft bgs) was analyzed by the laboratory resulting in 351 mg/kg diesel range organic compounds (DRO) and benzene at 0.0331 mg/kg. The Yukon River Inter-Tribal Watershed Council issued a contract to conduct a brownfield assessment. A Brownfield file was set up for brownfield-related work at this site, the cross-reference number for this file is 2413.57.001 (ADEC 2019).
2413.38.003	AKARNG Emmonak FSA	60 ft.	There is petroleum contamination at this site due to historic fuel spills and substantial offsite contamination that encroached on the AKARNG property as the result of a ruptured fuel line and subsequent flooding. There are three potential areas of contamination/spills. Although a cleanup at the site is pending, substantial data has been collected, and the soil and groundwater contamination plumes have been documented (ADEC 2020a).
2413.38.007	Emmonak City Hotel/Office Tank Farm	170 ft.	A 1997 Environmental Site Assessment report concluded there were 97 cubic yards of soil containing DRO compounds concentrations exceeding 2,000 parts per million (ppm). A soil sample collected from 4 ft bgs during the 2000 site recon contained DRO concentrations of 18,000 ppm, gasoline range organics (GRO) concentrations of 1,430 ppm and benzene concentrations of 1.97 ppm. This site record also includes Prevention, Preparedness and Response Program spill numbers (ADEC 2018a).
2413.38.001	Emmonak Washeteria	30 ft	The pipeline spill at Washeteria tank farm was identified and reported on June 6, 1994. The site was transferred to Rodman in 2017, and a work plan request was sent out in 2018 (ADEC 2018b).
2413.38.011	Emmonak Y-D Fisheries Development Association (YDFDA) Tank Farm	1,330 ft	In 2000, petroleum contamination was found along piping at the YDFDA tank farm. The tanks are no longer in use. One soil sample collected 4.5 ft bgs from a soil boring just outside the southeast corner of the tank farm contained a benzene concentration of 0.0539 mg/kg (ADEC 2024a).
2616.26.008	Peninsula Automotive-Naknek	210 ft	Contaminated soils were found during the removal of 1,000- and 3,000-gallon regulated underground storage tanks. Approximately 20 cubic yards of contaminated soil were placed in a land farming cell on site for treatment. Analysis verified that DROs, GROs, and benzene, toluene, ethylbenzene, and xylenes levels exceeded cleanup levels for soil. Contaminated soils also remain in place (ADEC 2024c).

File #	Site	Distance from FOC	Description
2616.38.005	North Pacific Seafoods Red Salmon Facility - Naknek	1,255 ft	In 2014, petroleum-contaminated soil was discovered near a valve box connected by aboveground piping to aboveground storage tanks containing Bunker C fuel. Initial response actions involved source area soil removal. Confirmation samples revealed DROs present in the surface and subsurface soils above ADEC cleanup levels. In 2017, five additional releases were reported. Cleanup actions followed and annual or semi-annual groundwater monitoring has occurred ever since. Concentrations are not stable nor decreasing but are, in fact, increasing in several of the wells (ADEC 2024b).
Notes: ADEC = Alaska Department of Environmental Control; ft = feet			

Emmonak has one health facility called the Pearl E. Johnson Sub-Regional Clinic, a part of the Emmonak Subregional Service Area of the Alaska Native Tribe Health Consortium (ANTHC), and it services additional communities adjacent to Emmonak including Chuloonawick, Alakanuk, Nunam, Iqua, Kotlik, Bill Moore's Slough, and Hamilton (YKHC 2018). When it comes to emergency services, the City of Emmonak has an Emmonak City Policy Department, Emmonak Fire Department, and a Women's Shelter (City of Emmonak 2024).

There are a few medical facilities near Naknek including the Naknek Clinic and King Salmon Clinics, which are two of 21 clinics managed in the Bristol Bay service area (BBHC 2022a; BBHC 2022b). They were created and managed in partnership with the Kakanak hospital in Dillingham, AK (BBHC 2022b). Naknek also has the Camai Community Health Center, which is a Federally Qualified Health Center that serves the BBB communities of Naknek, South Naknek, and King Salmon (CCHC 2024). The Bristol Bay Police Department has enacted its mission to provide a safe environment for all citizens, visitors and businesses, and the Bristol Bay Volunteer Fire and Emergency Medical Services (EMS) department manages fire and EMS response with a total of 10 year-round volunteers (BBB 2024a; BBB 2024b).

The Southcentral Foundation manages the Igiugig Community Health Clinic by providing direct health care services and is jointly owned and accompanied by the ANTHC (Southcenter Foundation 2024). Fire and emergency management is run through the Igiugig Fire Department (Igiugig 2024a).

Most communities that would be serviced by the Proposed Action have public safety facilities and staff such as Village Public Safety Officers, Tribal Police Officers, or municipal Police Officers. Public safety may be provided by the AK State Troopers, volunteer fire departments, and other organizations.

3.12.3 Electromagnetic Fields and Radiation

A common concern regarding FOC is the potential sensitivity of elasmobranchs and other fishes, marine mammals, sea turtles, and invertebrates to anthropogenic EMF (Normandeau et al. 2011; Snyder et al. 2019). The earth's background magnetic field ranges from 30 to 60 μ T (Copping et al. 2016). Unlike transmission power cables, FOCs emit negligible levels of EMF, no matter how high the frequency of transmission is. The cable would have no power running through it, so there is no anticipated EMF, and the cable would not carry any risk in terms of EMF radiation; there is no evidence of its impact on marine taxa.

4 Analysis of Environmental Impacts

The alternatives outlined in Chapter 2 may cause changes to the environment. This chapter assesses and analyzes the affected environment and potential changes and discloses the effects to decision makers and the public. The following bullets clarify some of the concepts:

- **Impacts/Effects:** The terms “effect” and “impact” are synonymous under NEPA. Effects may refer to adverse or beneficial phenomena that may be caused by the alternative(s).
- **Direct/Indirect:** A direct effect is caused by the action and occurs at the same time and place as the action. An indirect effect is reasonably foreseeable, also caused by the action that occur later in time or are removed in distance from the action.
- **Significance:** Significance is defined as a measure of the intensity and context of the effect. Intensity refers to the severity of impact. Context means that the effect(s) of an action must be analyzed in context such as society as a whole (human, national), the affected region, the affected interests, and the locality.
- **Intensity:**
 - **Negligible:** Change is too small to be measured, or no noticeable effect.
 - **Minor:** Change is just measurable. Change may affect a small portion (<15%) of individuals but not the overall population. There are no changes in management.
 - **Moderate:** Change is easily measured. Change may affect 15-75% of individuals of the population. There are required changes in management.
 - **Major:** A large, measurable change that is easily recognized. Change affects >75% of individuals of a population. There are profound changes in management.
 - **Duration:** Temporary (Short-lived [i.e., during construction]), Short-term (10 years or less), Long-term (More than 10 years).

4.1 Noise

Air-transmitted noise is measured in decibel (dB) units. The dB system provides a relationship between sound level and its perceived loudness to the human ear. The dB scale is logarithmic, so sound level increases or decreases exponentially with each dB of change. For example, 10 dB has a sound level 10 times more intense than 1 dB, while a 20-dB sound level is 100 times more intense. When the dB is adjusted to correct for the relative frequency of the human ear, it is referred to as an “A-weighted” decibel (dBA). Factors influence sounds such as distance from the sound source, terrain, vegetation or ground cover, and atmospheric conditions (e.g., wind, weather). Sounds at 70 dBA or lower are always safe for human ears, while sounds at 85 dBA or higher can lead to hearing loss if present for longer than 8 hours (ASLHA 2024).

Underwater noise also attenuates by distance from the source. The frequency of the noise level affects the distance traveled, and low-frequency noise levels carry long distances within water. Underwater sound levels are typically referenced as dB relative to one micropascal (dB re 1µPa). Ambient underwater noises include tides, currents, moving ice, and noise produced by marine mammals and humans. Fish and marine mammals may flee from intermittent loud noises (e.g., pile driving, blasting), and cumulative sound exposures can result in physical injury. Proposed Action consultation with NMFS and USFWS addresses anticipated construction and project noise levels to determine impacts and necessary mitigation.

The Proposed Action associated with terrestrial construction would temporarily increase noise in above ambient background sound levels. While none of the heavy machinery is proposed to run

continuously for the duration of the project, the greatest noise producing activities would include operating construction equipment such as an excavator, which is the loudest proposed terrestrial construction equipment (87 dBA) and would be used during most terrestrial construction activities. The standard attenuation rate for airborne noise generated from such construction activities is 7.5 dB per doubling of distance from the source (WSDOT 2020). Therefore, the operation of heavy machinery in the soft acoustic (i.e., vegetated) environment of the Project Area would be expected to attenuate to the most conservative ambient levels (rural environment ~40dB) at 3,800 ft from the source. These conservative estimates partially account for vegetation, weather, and traffic noise that surround the Project Area.

Where subsea FOC is installed, such as Etolin Strait and the YDNWR, the noise levels generated would be low (typically 155 to 170 dB re 1 μ Pa m) because the vessel would be traveling very slowly (approximately 3 knots) during cable laying activities. Comparatively, similar vessels such as freighters or cruise liners generate approximately 180 dB re 1 μ Pa m (Richardson et al. 1995). Where cable is installed using trench, underwater noise would likely increase above ship generated noise levels (up to approximately 178 dB re 1 μ Pa m; Nedwell et al. 2004). Received sound levels associated with submarine cable laying and trenching operations using dynamic positioning (DP) are expected to decline to 120 dB_{rms} re 1 μ Pa within 1.4 mi. of the source (Hartin et al. 2011).

Noise impacts associated with the Proposed Action are expected to be less than significant due to their temporary nature, limited intensity, and effective attenuation over distance. Terrestrial construction activities, including the use of heavy machinery such as excavators, would result in short-term increases above ambient sound levels but would not involve continuous operation. Subsea cable installation would generate relatively low underwater noise levels, comparable to or lower than those produced by common marine vessels. Overall, the spatial and temporal limitations of noise-generating activities, combined with natural attenuation and existing ambient conditions, support the conclusion that noise impacts would be less than significant.

4.2 Air Quality

Typical air quality impacts related to construction and daily operations would be estimated based on similar construction activities. The Proposed Action would likely have limited short-term effects on ambient air quality. These effects would be in the form of mobile source emissions from the cable-laying ship as well as vehicle and dust emissions from the terrestrial portion of the Proposed Action. These emissions are likely to be indistinguishable from other local sources of airborne particulates.

During construction, potential pollutants that may affect air quality at the Project site include:

- Vehicular traffic traveling to and from the Project area resulting in additional sources of carbon monoxide and carbon dioxide,
- Fugitive dust emissions from vehicle traffic, excavation, and construction,
- Soil and small amounts of concrete/asphalt removal or placement (particulate matter), and
- Fugitive dust from removal of sediment and placement of bedding material.

Air quality conditions in the proposed Project Area have not been classified, but it is assumed to meet clean air standards. The emissions from the cable laying vessel and terrestrial vehicles used during construction activities would represent a minor increase in the number of vehicles traversing the area daily and would not result in impacts causing or contributing to significant deterioration.

4.3 Fire Management

No changes are expected from how fire behaves in the area or how fire is managed, and fire suppression is not anticipated to be required along the ROW. If fire threatens the cable, fire management practices would remain the same as for areas not around the cable. No change in fire suppression strategy, initial attack response, or fuel reduction projects is anticipated or requested for this project. If the area burns, the cable could be assessed for functionality after the fire moves away. Rapid repairs could be made to replace specific points of loss, and then permanent design and repair could take place after initial triage is complete.

4.4 Geology and Soils

Shore-end segments of the marine fiber FOC route were selected to avoid developed shorelines and high-energy landfalls that are vulnerable to erosion or serve as designated vessel anchorages. Geophysical evaluations were conducted to inform route planning, with specific attention to minimizing exposure to geological hazards such as sediment slumping, strong currents, and unstable seabed conditions.

In deep-sea segments, cable burial would shield the FOC from known sources of damage, including bottom-contact fishing gear, subsistence fishing through Etolin Strait, anchor drag, and seismic activity. Excavated sediments from seabed trenching operations would be reused to cover the cable, ensuring that no marine soils are permanently removed from the Project Area. Seafloor sediments in the YDNWR would return to pre-construction conditions.

The proposed project impacts to vegetation would be temporary, resulting primarily from winter overland travel associated with construction activities. Areas that may be impacted were calculated based on a 50-ft.-wide construction ROW; however, most travel would occur within a narrower 30-ft.-wide corridor, so actual acreages affected would likely be smaller. Impacts would be reduced by conducting overland travel only when the snow depth is at least 6 in. and the ground is frozen to a depth of at least 12 in.

On land, most terrestrial segments of the FOC would be laid directly on existing soil or groundcover. Over time, seasonal freeze-thaw cycles may facilitate self-burial in some sections. Where trenching is required for cable burial, all excavated soil would be reinstated over the installed cable, eliminating permanent soil loss from the site. The only lasting impact to soils would be the physical footprint of the installed FOC, approximately 2 in. in diameter. Most other supporting infrastructure would be placed within previously disturbed areas, including the designated ROW.

Overall, impacts on geology and soils are expected to be less than significant. Minor localized permanent effects may result from the installation of new facilities, primarily due to soil compaction and slight changes in infiltration capacity, but these would be temporary and minimal in scope. Fiber lay on top of the organic mat would not likely result in soil compaction and would not affect permafrost.

4.5 Water Resources

The USACE completed their review and issued a NWP 57 for the installation and operation of the NTHE and Hooper Bay BU on March 23, 2026.

4.5.1 Surface Water

The methods used to install the FOC at water body crossing would include surface lay. This method of installation would be temporary with negligible impact to surrounding habitat. In crossing areas, installation would either occur in winter when the ground is covered in snow or ice to prevent permanent damage to local ecosystems. Based on the small overall project footprint(s) in these waterbodies, location of crossings across narrowed waterbody sections, and implementation of conservation measures to limit disturbance to water habitat (see **Appendix D**), it is concluded any impacts would be minimal and temporary. Installing a cable in a body of water, including the Alagnak River, could cause a temporary but minimal increase in turbidity that would be local to the FOC. Installing the cable during the winter months would minimize turbidity as much of the system would be frozen, particularly across the shallow segments of the river. The proposed crossing would occur downstream of the WSR segment, so any potential instream impacts would not impact this segment of the river. Post-installation conditions are anticipated to remain viable with no permanent, long-term, or significant long-term effects are anticipated.

Overall, impacts on surface water are expected to be less than significant. There would be no permanent impacts, and there may be temporary and minor, direct and indirect effects from surface laying FOC within rivers.

4.5.2 Groundwater

The FOC would be installed primarily by surface laying and therefore have no impact on groundwater in or near the Project Area. In case of emergency, construction teams would have an emergency spill kit to clean up any construction equipment fluids that accidentally leak in or near the proposed Project Area. Therefore, there would be no permanent or temporary impacts to groundwater.

4.5.3 Coastal Zone, Estuary, and Intertidal Areas

For FOC installation in coastal zone, estuary, and intertidal areas, HDD or trenching may be used to ensure the FOC location is not disturbed by anchorages or natural sediment movement along the coast. Deployment at these locations would displace sediment and permanently alter the marine environment. Additionally, there may be temporary and minor, direct and indirect effects from turbidity and sediment disturbance within marine and intertidal location from construction activities.

Since these impacts are minor and temporary, impacts from the Proposed Action on coastal zone, estuary, and intertidal areas are expected to be less than significant.

4.5.4 Floodplains

In general, the proposed project corridor is subject to flooding due to the low relief of the landscape and prevalence of permafrost, but proposed Project activities would not increase the likelihood of flooding. Much of the route would be surface laid and not disturb sediment layers or ground levels, and areas that are completed using HDD or trenching would occur near the coast where disturbed ground would be replaced, and flooding would usually occur regardless of temporary ground disturbance. Trenched components would be at a depth that should both sufficiently protect FOC from any flood-related erosion and not affect the integrity of any un-

mapped floodplains. The CLS would be built on pilings and not require fill or a change to existing ground topography. As a result of the Proposed Action, there would be no permanent or temporary impacts to floodplains.

4.5.5 Wetlands

Along the terrestrial portions of the route, wetlands would be traversed by construction equipment and crew. Limited data is available from USFWS's National Wetlands Inventory to characterize the landscape along the terrestrial segment from Naknek to Igiugig. In lieu of in-situ surveys, these areas have been conservatively assumed to consist entirely of wetlands, except for previously disturbed areas near the communities.

To minimize disturbance to wetlands, cable installation would occur in the winter when the ground is frozen, and snow and ice would help protect sensitive habitat. If any work were to occur outside of the winter season, mats would be used to cover sensitive habitat for minimal surface disturbance.

Impacts on wetlands are anticipated to be less than significant. The footprint of the cable occupies a 2-in. width area. Impacts on wetlands would be less than significant and would result in no net loss of wetland areas. **Table 4-1** shows the total length of cable to be installed in wetlands. **Table 4-2** shows total permanent impacts (cable presence) and temporary impacts (construction activity footprint) within the Proposed Action area. Temporary impacts are assumed to occur within a 50-ft. buffer centered on the cable, during installation activities. Permanent impacts are assumed to include the area and volume occupied by the FOC once installed. The total temporary area impacts listed in **Table 4-2** were calculated based on the total length of the segment (assuming 5,280 ft. per mi.) within the 50-ft. buffer. The volume of temporary volume impacts was calculated along the total length of the buried segment, assuming an 8-in. deep trench that would be 4 in. wide.

Table 4-1. Terrestrial Segments that Cross Wetlands by Installation Method

Segment - Location	Ground Lay (mi.)	Shallow Bury (mi.)	Total Length (mi.)
Emmonak Landing to Community	4.4	0.9	5.3
King Salmon to Igiugig	55.7	6.7	62.4
Hooper Bay	0.94	0.94	1.88

Table 4-2. Total Impacts to Terrestrial Wetlands

Segment - Location	Total Temporary Impacts	
	Area (ft ²)	Volume (cy)
Emmonak Landing to Community	1,399,200	38.9
King Salmon to Igiugig	16,473,600	289.6
Hooper Bay	44,693	4,965.8

4.5.6 Ice

When installing submerged FOC, temporary breaking of ice sheets may occur to help expose the earth to construction or cable laying activities. There is also the potential of ice scouring to damage the cable along the shallower marine segments between Nome, Emmonak, and Naknek,

as well as along the Alagnak River crossings. To minimize this possibility, the cable would be either shallow buried via trenching or protected with armoring in marine segments of the route that are less than 49 ft. deep. Overall, impacts to ice are expected to be temporary during installation, and less than significant. Once installed, there would be no temporary or permanent impacts associated with the cable.

4.5.7 Permafrost

Along terrestrial portions of the route where zero to ten percent permafrost coverage may occur, the cable would be surface laid or trenched in the uppermost 8 in. This upper layer near the surface is the active layer that lies above the permafrost, thawing during summer and refreezing in the winter. Since the cable would be surface laid over sensitive habitat and avoid deep burial, there are no anticipated direct or indirect effects to permafrost.

4.6 Biological Resources

4.6.1 Terrestrial Vegetation and Wildlife

The proposed project impacts to vegetation would be temporary, resulting primarily from winter overland travel associated with construction activities. Areas that may be impacted were calculated based on a 50-ft-wide construction ROW; however, most travel would occur within a narrower 30-ft-wide corridor, so actual acreages affected would likely be smaller. Impacts would be reduced by conducting overland travel only when the snow depth is at least 6 in. and the ground is frozen to a depth of at least 12 in.

Snow depths can vary due to drifting and topography. In general, when snow cover is low or absent, winter overland travel can disrupt the insulating surface organic layer, which may lead to thawing of the underlying frozen ground. In areas with moderate to high ground ice content, such thawing can cause loss of soil volume and subsidence (thermokarst), as well as potential changes to local hydrology. To reduce the likelihood of these types of permanent impacts, the proposed construction would avoid and/or minimize disturbance of insulating organic layers by using protective snow cover and limiting disturbance by using ground-lay cable methodologies.

As part of the proposed surface-laid cable installation, construction could involve trimming approximately 70 acres of a mixture of scrub-shrub and trees; 30 acres of vegetation on BLM-managed lands and 40 acres between Naknek and Igiugig. The temporary impacts caused by trimming in forested habitats would require regrowth. The shrub vegetation types where trimming would occur are dominated by deciduous shrubs (e.g., willow), typically recover relatively rapidly.

Some limited, temporary scrub-shrub clearing would be necessary to accomplish installation. The vegetation in these areas is likely to consist of small scrub trees such as willows, located within a subarctic tundra wetland. Deciduous shrubs, particularly willows (*Salix* spp.), are generally adapted to natural disturbance such as flooding, and typically recover rapidly from human-caused disturbance. No changes are expected to area fire regimes or management, and fire suppression is not anticipated to be required along the ROW. For these reasons, only temporary impacts to deciduous shrubs are anticipated because of vegetation clearing.

Evergreen shrubs, including common tundra species such as mountain avens (*Dryas* spp.), lowbush cranberry (*Vaccinium vitis-idaea*), and/or Labrador tea (*Ledum* spp.) are less tolerant of disturbance.

Damaged tussocks may lead to a permanent change in vegetation type as they are replaced by forbs and other graminoid species. The project would avoid clearing these vegetation types.

Winter construction at stream and river crossings may result in impacts to riparian vegetation. Thickets of tall willows, which commonly occur on the banks of streams and rivers, would be temporarily disturbed by vehicle traffic and other construction activities; however, the total area affected would be limited, and riparian willows are generally adapted to disturbance and expected to recover rapidly (Jorgenson et al. 2010).

Installation of the FOC during winter would limit the potential for rutting to the vegetative mat. Construction during this time would enable equipment and machinery to transport and operate on frozen ground, mitigating impacts to soils and root structures. As the cable installation would occur during frozen conditions, vegetation would be cut at the frozen ground or snow surface, allowing the root base to be left intact for regrowth.

Shallow trenching is proposed to minimize erosion and changes to surficial water flow by preserving the vegetative mat and underlying soil. The goal of shallow trenching is to place fiber just under the vegetative mat. Materials excavated would be temporarily side cast before being placed back into the open area, and the vegetative mat would be placed on top to promote regrowth. All trenches would be backfilled with excavated material, stratified, and replaced in the order removed, with the vegetative mat at the surface. The vegetative mat contains native vegetation and seed that is anticipated to naturally revegetate disturbed soils.

Although the Project Area is in a different bioclimatic zone, some of the vegetation types are similar to those that occur on the Arctic Coastal Plain and some comparison can be made from these ranks of ecotype resilience to overland travel, but that the rankings should be considered only as general guidance, since differences between the Arctic Coastal Plain and the Project Area may affect resilience in ways that are not currently understood.

Overall, although vegetation within the project footprint would be temporarily impacted, these vegetation types are not unique and are abundant and widespread throughout the surrounding landscape. Constructing in winter and the implementation of BMPs would help minimize disturbance, and the adjacent vegetation and habitat are expected to remain unaffected.

Permanent footprints of new CLSs, BMHs, and vaults would be minimal and would concentrate on previously disturbed areas within and around built communities.

The project's environmental impacts on terrestrial mammals would be related to the temporary human activity around installing the FOC during winter construction. This would include the temporary use of tracked vehicles and trailers for transporting the cable, camps, personnel, fuel, and construction equipment. In addition to potential disturbance and displacement of wildlife from project vehicles, there would be some temporary impacts from snow compaction and vegetation clearing along the route. This could temporarily impact herbivores along the project route, although these impacts would be localized and would only affect a small fraction of the available foraging habitat. Impacts to vegetation would be mitigated by requiring a minimum snow cover (a minimum of 6 in.) and frost layer levels for overland vehicle travel.

Compacted snow trails could also be used by predators, including wolves, resulting in an alteration of predator distribution and movements. This could result in some higher levels of predation along the route, but the extent of impacts is difficult to predict. Moose and caribou could also use these routes, resulting in lower energetic costs, but possibly higher levels of predation.

Snow compaction from project vehicles could result in direct mortality of small mammals denning along the route, as well as limiting their movements and access to habitat under the snow. Project activities have the potential to result in contaminant spills and adding food waste to the environment with subsequent impacts to terrestrial mammals. Protocols for handling food waste and avoiding dispersal of contaminants would be implemented to minimize potential impacts.

Any direct wildlife disturbance as a response to project vehicles or human activity associated with FOC deployment would result in localized and temporary displacement, as well as some energetic impacts to most species present during winter. Reimers et al. (2003) measured flight distances of wild reindeer in Norway in response to snowmobiles and found that the total flight distance was approximately 2,160 ft. They calculated the increase in total daily energy expenditure and estimated that 3 daily encounters during late winter would have moderate energy costs that would not result in demographic impacts. Wildlife of the Project Area currently has limited exposure to human infrastructure or vehicles other than encountering hunters on snowmobiles, and, as a result, they may have stronger reactions to human activity.

Winter installation would avoid the Mulchatna Caribou Herd. The herd typically moves to areas with more accessible forage and reduced snow depth in the winter season, often favoring shrub tundra and forested regions farther inland (Van Lanen et al. 2018). The landscape between Naknek and Igiugig is dominated by riverine and lake environments, which are less suitable for winter foraging and shelter. As a result, while individual caribou may occasionally pass through or use parts of the proposed Project Area, the likelihood of significant herd presence or aggregation is low (Van Lanen et al. 2018). Seasonal absence reduces the potential for direct impacts from winter construction activities. Moose often have a high tolerance for human activities, but because moose in many of these areas have had limited exposure to human activity, they may be more likely to be temporarily displaced by project activities.

No summer activities (e.g., overflights to inspect the FOC or regular maintenance) are planned. Cable breaks would most likely be accessed by aerial or winter off-road travel. Any overflights to repair the FOC in summer would be on an as needed case in response to an unanticipated break. This overflight would be targeted and not include the length of the terrestrial cable route. Helicopters used to repair may result in localized and temporary disturbance and displacement of terrestrial mammals. This temporary behavioral disturbance could result in an increase in energy expenditure due to higher stress levels and an increase in startle and flight responses during the repair efforts.

4.6.2 Migratory Birds

Construction and cable laying would be expected to have temporary and minor impact on migratory birds due to construction timing and methodology. Most of the construction would occur in winter, avoiding peak migratory and nesting season, and thus reducing the risk of disturbing nesting birds, fledglings, and migratory stopover sites. Habitat in the undeveloped areas of the proposed Project route is large and intact, with ample space for migratory birds to avoid the temporary disturbances of construction activities.

Additionally, the cable would be predominantly buried or surface laid, thereby avoiding the introduction of new vertical structures that could create perching or resting opportunities. Aerial installation is planned in community areas where such infrastructure already exists. Although new poles may be installed, they will be placed in areas with a history of aerial installations.

Given the existing infrastructure and the minimal change in the quantity and dimensions of the new FOC, the risk of avian collisions is considered negligible.

The burial that would occur involves only temporary work areas and a narrow trench, which limits habitat disturbance, allows for rapid restoration of any disturbed vegetation, and avoids long-term fragmentation of bird habitats. The FOC would not emit light, noise, or EMF that could attract or disorient birds. Overall, no operational impacts, delayed consequences, or reasonably foreseeable effects were identified.

Aerial overflights of the FOC to repair broken segments during summer have the potential to elicit avoidance reactions from birds. These reactions would depend on aircraft attributes (e.g., flight pattern, engine type, altitude) and animal characteristics (e.g., species type, life-stage, level of aggregation). The extent of aerial overflight impacts on birds would depend primarily on the frequency of overflights and landings in the same area, as a single overflight or landing would be a limited exposure. The overflights proposed for this project would be targeted, using the aircraft to access breakages for repair (i.e., single purpose action), not regular maintenance checks. This action would likely temporarily displace birds in the area of the breakage by project activities but would not have a long-term impact.

4.6.3 BLM Sensitive Species

The proposed installation may affect BLM Sensitive Species, including migratory birds, invertebrates, fish, and plants. Migratory birds like Kittlitz's Murrelet, Buff-breasted Sandpiper, and Yellow-billed Loon depend on undisturbed tundra and wetland habitats for nesting and raising young. Shorebirds and loons are particularly vulnerable to habitat fragmentation and human disturbance during the breeding season. Songbirds such as the Olive-sided Flycatcher and Rusty Blackbird may also be displaced by noise and activity if construction occurs during their active periods.

Invertebrates, including bumble bee species and aquatic insects, may be affected by soil disturbance, vegetation removal, and changes in microhabitat conditions. These species rely on intact ground cover and clean water systems for reproduction and development, making them sensitive to even low-impact surface activities.

Fish species such as Arctic Char and Alaskan Brook Lamprey may be impacted by construction in stream crossings. Sedimentation, bank disturbance, and changes in hydrology may degrade spawning or overwintering habitat, particularly in cold, clear water systems.

Plant species are vulnerable to direct damage from trampling, soil compaction, and vegetation clearing. These plants often occupy niche habitats with limited distribution and may be slow to recover from disturbance.

To reduce these risks, construction is planned for winter when many species are dormant, absent, or less active. This timing avoids critical life stages such as nesting, spawning, and active growth. Additional mitigation measures include implementing erosion control and invasive species prevention protocols. Pre-construction surveys and seasonal timing restrictions will be used to further reduce risk to migratory birds and other sensitive species and ensure compliance with BLM conservation objectives.

Required Operating Procedures including FW-3a, 3b, 3c, 3e, 3f, and 4b, as well as SS-1a and 1-b would be implemented to avoid impacts to wildlife and special species within BLM lands (see

Appendix D). If emergency access is required within the nesting season window, the project would coordinate with USFWS to determine the appropriate course of action prior to mobilizing crews or equipment. These are expected to be targeted in specific areas (i.e., breakages), as well as limited duration and intensity.

4.6.4 Threatened and Endangered Species

Due to the potential impacts associated with cable installation, it has been determined that the effects of the Proposed Action on the ESA-listed species in the area include temporary increase in turbidity, temporary vessel presence, temporary vessel noise, and permanent aerial FOC presence. Consultation with NMFS was initiated on June 26, 2024, and with USFWS on August 16, 2024. Both agencies evaluated the anticipated impacts of the Project to species listed under ESA. On December 12, 2024, with the implementation of BMPs (see **Appendix D**), USFWS concurred with NTIA's determination that the Project would affect, but not likely adversely affect either species or critical habitat under their jurisdiction. On April 8, 2025, NMFS concurred with NTIA's determination that the Project would affect, but not likely adversely affect either species or critical habitat under their jurisdiction (see **Appendix G** for LOCs).

4.6.4.1 Turbidity

Cable laying and trenching operations on the seafloor may result in localized short-term, small-scale increases in turbidity. Although no study has focused on the impact of particle resuspension induced by cable installation on marine communities, it should generally have negligible impacts on marine ecosystems (Taormina et al. 2018), including those within the YDNWR. Increases in turbidity due to cable installation operations would be dependent on location, active currents, sediment type, geological disturbances, and other variables. However, due to the small size of the cable, the transient operation of the installation, and the short term of operations, there would be no permanent or long-term impacts on marine water quality due to suspended sediments.

All the ESA-listed species are highly mobile and/or migratory and are not expected to be temporarily nor permanently displaced due to the Proposed Action, including the YDNWR, as their mobility enables them to avoid any potential deleterious impact.

Sedimentation and turbidity are primary contributors to the degradation of salmonid habitat (Bash et al. 2001). Excess sediment loading and turbidity levels can clog the gills of fish, smother eggs, embed spawning gravels, and disrupt feeding and growth patterns of juveniles (Bruton 1985). By working in anadromous rivers in winter and the temporary nature of construction, the turbidity associated with the Proposed Action would be minimal, localized, and short-term. Turbidity is anticipated to be insignificant to all ESA-listed species that may be present in the Action Area.

4.6.4.2 Vessel Presence and Strike Risk

Marine species within the region are accustomed to regular vessel traffic and human activity in the marine waters from Nome to Naknek. This area includes portions of the Bering Sea, including Etolin Strait, and Bristol Bay, which support year-round commercial fishing, cargo transport, and community resupply operations. A review of AIS data from the Marine Exchange of Alaska and NOAA's Marine Cadastre confirmed consistent vessel presence in the shipping lands of the Bering Sea, including west of Nunikvak Island and the YDNWR, with thousands of transit segments recorded annually. Vessel presence during marine cable laying and burial could

result in temporary and minor disruptions in behavior of ESA-listed marine mammals. Potential responses to the Proposed Action may include temporary disruption of a species' current behavioral state and/or temporary avoidance of the Action Area.

A study in Juneau, AK analyzed humpback whale movements and behavior in response to whale-watching vessels and found that feeding and traveling humpback whales were likely to maintain their behavioral state regardless of vessel presence, while surface active humpback whales were likely to transition to "traveling" in the presence of vessels (Schuler et al. 2019). A cable laying ship operates at much slower speeds, and the presence of the vessel over a short period of time is not expected to result in any significant alterations in the behavior of ESA-listed whale species in the Action Area. Vessels transiting in the marine environment have the potential to strike marine mammals (Laist et al. 2001; Jensen and Silber 2004). The probability of strike events depends on the frequency, speed, and route of the vessels, as well as distribution of marine mammals in the area. Vessel strikes of humpback whales are far more likely than strikes of pinnipeds (e.g., Steller sea lions) and other whales (Neilson et al. 2012).

Laist et al. (2001) found a direct relationship between the occurrence of a whale strike and the speed of the vessel involved in the collision. An examination of all known ship strikes for large whales (i.e., baleen and sperm whales) from all shipping sources indicates vessel speed is the principal factor in whether a vessel strike results in death (Laist et al. 2001; Vanderlaan and Taggart 2007). The authors concluded that most deaths occurred when a vessel was traveling more than 13 knots, which is significantly greater than the vessel speed associated with the transit and cable laying operations of the Proposed Action. The cable-laying vessel would be traveling at a speed of approximately 3 knots while in operation.

Overall, any effects on ESA-listed marine mammals are expected to be limited to temporary disruption of current behavioral state and/or avoidance of a limited area around Quintillion's proposed cable laying activities. BMPs would ensure effects are short-term and minimal.

4.6.4.3 Vessel Noise

Acoustic disturbance associated with cable installation is expected to be minor and is limited to the noise produced by vessels during operations. According to Taormina et al. (2018), there is no clear evidence that underwater noises emitted during cable installation affect marine mammals or any other marine animal. Compared with other anthropogenic sources of noise—such as sonar, pile driving, or explosions—underwater noise linked to undersea cables remains low. Underwater noise from the cable ship would likely increase above ambient noise levels in a 7,545 ft. radius around the ship (up to approximately 178 dB re 1 μ Pa m; Nedwell et al. 2004). Cable installation would be a spatially localized and a temporary event, so the impact of noise on marine communities is expected to be minor and brief.

Vessels associated with the Proposed Action would have a transitory and short-term presence within the Action Area; vessel noise is expected to elicit no more than short-term behavioral responses. Marine mammals' reactions to this type of acoustic disturbance may include approach or deflection from the noise source, temporary avoidance behavior, or short-term masking of echolocation or acoustic communication among individuals. While listed marine mammals could be exposed to acoustic stressors from vessel transit, most of the acoustic energy they would be exposed to would be low frequencies below the best hearing ranges of the marine mammals expected to occur within the Action Area. Due to project related vessels emitting continuous

sound while transiting or laying cable, vessel activities would alert marine mammals of their presence before the received level of sound exceeds 120 dB (level of behavioral harassment). Therefore, a startle response is not expected. Rather, deflection and avoidance are expected to be the most consequential responses in those instances where there is any response at all. Noise associated with project activities would not result in immediate or long-term effects to marine mammals, thus the anticipated effects to marine mammals from vessel noise would be considered insignificant. Once the cable is laid or buried, normal operation of the cable is considered benign, and would not produce any noise that would affect ESA-listed species.

4.6.4.4 Aerial Fiber Optic Cable Strike Risk

Aerial FOC installation is planned for Emmonak, Hooper Bay, and Naknek where existing aerial infrastructure is already present. The cables would be positioned approximately 30 to 40 ft above the ground. Based on the existing aerial infrastructure at these locations, the risk of ESA-listed avian species colliding with aerial FOCs is considered negligible, as the quantity and dimensions of the new FOC will be less than those currently in place. No operational impacts, delayed consequences, or reasonably foreseeable effects were identified.

4.6.4.5 Effects Determinations

Based on the use of BMPs, unlikely presence of species in the Action Area, the minimal and temporary increase in turbidity, and the minimal and temporary increase in acoustic disturbance during terrestrial construction and submarine cable installation, the effects of the Proposed Action on the ESA-listed species in the area are:

- Bearded seal, Beringia DPS - **May affect, not likely to adversely effect**
- Arctic ringed seal - **May affect, not likely to adversely effect**
- Steller sea lion, West DPS - **May affect, not likely to adversely effect**
- Fin whale - **May affect, not likely to adversely effect**
- Humpback whale, Mexico DPS - **May affect, not likely to adversely effect**
- Humpback whale, Western North Pacific DPS - **May affect, not likely to adversely effect**
- North Pacific right whale - **May affect, not likely to adversely effect**
- Sperm whale - **May affect, not likely to adversely effect**
- Spectacled Eider - **May affect, not likely to adversely effect**
- Steller's Eider - **May affect, not likely to adversely effect**

4.6.5 Designated Critical Habitat

4.6.5.1 Bearded Seal, Beringia DPS

The proposed Project “**May Affect but is Not Likely to Adversely Affect**” critical habitat for the Beringia DPS of the bearded seal. The effects to each of the physical or biological features (PBFs) are evaluated below:

1. Sea Ice Habitat:

- Seasonally ice-covered marine waters over the continental shelf.
- Areas with pack ice that provide suitable haul-out platforms for birthing, nursing, molting, and resting.

It is expected that the cable-laying ship would transit this area sometime between April and October 2026. Sea ice would not be present at this time.

2. Water Depth and Substrate:

- Shallow waters (typically less than 656 ft. deep) with soft-bottom substrates that support benthic prey communities.

There would be no effect on this PBF from the Proposed Action.

3. Prey Availability:

- Access to benthic invertebrates and demersal fish, including clams, crabs, shrimp, cod, and other bottom-dwelling fish.

Any increase in suspended sediment or turbidity in the water column due to project activities is expected to be minimal, dissipate quickly, and would not degrade water quality or alter long-term habitat conditions in the marine environment. This would not limit seals' prey availability in any biologically significant manner.

4. Acoustic Environment:

- A relatively undisturbed soundscape, especially during sensitive periods like breeding and nursing, to avoid stress and behavioral disruption.

Cable installation would be a spatially localized and a temporary event, so the impact of noise on marine communities is expected to be minor and brief. Once the cable is laid or buried, normal operation of the cable is considered benign, and would not produce any noise that would affect ESA-listed species.

4.6.5.2 *Arctic Ringed Seal*

The proposed Project “**May Affect but is Not Likely to Adversely Affect**” critical habitat for the arctic ring seal. The effects to each of the PBFs are evaluated below.

1. Sea Ice Habitat:

- Seasonal sea ice is used for pupping, nursing, basking, and molting.
- Ice must be stable enough to support the construction of subnivean lairs (snow caves used for birthing and protection from predators).

It is expected that the cable-laying ship would transit this area sometime between April and October 2026. Sea ice would not be present at this time.

2. Snow Cover:

- Adequate snow accumulation on top of sea ice (typically at least 7.9 in.) is essential for forming and maintaining subnivean lairs.

It is expected that the cable-laying ship would transit this area sometime between May and October 2026. Sea ice and snow cover would not be present at this time.

3. Foraging Habitat:

- Marine waters over the continental shelf and slope that provide access to prey species such as Arctic cod and other fish and invertebrates.
- These areas must be accessible year-round, especially during ice-covered months.

The cable-laying ship would transit through the area slowly while installing subsea FOC. Its presence would not preclude seals from accessing any foraging habitat in any significant way.

Any increase in suspended sediment or turbidity in the water column due to project activities is expected to be minimal, dissipate quickly, and would not degrade water quality or alter long-term habitat conditions in the marine environment.

4. Seasonal Use Periods:

- The habitat designation considers three critical seasonal periods:
 - Winter–Spring: Subnivean lair use for reproduction.
 - Late Spring–Early Summer: Basking and molting.
 - Year-Round: Foraging.

The installation will be short-term and temporary in nature. The Proposed Action would not hinder any seasonal uses.

4.6.5.3 *Steller Sea Lion, West DPS*

The proposed Project “**May Affect but is Not Likely to Adversely Affect**” critical habitat for the Western DPS of the stellar sea lion. Construction of the proposed project may impact Steller sea lion critical habitat by causing disturbance at rookeries. The effects to each of the PBFs are evaluated below.

1. Terrestrial zones that extend 3,000 ft. landward from each major haulout and major rookery in AK.

No landward part of the project would be located near a major haulout or rookery. Therefore, it is concluded there would be no effect to this PBF.

2. Air zones that extend 3,000 ft. above the terrestrial zone of each major haulout and major rookery in AK.

No landward part of the project would be located near a major haulout or rookery. Therefore, it is concluded there would be no effect to this PBF.

3. Aquatic zones that extend 3,000 ft. seaward of each major haulout and major rookery in AK that is east of 144° W longitude.

No part of the project would be located east of 144° W longitude. Therefore, it is concluded there would be no effect to this PBF.

4. Aquatic zones that extend 20 nm seaward of each major haulout and major rookery in AK that is west of 144° W longitude.

The cable-laying ship would pass within approximately 14 nm from Cape Newenham, which places it within the 20 nm aquatic zone of a major haulout for designated Steller sea lion critical habitat. It is expected that the cable-laying ship would transit this area sometime between April and October 2026. Spring and summer are seasons when Steller sea lions may be breeding and foraging in the area. The vessel’s path would cross approximately 30 nm of the aquatic zone at a maximum speed of approximately 10 knots. At this speed, the vessel would cross the aquatic zone in approximately three to four hours. Therefore, the potential for disturbance to sea lions foraging near the haul out would be short-term and transitory. It is not expected that the vessel’s presence would create a substantial disturbance because it would be moving slowly and would be near the edge of the protective aquatic zone. Therefore, it is concluded that any effect to this PBF would be insignificant.

5. Three special aquatic foraging areas: the Shelikof Strait area, the Bogoslof area, and the Segum Pass area, as specified at 50 CFR 226.202(c).

No part of the project would be in any of these special aquatic foraging areas. Therefore, it is concluded there would be no effect to this PBF.

4.6.6 Essential Fish Habitat

NMFS was consulted on September 16, 2025. On September 29, 2025, they confirmed that, while the Project may adversely affect EFH for Pacific salmon and Bering Sea groundfish, effects would be minimal and temporary in nature (see **Appendix G** for LOC).

All project activities were assessed for impacts to EFH and FMP fish species. Based on the geographic distribution of the Project, the affected area is relatively small, and the Project is not anticipated to prohibit movement of EFH species through the Project Area, including Etolin Strait and the YDNWR, or to adversely affect their prey species in any measurable way over the long-term.

The direct impacts to marine EFH from the installation of the submarine cable would include a minor and temporary increase in turbidity and temporary habitat disturbance where the submarine cable is trenched along the sea floor. The cable would be a maximum of 2 in. in diameter with the plow installing the cable creating a temporary 5 ft. by 3 ft. trench that would fill in naturally over days to weeks. The seafloor along the cable route from Nome through Etolin Strait to Naknek is comprised primarily of soft sediment that does not represent high quality habitat, such as eelgrass or kelp. Because the project installation activities are anticipated to be relatively benign and short in duration, benthic marine communities of fish and other mobile organisms, if affected at all, are expected to quickly recolonize the area upon completion of installation.

The Project may adversely affect EFH for Groundfish, although these impacts would be minimal and short term. Additionally, potential adverse effects to EFH for Groundfish will be mitigated based on the small overall project footprint, implementation of minimization measures to limit disturbance to species and habitat, and a lack of permanent impacts to EFH. There would be no effect to Pacific Salmon EFH for marine life stages.

4.6.6.1 Anadromous Stream Habitat

Like the marine environment, installation of the cable across the anadromous Alagnak River and Peak and Ole creeks would be temporary with minor impacts. Crossings would occur in winter, and Quintillion obtained a Fish Habitat Permit from ADF&G for the project on November 18, 2025. The Proposed Action may adversely affect EFH during construction only for Pacific Salmon EFH for freshwater life stages. However, based on the small overall project footprint(s) in these waterbodies, location of crossings away from critical salmonid spawning habitat, implementation of conservation measures to limit disturbance to species and habitat, and a lack of long-term impacts to EFH, it is concluded any impacts would be minimal and temporary.

Post-installation conditions are anticipated to remain viable for supporting FMP-managed fish species. No permanent, long-term, or significant short-term effects are anticipated. Following installation, the presence of FOC is also not anticipated to adversely affect either marine or freshwater EFH or FMP-managed fish species.

4.7 Historic and Cultural Resources

The APE for the NTHE is defined as a 50-ft. buffer extending out on all sides of the footprint of proposed ground disturbing activities. Where the FOC will be laid on the ground or shallow

buried, the APE will be a 100-ft. wide corridor and 200-ft. for the aerial FOC. The APE for the subsea portion of the NTHE is the 820-ft. wide route remotely surveyed for the Project.

In consultation with the Alaska SHPO and the Proposed Action cooperating agencies, NTIA determined that the development of a project-specific Programmatic Agreement (PA) would be appropriate to address their collective obligations under Section 106 of NHPA. The PA provided a process for NTIA, BLM, other land managers, and the Section 106 consulting parties to fully identify historic properties that may be affected by the Proposed Action and implement the avoidance, if possible, or mitigation of adverse effects on historic properties. The PA allows for a phased approach to complying with Section 106, pursuant to the implementing regulations found at 36 CFR § 800. Further, the PA establishes a collaborative process for the future identification, evaluation, mitigation, monitoring, and recovery of historic properties, consistent with Advisory Council on Historic Preservation (ACHP) regulations pursuant to Section 106 of the NHPA. As part of this and the general Section 106 process, NTIA consulted with state and federal agencies, federally recognized tribes, local governments, and other parties that have an interest or concern about any cultural resources, historic properties, or traditional cultural sites. The PA guides the alternative Section 106 process, including consultation by signatories with Tribes and other consulting parties. The PA was executed on March 10, 2026. See **Appendix F** for the executed PA.

4.7.1 Archaeological and Architectural Resources

The project involves multiple construction methods with varying levels of ground disturbance, with varying potential to impact cultural resources. The potential ranges from No Potential to High Potential, depending on whether the work occurs in previously disturbed utility corridors or undisturbed ground, and the depth/extent of excavation.

Activities with no potential for impact involve little to no ground disturbance or utilize existing infrastructure. These construction methods include surface lay, aerial construction on existing pole lines, subsea burial, and shore-end installations below mean high tide. These methods require only adherence to an inadvertent discovery plan and pose minimal risk to cultural resources.

Construction methods with low potential generally occur in previously disturbed utility corridors or involve minimal ground disturbance. These include standard directional bores, large HDD bores, shallow burial trenches, and shelter and vault installation on existing pads. For these activities, reconnaissance surveys or installation under an inadvertent discovery plan are typically sufficient, with surveys conducted only at the discretion of a qualified archaeologist.

In contrast, activities with medium to high potential involve new ground disturbance or excavation in undisturbed areas. These methods often require archaeological surveys, typically covering excavation areas with a 50-ft. buffer or at an archaeologist's discretion, to mitigate the risk of impacting cultural resources.

Overall, the majority of the FOC will be installed using subsea burial or terrestrial surface lay, which pose no risk to cultural resources. Much of the remaining project route would be installed through previously disturbed corridors and poses low risk. Segments involving undisturbed ground or excavation present localized medium to high potential for cultural resource impacts and may require formal archaeological surveys and monitoring of ground disturbing activities. Avoidance and mitigation measures are outlined below and will be finalized through the PA process.

Avoidance of adverse effects to historic properties could be achieved by moving the proposed Project corridor or the location of proposed Project facilities. Avoidance could also be achieved by keeping construction activities away from NRHP-eligible properties, limiting the effect to existing demonstrated disturbance areas, or avoiding the cultural resources by boring or horizontal directional drilling, depending on the nature of the resource. If the proposed Project could not avoid a particular cultural resource, NTIA would consult with the PA signatories to determine those measures to be implemented by Quintillion to minimize and mitigate adverse effects on historic properties identified in the APE, consistent with the stipulations of the executed PA. If NTIA determines that the adverse effect could not be avoided, Quintillion would draft a comprehensive treatment plan for each adversely affected historic property. The treatment plan would describe measures to minimize and mitigate the adverse effect of proposed Project construction activities on historic properties, the way these measures would be carried out, and a schedule for their implementation. Mitigation would be conducted prior to the approval of construction within the area following the treatment plan and the protocols outlined in the approved PA. See **Appendix F** for the executed PA.

4.7.2 Native American Traditional, Cultural, or Religious Resources

In accordance with the requirements of Section 106 of the NHPA, a comprehensive consultation process was undertaken to identify and address any potential impacts on traditional, cultural, or religious resources. This process involved outreach to multiple tribal governments, tribal organizations, and affiliated communities with ancestral or cultural ties to the proposed Project Area. Each community was invited to participate in the consultation process and was provided with a project description to engage in dialogue, share concerns, and contribute to the identification of culturally significant resources. These entities were also invited to participate in the development of the PA described above.

A record of all correspondence is provided in the Community Engagement Table located in **Appendix B**. This documentation reflects the full scope of engagement efforts, including formal letters, email communications, virtual and in-person meetings, and follow-up discussions.

All questions, comments, and concerns raised during the consultation were carefully considered and addressed in coordination with the respective communities. This included clarifying project details, responding to inquiries about potential effects, and incorporating feedback into the planning and mitigation framework where appropriate.

Based on the outcomes of this consultation to date and the information provided by participating tribes and organizations, currently the Proposed Action would result in no significant effect on native American traditional, cultural, or religious resources. The PA process included additional consultation and other measures to ensure a reasonable and good faith effort to identify resources of importance to Tribes.

4.7.3 Subsistence

Effects on subsistence are evaluated by determining effects to the abundance and distribution of resources, access to resources, and competition for resources. The activities associated with the Proposed Action do not present a significant possibility of a significant restriction of subsistence use. Activities may temporarily displace subsistence game or harvesters during the construction period; however, these effects would be localized, short-term, and would not significantly affect the abundance and distribution of resources, access to resources, or competition for resources. See **Appendix I** for the BLM's Section 810 ANILCA Compliance Determination.

The 76.7 mi. of subsea cable installation through the Etolin Strait and YDNWR would occur once from mid-July to late August. The portion of the Proposed Action that passes through the YDNWR is not likely to alter the availability, distribution, migration, or location of subsistence resources to a significant degree. Any change in migration or distribution would be limited to site-specific areas and short in duration (i.e., during cable installation). Access to subsistence resources would not be limited by the Proposed Action during the cable operation.

Construction activities would occur over winter months and would have a direct and temporary effect of disturbance within 50 ft. of the FOC centerline. HDD bores and community fiber would be installed over the summer season of 2026 and 2027. Mainline fiber would be installed in one winter segment between 2025-2026.

During the construction phase, 3 to 5 snowmachines, a trencher, and one vibratory plow would be regularly in use within the corridor and producing light and noise that would be disruptive to species overwintering in the area, and as a result, to subsistence users targeting those species. The construction site would constantly be moving as cable is laid, so light and sound impacts would be localized and temporary.

Disturbance associated with installation of fiber may include subsistence users encountering FOC, construction laborers, as well as lights and noise from construction. Should subsistence users pass through the construction area during active construction, construction activities can stop while subsistence users pass. The potential for interaction between snowmachines and the surface-laid fiber during construction has also been considered (i.e., a snowmachine becoming hooked on the cable). Construction would occur during winter, and newly installed fiber is expected to be covered by snowfall and subsequently buried as snowpack accumulates. Vegetation and surface conditions support natural settling of the cable into the underlying organic layer when seasonal thaw occurs, at a time when snowmachine use is not anticipated. In subsequent winters, the cable is expected to be fully under the snowpack. Based on these conditions and the temporary, localized nature of installation, a significant risk to snowmachine users is not expected.

The proposed action does not include new roads, trails, runways, or boat launches, nor does it limit access to existing facilities. The project is not expected to impact access to or success of subsistence activities taking place within the project area, during or after construction.

4.7.4 Paleontological Resources

There are no known paleontological resources in the vicinity of the Proposed Action, and the surrounding region was assessed as PFYC class 2. Therefore, it was determined that there would be no effect on paleontological resources due to project-related activities.

4.8 Aesthetic and Visual Resources

4.8.1 Visual Aesthetic

Visual aesthetic impacts would be less than significant along the proposed route. The installation of a FOC typically includes a minimal and temporary visual disturbance as construction equipment is localized to the construction site, whether on land for terrestrial portions of the project or on water for marine portions of a project. The ground would be temporary. A temporary increase in vehicles and construction crews would occur as the cable is laid either on top of the soil in more remote ecosystems where it would shallow bury over time or be buried underground with disturbed surface soils and vegetation restored, or it is buried using HDD rigs and backhoes near shorelines

to avoid disturbing sensitive habitat. Any trenching would be backfilled and covered with the original vegetative mat, with disruption remaining temporarily visible until the next growing season.

When it comes to installed FOC, after the short time in which the project is being deployed is completed, the visual aesthetic of a place would return to normal with little to no changes in appearance to the minimally invasive nature of the project. The activity proposed on BLM lands is designed to be unnoticeable to the casual observer after vegetation within a 50-ft construction corridor reaches the height of adjacent vegetation. This is anticipated to be substantially completed after the first growing season (by late August) immediately following construction. Changes to the landscape characteristics are not anticipated, and visual disruption would be minimal and temporary.

The project would not detract from the BLM's ability to manage permitted activities to meet the objectives of VRM Class III (activities may attract attention but should not dominate the view of the casual observer) and Class IV (activities may dominate the view and be the major focus of viewer attention). Aerial segments would be limited to adding to existing poles or limiting the number of new poles in an already populated area.

4.8.2 Light Aesthetic

Similar to **Section 4.8.1**, the installation of a FOC includes minimal and temporary light disturbances from lights on the cable installation vessel, or lights in staging areas along the project route if construction were to take place at night. Light from the vessel in the marine environment would be no more than the usual light emitted from vessel traffic in the area. Light aesthetic impacts would be less than significant along the proposed Project route as most of the infrastructure would be at or below ground level. Additional lighting associated with the new CLS would be limited to predominantly entrances/exits of a facility.

4.9 Land Use

4.9.1 County and Municipal Ordinances and Zoning

Nome and Naknek have published zoning and land use regulations, and Emmonak, Hooper Bay and Igiugig do not. The Proposed Action would comply with existing zoning regulations and would not require re-zoning or a conditional use permit.

4.9.2 Existing Land Use Within and Around the Proposed Action Area

No permanent or temporary impacts are anticipated to land use due to the Proposed Action. The Proposed Action crosses large areas with relatively undeveloped and undisturbed land and sea. Where it does intersect communities, it is buried or installed in the ROWs of roads to minimize impacts to current infrastructure. The Proposed Action may convert a small amount of land from its existing use to utility use. This is not expected to have an adverse impact on adjacent land uses because it is compatible and is not anticipated to interfere with the functions of these land use types.

The Proposed Action would likely result in amending the YDNWR CCP to change the management category for the entirety of the 50 ft. wide ROW corridor from Minimal Management to Moderate Management. Moderate Management would allow changes to the refuge environment that are temporary or permanent but small in scale and that do not disrupt ecological processes. The natural landscape would remain the dominant feature, with signs of human activities unlikely evident.

4.10 Infrastructure

4.10.1 Transportation

The Proposed Action would have minor impacts on travel patterns during construction to the presence of work vehicles within construction areas. Minor access control would need to be implemented to provide safe access to residential, commercial, and public facilities. Traffic Control Plans would be used to ensure safety by temporarily diverting vehicle or food traffic around construction areas. A minor impact on marine transportation is anticipated during cable-laying activities as boats may have to detour around the cable-laying ship. The Proposed Action is expected to have no permanent or temporary adverse impacts.

4.10.2 Public Utilities

The Proposed Action is expected to have less than significant impacts on public utility infrastructure and is not anticipated to change the demand for water, wastewater, or landfill services. Improved internet may result in residents spending more time inside and online, which would increase demand for electricity. However, this increase is expected to be minimal and within the capacity of each community's power plant. The impact is expected to be permanent, and the change in electricity usage would vary depending on the number of connections and other factors. The electricity needed for the CLSs is anticipated to be minimal and within the capacity of each community's electrical service. During construction, a slight increase in demand for public services is anticipated due to the presence of construction crews. This impact is expected to be minor and temporary.

4.11 Socioeconomic Resources

4.11.1 Population Characteristics, Demographics, and Housing

The Proposed Action would have no adverse impact on specific demographics or housing access and would have a beneficial impact on minority and low-income communities. All communities along the Proposed Action route would have access to the same broadband service access. Therefore, it would increase each community's access to reliable and fast broadband service which would positively affect many aspects of each community including access to health and educational services.

4.11.2 Employment

When communities increase their broadband access, it is expected that this change would provide new access to economic opportunities such as remote working. Additionally, when local weather is challenging, community members, organizations, and companies can save time and energy by hosting online meetings instead of meeting in person, which can save them time, energy, and reduce operational costs. The Proposed Action would have no adverse impacts on employment and would have beneficial impacts with increased access to resources, tools, and the resiliency needed to build successful businesses.

4.11.3 Income

As stated in **Section 4.11.2**, access to broadband can increase the access of community members to remote working opportunities. It also can improve phone and video call connectivity, access to online goods and services, and increase participation in social media. If the new internet service

is a cheaper service, it can allow residents to spend more money on other needed goods and services. There are no adverse impacts to include because of the Proposed Action, and residents would have increased opportunities for income and to goods and services that can reduce their expenditures.

4.11.4 Schools

The deployment of the Proposed Action would have a beneficial impact on educational services since residents would have increased access to online resources, classes, and services due to new means to participate in education. Faster and more reliable internet provides more educational opportunities and benefits schools. It also promotes online learning. Due to these impacts, no adverse impacts on schools are anticipated from the Proposed Action.

4.12 Human Health and Safety

4.12.1 Hazardous Sites

There are nine hazardous sites within 1,500 ft of the Project Area (ADEC 2023b). Seven of the sites are in Emmonak, and two are in Naknek (ADEC 2023b). Of those sites, three (3) are within 100 ft. of the Project Area. These include the Emmonak Tank Farm at 65 ft, the AKARNG Emmonak FSA at 60 ft, and the Emmonak Washeteria at 30 ft. (ADEC 2023b). Generally, construction activities would stay within 50 ft. of the FOC centerline, avoiding these areas. At Emmonak, siting of construction would take into consideration the proximity of the Washeteria and avoid impacting this area. No new hazardous sites are anticipated to occur because of the Proposed Action.

Prior to beginning construction, Quintillion shall ensure their construction contractors have implemented a Spill Response Plan. Any hazardous material generated from construction would be disposed of in accordance with state and federal regulations. Per BLM ROPs, no refueling or oil change would occur on their managed lands. In the event of an oil or hazardous substance release, construction crew will abide by the Spill Response Plan to address containing the spill and follow AK state law (18 Alaska Administrative Code 75.300) that requires the event to be reported to the ADEC Spill Prevention and Response Program immediately.

4.12.2 Public Health and Safety

The Proposed Action would not adversely affect public health and safety. Overall, it would have a beneficial impact on public health and safety since it would update the services to public health and safety facilities. The implementation of faster and more reliable internet would improve existing services and provide opportunities for new services. Improved internet access would provide more opportunities for residents to access medical information available online. It would also allow more telemedicine opportunities. This could reduce costs for health care providers and patients while increasing services. This is anticipated to improve the overall health of community residents because residents would have greater access to care. No adverse significant impacts on public health and safety facilities are anticipated because of the Proposed Action. Beneficial long-term impacts are anticipated.

4.12.3 Electromagnetic Field Radiation

The Proposed Action does not transmit electromagnetic radiation; therefore, this shall not be evaluated further in this document.

4.13 Reasonably Foreseeable Effects

Reasonably foreseeable effects may include effects that are later in time or farther removed in distance from the Proposed Action. The geographic scope of 2 mi. from the centerline was assessed for reasonably foreseeable actions for most resources as the area in which direct and indirect effects of each resource would occur temporally in the past, present, or reasonable foreseeable future (i.e., where there would be project effects that could overlap). These are listed in **Table 4-3**.

Table 4-3. Reasonably Foreseeable Future Actions in the Project Area

Project	Community	Description	Status
Sanitation facilities upgrade	Naknek	Expansion of the Naknek sanitation facilities	Not Started
Water and Wastewater Improvements	Emmonak	Water intake system approved	Started
Old Town Water and Sewer Improvements	Hooper Bay	Upgrade of the town's sewer system	Started

The Proposed Action is one of several infrastructure improvements planned or underway in the region, including sanitation and water system upgrades in Naknek, Emmonak, and Hooper Bay. These projects are localized in scope and focused on essential public services.

Naknek Sanitation Facilities Upgrade: The Naknek Class II Municipal Solid Waste Landfill currently accepts municipal solid waste and construction and demolition debris. Naknek is proposing a lateral expansion of the landfill that would result in an additional 8-acre waste disposal area.

Emmonak Water and Wastewater Improvements: The village is upgrading its water infrastructure with a new all-season intake system to provide more reliable water supply to the village. This project will include a new HDD pipeline into a channel of the Yukon River and a new pump house on the riverbank that will provide the community with access to an adequate supply of water to year-round.

Hooper Bay Water and Sewer Improvements: The Old Town area of Hooper Bay is upgrading the water and sewer system improvements. This work includes two new watering points, two urine disposal points with solids disposal stations, indoor plumbing and fixtures, dry separating toilets, and boardwalk improvements.

4.13.1 Wetlands

These projects would not contribute significantly to foreseeable impacts on wetlands as the amount of wetlands in the Project Area is presumably high and the amount of wetland fill from past, present, and foreseeable future actions is small in comparison to the regions' acreage of wetlands. Additionally, no components of the Proposed Action would be trenched or constitute a permanent impact to the Waters of the U.S. overlap with the projects listed in **Table 4-3**.

4.13.2 Other Resources

Other environmental considerations, including noise, air quality, land use, and visual resources, are similarly limited in scale and duration. These projects do not introduce new or disproportionate impacts and aligns with the type and intensity of activity already occurring or anticipated in the region. The foreseeable impacts on noise, air quality, geology and soils, cultural and historic

resources, aesthetic and visual resources, land use, infrastructure, socioeconomic resources, and human health and safety are small enough to be negligible.

While improved broadband access may support future development, the Proposed Action itself does not directly drive land use change. Its environmental contribution is modest and does not interfere with or amplify the effects of other identified projects.

4.14 Summary of Impacts

Table 4-4 outlines the comparison of impacts of the No Action Alternative and Proposed Action if they were to occur.

Table 4-4. Comparison of Alternatives

Alternative	Impact Category	Description of Potential Impacts
Noise		
Proposed Action	Less than Significant	No permanent impacts: Temporary noise impacts on land and subsea due to construction activity.
No Action Alternative	No Impact	No permanent or temporary impacts.
Air Quality		
Proposed Action	Less than Significant	Negligible temporary impacts: localized emissions would occur during construction from equipment and crew vehicles.
No Action Alternative	No Impact	No permanent or temporary impacts.
Fire Management		
Proposed Action	Less than Significant	No change to Fire Management is expected with assessment and repair of cable to be conducted post-fire.
No Action Alternative	No Impact	No permanent or temporary impacts.
Surface Water		
Proposed Action	Less than Significant	Minor localized permanent impacts from installation of new facilities (i.e., laying FOC on a riverbed); would also result in temporary and direct effects from trenching within riverbeds and riverbanks during construction activities. Environmental conditions would be restored to the original state once installation is complete. BMPs would be employed to avoid temporary and permanent impacts to wetlands from construction equipment.
No Action Alternative	No Impact	No permanent or temporary impacts.
Ground Water		
Proposed Action	No Impact	No permanent or temporary impacts.
No Action Alternative	No Impact	No permanent or temporary impacts.
Coastal Zones, Estuary, and Intertidal Areas		
Proposed Action	Less than Significant	Sediment would be displaced by trenching and temporarily alter the local conditions, which would be restored to the original state once installation is complete. There may be temporary and minor direct effects within marine and intertidal locations due to turbidity and sediment disturbance from construction activities.
No action	No Impact	No permanent or temporary impacts.
Floodplains		
Proposed Action	Less than Significant	No permanent or temporary impacts. Floodplains would be recontoured to reflect pre-construction conditions.
No Action Alternative	No Impact	No permanent or temporary impacts.

Alternative	Impact Category	Description of Potential Impacts
Wetlands		
Proposed Action	Less than Significant	Minor localized permanent impacts from installation of new facilities (i.e., buried FOC) would also result in temporary direct effects from operating machinery in the area during construction. BMPs would be employed to avoid temporary and permanent impacts to wetlands from construction equipment.
No Action Alternative	No Impact	No permanent or temporary impacts.
Ice		
Proposed Action	Less than Significant	No permanent impacts to ice resources; Winter construction activity may require temporary breaking of ice to allow for cable laying. The ice is expected to refreeze to original conditions.
No Action Alternative	No Impact	No permanent or temporary impacts.
Permafrost		
Proposed Action	Less than Significant	There are isolated areas of permafrost (<10%) in the Project Area. Impacts to permafrost are unlikely due to its limited extent.
No Action Alternative	No Impact	No permanent or temporary impacts.
Vegetation and Habitat		
Proposed Action	Less than Significant	The proposed winter overland travel and proposed vegetation clearing may result in short-term vegetation effects.
No Action Alternative	No Impact	No permanent or temporary impacts.
Migratory Birds		
Proposed Action	Less than Significant	No permanent impacts would occur. Minimal temporary effects due to construction activities (i.e., noise) in summer months.
No Action Alternative	No Impact	No permanent or temporary impacts.
Bald and Golden Eagles		
Proposed Action	Less than Significant	No permanent impacts would occur. Minimal temporary effects due to construction activities (i.e., noise) in summer months.
No Action Alternative	No Impact	No permanent or temporary impacts.
Wildlife		
Proposed Action	Less than Significant	No permanent impacts may result in minimal temporary effects (i.e., noise) due to construction activities in summer months.
No Action Alternative	No Impact	No permanent or temporary impacts.
Threatened and Endangered Species and Critical Habitat		
Proposed Action	Less than Significant	No permanent impacts; may result in temporary and minor impacts in the marine and surrounding environments from vessel noise and lighting during cable laying activities.
No Action Alternative	No Impact	No permanent or temporary impacts.
Fisheries and Essential Fish Habitat		
Proposed Action	Less than Significant	This would result in negligible, permanent direct impacts from cable installation (i.e., trenching FOC into the seafloor) and a temporary increase in local turbidity conditions as a result. Conditions would rapidly rebound to their original state.
No Action Alternative	No Impact	No permanent or temporary impacts.

Alternative	Impact Category	Description of Potential Impacts
Historic and Cultural Resources		
Proposed Action	Less than Significant	PA was approved for the Proposed Action that provides agreement among stakeholders on required survey and mitigation necessary to reduce or avoid adverse effects to historic and cultural resources. While ground disturbance would occur, it is expected that impacts to historic and cultural resources would be avoided or mitigated, per the procedures established in the PA.
No Action	No Impact	No permanent or temporary impacts.
Paleontological Resources		
Proposed Action	No Impact	There are no known paleontological resources in the vicinity of the Proposed Action, and the surrounding region was assessed as PFYC Class 2 (Low Potential).
No Action	No Impact	No permanent or temporary impacts.
Subsistence		
Proposed Action	Less than Significant	Temporary ground disturbance would occur. This would not decrease grazing opportunities for herds and/or the availability of subsistence resources within the region.
No Action Alternative	No Impact	No permanent or temporary impacts.
Aesthetic and Visual Resources		
Proposed Action	Less than Significant	Construction of new structures for the project (i.e., a building for a CLS) may alter visual resources in local communities.
No Action Alternative	No Impact	No permanent or temporary impacts.
Land Use		
Proposed Action	No Impact	No permanent or temporary impacts.
No Action Alternative	No Impact	No permanent or temporary impacts.
Infrastructure		
Proposed Action	Beneficial – No Adverse Impact	No adverse impacts. The communities would gain benefits such as increased economic development, educational resources, and healthcare access, among other opportunities, because of the improved connectivity from this Proposed Action.
No Action Alternative	Less than Significant	A lack of internet alternatives may encumber local infrastructure of Nome, Emmonak, Naknek, or Igiugig.
Socioeconomic Resources		
Proposed Action	Beneficial – No Adverse Impact	No adverse impacts. It would create long-term benefits such as stimulate residential, commercial, or industrial development in previously rural or undeveloped areas.
No Action Alternative	Significant	A lack of adequate broadband service would continue to delay economic development; ongoing use of the existing system would operate with high latency, low bandwidth, and limited capacity of satellite systems.
Human Health and Safety		
Proposed Action	Beneficial – No Adverse Impact	The project would provide increased healthcare access, safety, and educational opportunities.
No Action Alternative	Significant	Public health and safety facilities and emergency response would continue to be underserved.

Alternative	Impact Category	Description of Potential Impacts
Reasonably Foreseeable Effects		
Proposed Action	Less than Significant	Any reasonably foreseeable effects on noise, air quality, geology and soils, water resources, biological resources, cultural and historic resources, aesthetic and visual resources, land use, infrastructure, socioeconomic resources, and human health and safety are small enough to be negligible.
No Action Alternative	No Impact	No permanent or temporary foreseeable impacts.

5 Applicable Environmental Permits and Regulatory Requirements

A large outreach to regulatory agencies has been ongoing since 2024 and summarized below. These discussions focused on regulatory requirements needed to be completed and/or met before the FOC could be installed (**Table 5-1**). Outreach that began in 2026 is reflected in Row 8 on Table 5-1 for the USFWS YDNWR.

5.1 Consultation and Correspondence Communications

A large outreach effort was conducted from 2023-2025 across western AK to support the Proposed Action, which is detailed in **Appendix B**. Additional outreach conducted since 2023 is summarized in this chapter.

5.1.1 Stakeholder Communication

Outreach to local government entities and other non-Tribal stakeholders was conducted to ensure coordination and transparency throughout the project process. Quintillion engaged stakeholders through emails, phone calls, informational briefings, and in-person or virtual meetings. These efforts provided opportunities for stakeholders to review project details, ask questions, and share concerns. Communication continued until stakeholders either confirmed they had no further input or ceased responding after reasonable follow-up attempts.

5.1.2 Tribal Outreach/Communication

Tribal outreach was conducted with the support of a designated tribal liaison for Quintillion. Quintillion employed a variety of engagement methods, including email correspondence, phone calls, presentations of project details with opportunities for dialogue, and in-person or virtual meetings. Communication and coordination with Tribal representatives continued throughout the planning process until all questions and concerns related to the project were addressed. Outreach efforts concluded either when Tribal representatives confirmed that they had no further input or when follow-up communications did not receive a response after reasonable attempts to re-engage. Information about Quintillion's outreach is presented in **Appendix B**.

The public comment period for this EA occurred from December 17, 2025, through January 16, 2026. Comments from Paug-Vik Inc., Ltd, Levelock Natives Limited, Igiugig Native Corporation, and BBNC were received in a joint letter dated January 16, 2026. Quintillion's responses to those comments are presented in **Table B-3** in **Appendix B**.

5.1.3 Agency Consultations

Table 5-1 summarizes relevant communication with representatives from federal, state, local entities. **Table 5-2** summarizes anticipated permits, consultations, and approvals required to construct the project.

Table 5-1. Summary of Agency Coordination Contact

Entity	Representatives	Response
USACE	Quinn Germann / Tyler Marye	Construction of utility lines and associated facilities provided the activity does not result in the loss of greater than ½-acre of waters of the U.S. for the complete project.
ADNR	Diana Leinberger / Bruce Sackinger / Jay Rokos	Requirements to obtain an easement from ADNR and timelines associated with the process.
ADF&G	Josh Brekken	Review requirements to obtain a Fish Habitat Permit to cross anadromous streams.
DOT-PF	Sharyn Augustine / Britton Goldberg / Ryan Siverly	Requirements to obtain a ROW within DOT-PF roads.
NMFS	Leanne Roulson / Sierra Franks / Veronia Runge	Information needed to satisfy ESA consultation
USFWS	Kaitlyn Howell	Information needed to satisfy ESA consultation
NPS	Sharon Kim / Emily Johnson / David Raikow / Krista Perine	Discussion surrounding cable crossing WSR. Request a detailed alternatives analysis that outlines scenarios to avoid impacting the WSR.
USFWS YDNWR	Jaron Ming / Spencer Rearden	Information needed to satisfy crossing refuge lands or waters.

Table 5-2. Anticipated Permits, Consultations, and Approvals to Construct the Project

Responsible Agency	Permit or Approval	Regulated Activity
USACE	NWP #6 Survey Activities	Geophysical sediment sampling.
	NWP #57 Utility Line Activities	Construction of utility lines and associated facilities provided the activity does not result in the loss of greater than ½-acre of waters of the U.S. for the complete project.
USFWS	ROW Grant	Subsea cable installation through YDNWR
BLM	ROW Grant	Construction on BLM lands
NMFS	ESA Consultation / EFH Assessment	Potential to cause harm to ESA-listed species, EFH species, and/or affect their respective habitat.
USFWS	ESA Consultation	Potential to cause harm to threatened and endangered species.
U.S. Coast Guard	Local Notice to Mariners	Notification of activity during surveying and cable laying.
ADNR	Public Utility Easement	Required to place a cable on state-owned tide and submerged lands over the long term.
	Entry Authorization	Required for the construction of permanent structures on State lands.
OHA	Section 106 of NHPA Review	NHPA requires federal and state agencies to consider the effects of their undertakings on historic and cultural resources and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.
	AHPA Review	AHPA requires a review of State public construction projects to determine if historic, prehistoric, or archaeological sites may be adversely affected.
ADF&G	Fish Habitat Permit	Work within or across a specified anadromous waterbody.
DOT-PF	Utility Permit	Utility construction activities in DOT-PF ROW
AK Dept. of Public Safety, Fire, & Safety	State Fire Marshal's office review	Required for construction of any building/structure
Borough	Building Permit	Required for construction of a cable landing station
	Land Lease	Required for placing cable/construction on Borough-owned land over the long term
	Utility ROW Permit	Required for installation of conduit within a public ROW

6 References

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Appendix A – Project Description

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**Nome to Homer Express Middle Mile Network
Project with Joint Agency Collaboration on the Hooper
Bay Broadband Project**

Project Description

Quintillion
3601 C Street, Suite 1000B
Anchorage, AK 99503

September 11, 2025

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ACRONYMS AND ABBREVIATIONS

AK	Alaska
ANCSA	Alaska Native Claims Settlement Act
BMH	Beach Manhole
CAI	Community Anchor Institutions
CLS	Cable Landing Station
DA	Double Armor
DGPS	Differential geographic positioning system
DNR	Alaska Department of Natural Resources
DOT-PF	Alaska Department of Transportation and Public Facilities
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FOC	Fiber Optic Cable
FONSI	Finding of No Significant Impact
FTTP	Fiber-to-the-Premises
GCI	GCI Communication Corp.
HDD	Horizontal Directional Drilling
HDPE	High-density polyethylene
LW	Lightweight
LWA	Lightweight-Armored
m	Meter
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	NOAA National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fisheries Management Council
NPS	United States National Park Service
NTHE	Nome to Homer Express
NTIA	National Telecommunications and Information Administration

OSP	Outside plant
PFE	power feed equipment
Project	Nome to Homer Express submarine fiber optic cable system
ROV	Remotely operated vehicle
ROW	Right-of-way
SA	Single Armor
SHPO	State Historic Preservation Office
US	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish & Wildlife Service

Project Name: Nome to Homer Express Middle Mile Network Project with Joint Agency Collaboration on the Hooper Bay Broadband Project
Applicant: QSH Parent Holdco LLC

Total Estimated Project Cost:
\$160,564,315.94 – Nome to Homer Express (NTHE)
\$24,957,845 – Hooper Bay Project

1. PROJECT DESCRIPTION

1.1 INTRODUCTION

Quintillion is deploying its *Nome to Homer Express (NTHE)* submarine and terrestrial fiber optic cable system across western Alaska, a transformative infrastructure initiative that will interconnect existing fiber telecommunications networks in Nome, AK, with competitive fiber infrastructure in Homer, AK. This new middle-mile route—underpinned by a National Telecommunications and Information Administration (NTIA) Middle Mile Grant—will extend Quintillion’s existing subsea and terrestrial network south from Nome to Emmonak, follow the Yukon-Kuskokwim (YK) Delta coastline to Naknek, and traverse overland to Igiugig. From Igiugig, the system interconnects with existing dark fiber pairs stretching across Iliamna Lake to Pile Bay and Williamsport, culminating in a final submarine segment across Cook Inlet to Homer. At Homer, NTHE will tie into multiple regional carriers, enabling resilient, low-latency, competitive broadband access and interconnection to national and global networks, including cloud services **(Figure 1)**.

NTHE is composed of both submerged marine segments and terrestrial alignments, crossing various land jurisdictions and remote terrain. Quintillion is committed to full compliance with the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), and all relevant federal, state, tribal, and local environmental permitting requirements. The project is structured to enhance statewide broadband capacity and enable service delivery to previously unserved or underserved Alaskan communities.

Quintillion currently owns and operates a subsea fiber optic cable system serving Alaska’s Northwest and North Slope Arctic regions, utilizing terrestrial infrastructure to reach its internet gateway in Seattle, WA. Building on this backbone, the NTHE project serves as the critical expansion of Quintillion’s open access middle mile network, driving redundancy, resiliency, and regional accessibility across Alaska.

One of the key leveraging initiatives within the NTHE ecosystem is the Hooper Bay Broadband Project. This initiative will utilize a planned branching unit off the NTHE subsea route to construct a dedicated subsea middle mile extension reaching the Native Village of Hooper Bay under a US Department of Agriculture (USDA) Rural Utilities Service (RUS) Reconnect Grant **(Figure 2)**.

As part of its integrated network strategy, Quintillion will design, construct, own, operate, and maintain the Hooper Bay subsea and terrestrial fiber optic infrastructure. Quintillion will act as the Internet Service Provider (ISP), offering enterprise and residential broadband through advanced Operational Support Systems and Business Support Systems (OSS/BSS), including dedicated technical support and customer service teams. Moreover, consistent with its open access model, Quintillion will operate the new Hooper Bay middle mile infrastructure as part of its broader NTIA Middle Mile Grant-backed network, providing equitable backhaul access to other broadband and advanced service providers serving the region.

The integration of the Hooper Bay project within the broader NTHE framework represents a scalable and sustainable approach to broadband expansion, utilizing shared infrastructure to maximize public investment, extend middle-mile reach, and ensure service delivery in alignment with NTIA objectives and community needs.

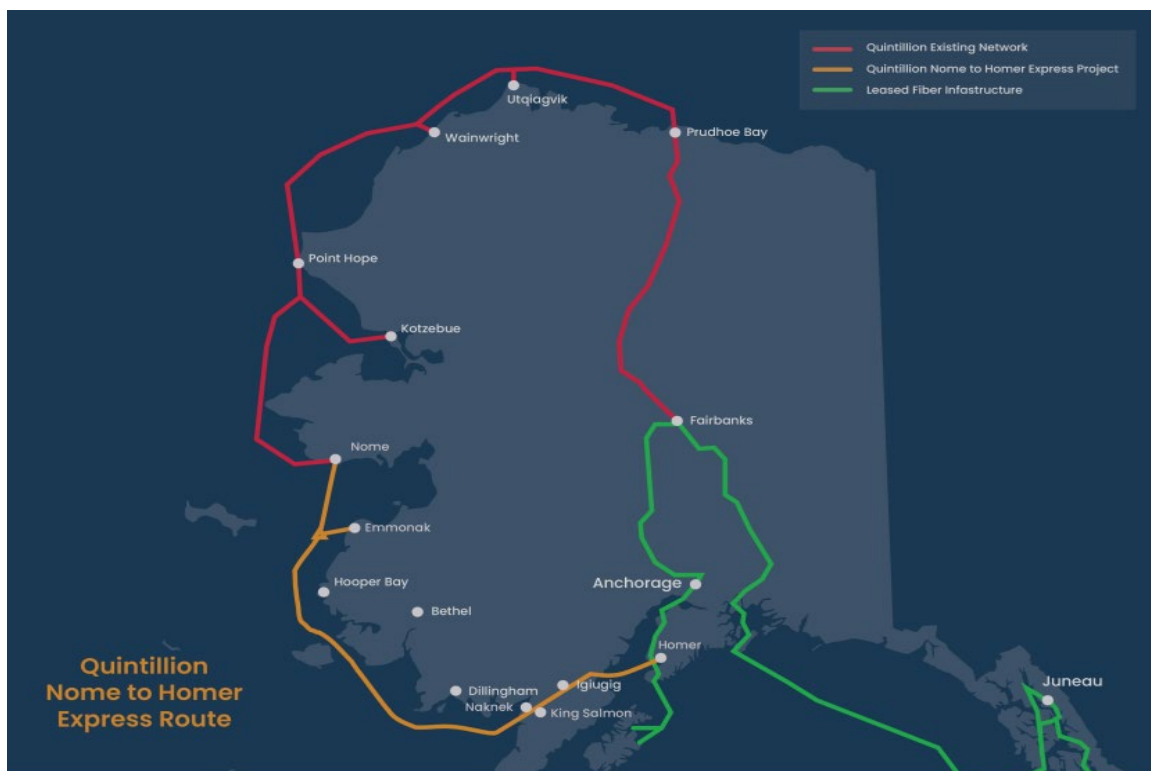


Figure 1: Proposed NTHE Network relative to Quintillion's entire network

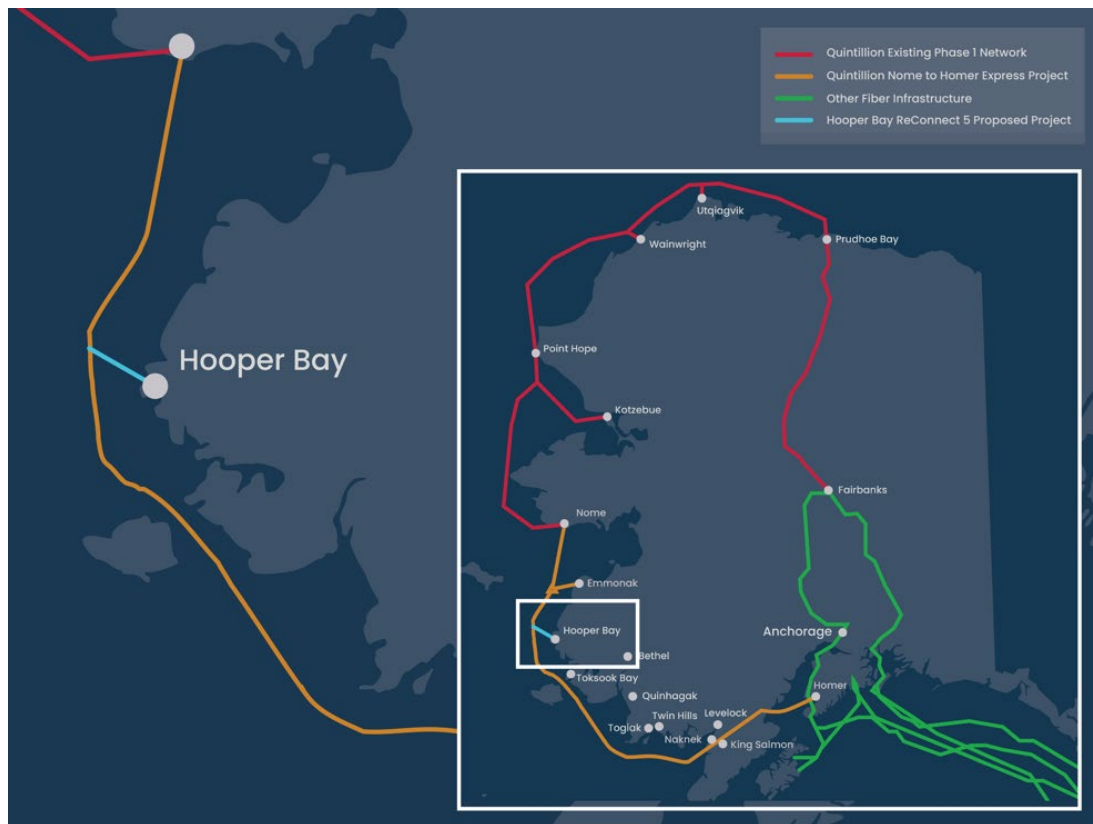


Figure 2: Hooper Bay branch relative to Quintillion’s entire network

1.2 PROJECT PURPOSE AND BENEFITS

The NTHE system will provide direct fiber access and communications facilities for the communities of Emmonak (population 858), Naknek (464), and Igiugig (61), and access and facilities to Hooper Bay (1,193) with Fiber-to-the-Premises (FTTP). The Community Anchor Institutions (CAI) for these communities have been identified and will be considered in the construction plan, providing access points to the fiber optic cable (FOC), ensuring ease of access for last-mile providers and key CAIs. Additional and future prospective projects include expanding on the Nome to Homer Express network to serve the communities of Homer (5,491), Toksook Bay (682), Quinhagak (713), Eek (356), Oscarville (74), Napaskiak (434), Bethel (6,179), Goodnews Bay (277), Togiak (858), Dillingham (2,226), King Salmon (307), and Levelock (60). The NTHE project would help strengthen long-term economic and community stability in rural Alaska, where legacy industries such as timber and mining have been in decline and where residents have ever-increasing needs for broadband to support telemedicine, distance learning, remote working, civic engagement, e-commerce, marketing, and sharing cultural resources and knowledge. Additionally, the project will bring new resilient middle-mile capacity to the vicinity of military bases including Fort Wainwright, Fort Greely, and Eielson AFB, several Alaska Army National Guard bases, and Alaska Coast Guard stations. The project is funded primarily (61%) by a Middle Mile Grant from NTIA with an RUS Reconnect Grant for the branching unit to Hooper

Bay with FTTP. The project provides broadband service to tribally- and ANCSA-owned land and facilities, and helps to support economic development, community sustainability, and self-determination objectives. A key feature of this project will be to complete a transformative, foundational, and resilient fiber ring that connects Anchorage, Fairbanks, and Prudhoe Bay to the Northwest Arctic, down to Bristol Bay, and across the Alaska Peninsula to Homer and back to Anchorage.

1.3 PROPOSED CONSTRUCTION ACTIVITIES

Quintillion's Nome to Homer Express (NTHE) project proposes to construct approximately 894.34 miles of middle-mile fiber optic cable (FOC) infrastructure comprising both submarine and terrestrial segments from Nome to Igiugig. This new route will interconnect with Quintillion's existing Phase I subsea system at the Cable Landing Station (CLS) in Nome and extend to leased dark fiber pairs on GCI's network from Igiugig to Homer (204 miles). At Homer, the system will interconnect with multiple regional providers to establish a diverse, resilient, low-latency, and competitive broadband pathway to the continental United States and global cloud services. By closing the loop on Quintillion's statewide fiber infrastructure, the NTHE project will create a redundant fiber ring, improving broadband resiliency for carriers and end users statewide and significantly enhancing Alaska's digital connectivity to the world (illustrated in **Figure 1**).

The NTHE project includes the construction of new subsea and terrestrial cable infrastructure that will:

- Deploy a new submarine fiber optic cable from the existing CLS in Nome to a new CLS in Naknek, Alaska.
- Install a Branching Unit (BU) and lateral spur connecting to a new CLS in Emmonak, located within the Yukon River Delta.
- Extend a terrestrial fiber optic route from Naknek to Igiugig, where the system will transition to subsea infrastructure again, interconnecting with existing dark fiber pairs.
- Utilize these dark fiber segments to carry service from Igiugig across Lake Iliamna to Pile Bay, then overland to Williamsport, and across Cook Inlet to Homer, where the system will terminate at Quintillion's co-located CLS facility. This location serves as a critical network aggregation point, supporting interconnection with multiple terrestrial and subsea carriers.

2. HOOPER BAY INTEGRATION – LEVERAGING THE NTHE BACKBONE

As a key leveraging initiative, Quintillion's Hooper Bay Broadband Project, which is approximately 38.45 mi., is fully integrated into the NTHE architecture via a planned Branching Unit off the NTHE subsea main line. This branch will:

- Extend a dedicated subsea middle mile spur from the BU to a new Beach Manhole (BMH) in Hooper Bay, Alaska

- Establish a new Cable Landing Station (CLS)—also referred to as a Communications Shelter—within Hooper Bay to terminate the subsea segment.
- Support the deployment of a fiber-to-the-premises (FTTP) last-mile network, delivering 10 Gbps symmetrical XGS-PON service to every Broadband Serviceable Location (BSL) within the Hooper Bay service area.

This integrated last-mile architecture will ensure comprehensive connectivity for this Unserved community, advancing the NTIA’s digital equity goals and Alaska’s broadband access objectives.

Quintillion will design, construct, own, operate, and maintain the Hooper Bay subsea and terrestrial FOC infrastructure as part of its open-access network. As with the broader NTHE system, the Hooper Bay middle mile segment will be operated on an open-access basis, ensuring fair and non-discriminatory access to other service providers and enabling third-party ISPs to extend services to Hooper Bay using Quintillion’s backhaul.

Quintillion will serve as the Internet Service Provider (ISP) for the FTTP segment, with full-service delivery supported by its Operational Support Systems (OSS) and Business Support Systems (BSS), as well as its internal technical support and customer service teams.

This integrated deployment approach—leveraging the NTHE backbone to deliver high-capacity middle mile to remote community endpoints—demonstrates Quintillion’s commitment to scalable, equitable broadband deployment in alignment with NTIA’s Middle Mile Grant (MMG) program.

3. FIBER OPTIC CABLE SYSTEM

3.0 CABLE AND CONSTRUCTION TYPES

The NTHE project is a hybrid system consisting of submarine and terrestrial cables, components, and facilities. The diagram presented in **Figure 3** provides an overview of the components that constitute this hybrid submarine cable system. It serves as a reference for identifying and describing the various components. This includes the transition point from submarine FOC to terrestrial FOC, while identifying the various components from the Beach Manhole (BMH) to the CLS, and beyond the CLS for access to the system. **Figure 4** shows the complete route, including segment IDs for easy reference. **Table 1** lists the distances for each segment, including submarine and terrestrial.

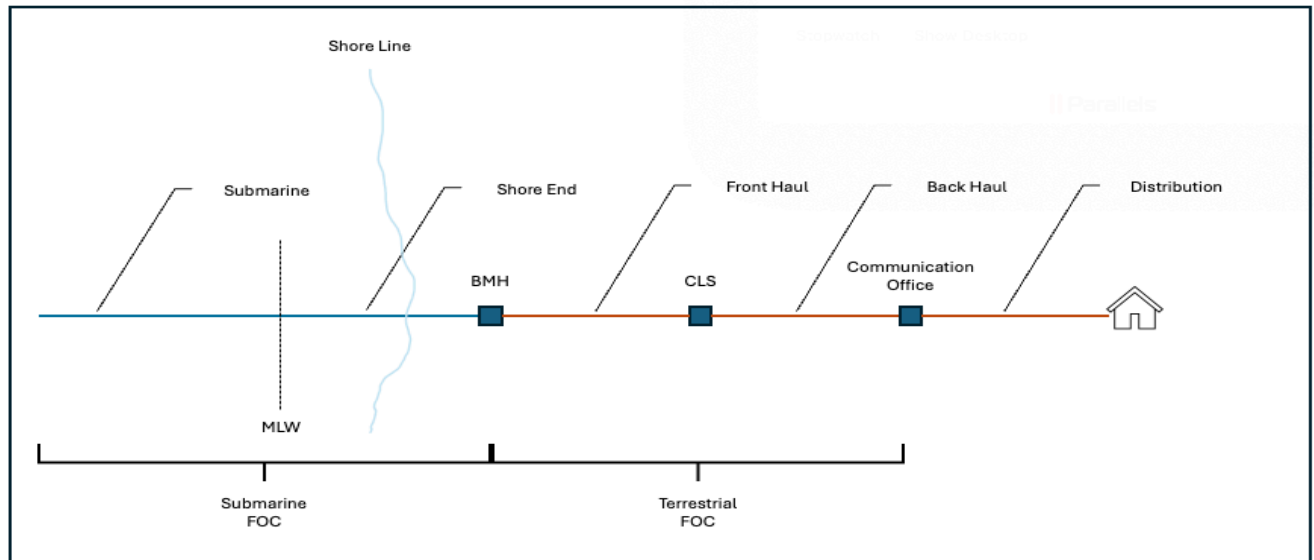


Figure 3: Hybrid Submarine Cable System diagram with associated components

Submarine FOC: This construction involves the installation of a submarine FOC within the marine environments from BMH to BMH. These segments are either plowed or laid on the seafloor (surface-lay). The submarine FOC components include BUs, which allows the extension of the submarine FOC branches from the main trunk to the BMH, at which point the Submarine FOC transitions to a Terrestrial FOC. From the BMH the terrestrial FOC will be constructed to the CLS (referred to as Front Haul) and will extend beyond the CLS to provide access points for CAIs in the region. Landing points for the submarine FOC will include shore-end construction from the MLW to the BMH, where the construction method and timing are different from the main trunk construction.

Terrestrial FOC: This construction involves the installation of a terrestrial fiber optic cable (FOC) across a variety of Alaskan landscapes, including wetlands, inland lakes, and stream crossings. Terrestrial FOC segments will terminate at Beach Manholes (BMHs), underground vaults, and Cable Landing Stations (CLSs). The scope of construction also includes front haul segments (Table 2) extending from the BMH to the CLS for Nome, Emmonak, and Naknek.

Additionally, the Hooper Bay Broadband Project will mirror this approach, with a subsea branch from the Nome to Homer Express (NTHE) mainline landing at a newly constructed BMH in Hooper Bay. From this BMH, a front haul segment will be constructed to a new CLS (Communications Shelter) located within the community. This terrestrial link will support the transition from the subsea middle mile to the local fiber-to-the-premises (FTTP) network, enabling last-mile connectivity to every Broadband Serviceable Location (BSL) in Hooper Bay.

The NTHE project will require a comprehensive set of Federal, State, and Local permits, with a particular focus on historical, environmental, and cultural resource risks, as well as the development of mitigation plans where necessary. Quintillion, with technical support from

Environmental Science Associates (ESA), has identified the construction path to guide these permitting and compliance efforts, as outlined below and in **Figure 4**.

Construction Paths:

Submarine FOC: 410 ft. on each side of route centerline, with total width of 820 ft.

Terrestrial FOC: 25 ft. on each side of route centerline, with total width of 50 ft.

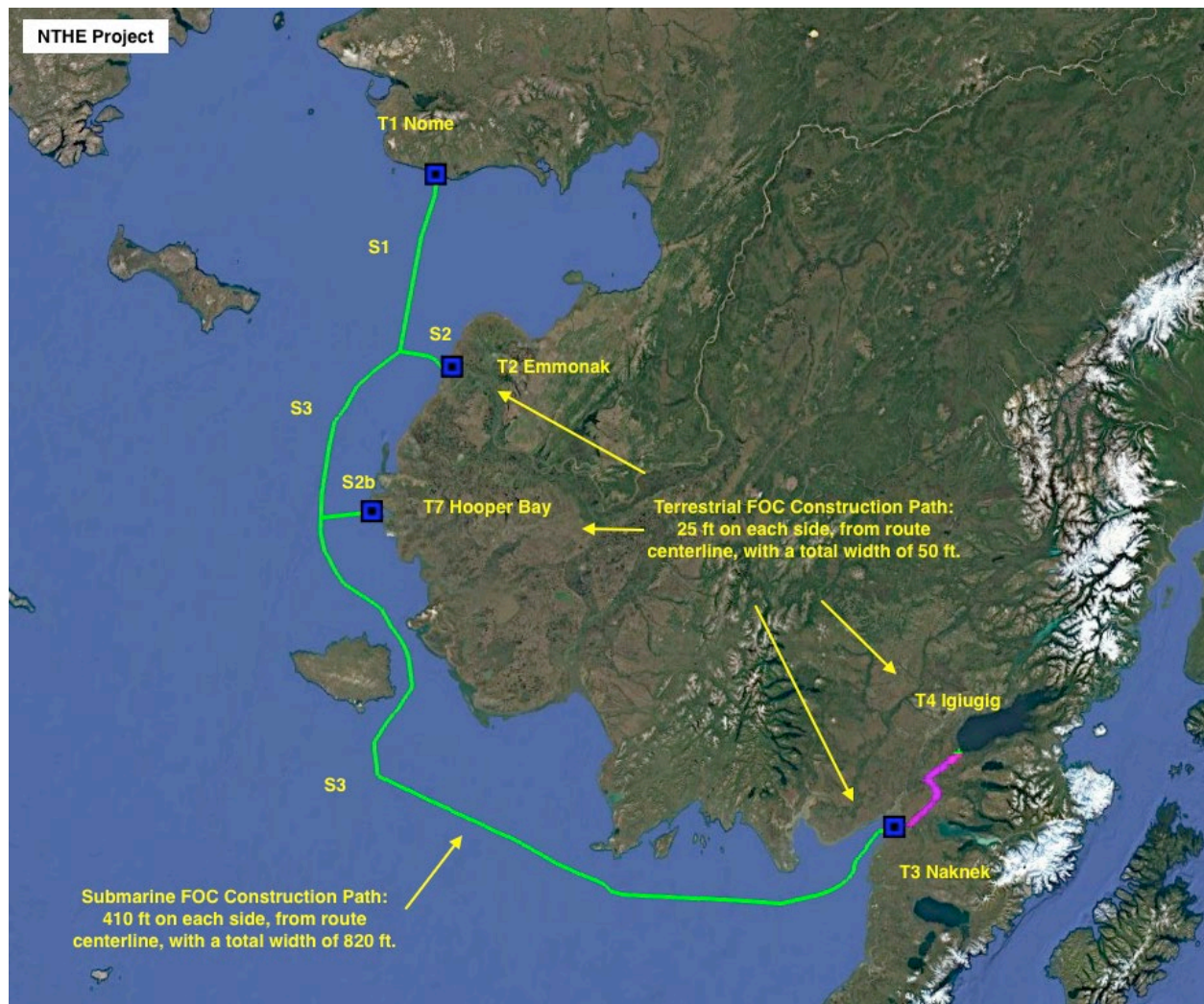


Figure 4: Submarine Routes and Identification Numbers (Segment IDs)

In parallel, the Hooper Bay Broadband Project, which leverages a planned branching unit off the NTHE mainline, will also undergo site-specific permitting and regulatory review, including the establishment of a construction path. This construction path will address both the subsea spur route to Hooper Bay and the terrestrial infrastructure extending from the Beach Manhole (BMH) to the new Cable Landing Station (CLS). The Hooper Bay construction path will specifically evaluate potential impacts to cultural resources, subsistence use areas, coastal habitats, and

wetlands, ensuring alignment with National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and other applicable permitting frameworks. Mitigation strategies will be developed accordingly, consistent with those applied across the NTHE system.

Segment Type	Project Area	Seg ID	from	to	Length (mi.)	Associated Facilities
Terrestrial FOC	Nome	T1	Nome CLS	Nome BMH	0	Existing CLS, BMH, New CLS
Submarine FOC	Bering Sea	S1	Nome BMH	Emmonak BU	113.53	Existing BMH and CLS, and new BU
Submarine FOC	Bering Sea	S2	Emmonak BU	Emmonak BMH	35.65	New BMH and CLS
Terrestrial FOC	Emmonak	T2	Emmonak BMH	Emmonak	9.46	New BMH and CLS
Submarine FOC	Bering Sea	S3	Emmonak BU	Naknek BMH	656.48	New Bu
Terrestrial FOC	Naknek - King Salmon	T3	Naknek BMH	King Salmon	10.33	New BMH and CLS
Terrestrial FOC	King Salmon - Igiugig	T4	King Salmon	Igiugig BMH	68.89	New BMH
Submarine FOC	Bering Sea	S2b	Hooper Bay BU	Hooper Bay BMH	32.33	New BU
Terrestrial FOC	Hooper Bay	T7	Hooper Bay BMH	Hooper Bay CLS	6.12	New BMH and CLS
				Total	932.79	

Table 1: Submarine and Terrestrial segments

System Component	Landing Points	Front Haul	Length (mi.)
Shore-ends	Nome	Existing BMH and CLS	0.0
Shore-ends	Emmonak	New BMH and CLS	9.11
Shore-ends	Naknek	New BMH and CLS	3.20
Shore-ends	Hooper Bay	New BMH and CLS	1.95

Table 2: Front Haul segments from BMH to CLS

3.1 SUBMARINE FOC

3.1 TRUNK AND BRANCH INSTALLATION

The primary marine route includes submarine FOC segments from Nome to Naknek, including a branch to Emmonak and Hooper Bay. The path chosen for the marine routes was identified through desktop studies and a marine route survey, conducted in 2023 and 2024. These engineering and field studies assist in selecting routes that provide considerations for environmental and anthropogenic forms of disturbance on the cable system that may lead to cable faults. The International Cable Protection Committee (ICPC) has identified fishing activities as the primary cause for submarine cable faults and repairs (ICPC 2021). As such, the proposed route identified in the desktop and marine route surveys avoids high-impact fishing grounds where possible. Where ground fishing areas cannot be avoided, the cable would be buried. Shore-end segments of the marine route were identified by avoiding developed shorelines and high energy landfalls that are subject to erosion and defined vessel anchorages. Geophysical reviews were also conducted for the route, and considerations were made to avoid areas prone to sediment slumping, fast currents, and other geological hazards.

The marine route would rely on two or more vessels for construction operations. The vessel used for cable installation operations would be dependent upon water depth, location, and installation method. A cable ship (**Figure 5**) would be used for cable-laying and plowing operations within areas of the marine route with water depths exceeding 49 feet (ft) and would rely on dynamic positioning. Proposed construction in waters shallower than 49 ft would be conducted using a contracted Alaska Vessel of Opportunity (VOO), which is a tug and barge, a small landing craft stored on the cable ship, or any small vessel capable of operating in shallow waters. Additionally, shore-end locations would be assisted by a landing craft. These vessels would have a shallow draft, making shallow waters and landings more accessible.



Figure 5: Main lay cable vessel depiction

The submarine FOC will consist of lightweight submarine cable, while all other marine portions of the route would use either a single or double armor submarine cable. The submarine cable, measuring approximately 1 inch in diameter, is constructed from benign materials (**Figure 6**).



Figure 6: Submarine Cable Profile

Prior to trenching operations on the seabed, a pre-lay grapnel run (PLGR) would be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation would be to identify and clear any seabed debris (e.g., wires, hawsers, fishing gear) deposited along the route. PLGR is conducted by pulling a grapnel (**Figure 7**) along the route over the seabed. Any debris recovered by the grapnel would be discharged ashore upon completion of the operations and disposed of in accordance with local regulations. If debris cannot be recovered, then a local re-route would be planned to avoid the debris. The PLGR operation would be conducted to industry standards for employing towed grapnels, and the type of grapnel would be determined by the nature of the seabed.



Figure 7: Grapnel on the deck of main lay cable vessel

3.2 CONSTRUCTION METHODOLOGY

3.2.1 SURFACE LAY

Submarine FOC components would either be laid on top of the seafloor or buried by plowing. The Cable would be laid on the seafloor within areas identified as low risk to cable disturbance or where traversing seafloor substrates that do not allow for plowing (e.g., steep grades, bedrock). When placing cable on the seafloor, bathymetric conditions would be analyzed so the vessel can lay the cable with the engineered slack necessary to allow the cable to conform to the seafloor. If the substrate allows, plowing would be used where there is significant risk of outside disturbance to the cable. In high-risk areas where the substrate does not allow for plowing, cable armoring would be implemented.

3.2.2 BURIAL

Burial within waters deeper than 40 ft would be conducted using a cable plow (**Figure 8**). Burial within deep sea segments would protect the submarine FOC against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow would be pulled along the seafloor by a tow wire connected to the cable ship. The cable would be fed through the plow's share blade, penetrating seafloor sediments under the plow up to 5 ft deep while excavating a path 1 ft wide. The cable would exit the lower aft end of the share blade, and the sediments would immediately collapse on top of the cable behind the plow.



Figure 8: Submarine Cable Plow

In waters shallower than 40 ft, trenching would occur within areas where cable protection from additional environmental conditions such as surf action and ice scour are needed. At these depths, trenching would be conducted by a jet sled, which is a self-propelled cable trenching system that uses water pressure to destabilize the seafloor and bury the cable. The water used for jetting is supplied from the surface by high pressure hoses. This system would allow for jetting pressure and flow rates to be manipulated based on local conditions. The pressurized water would be focused on the seafloor, liquifying the substrate by turning it into a slurry. The cable would then sink within the trench. The jet sled would be accompanied by divers who would monitor trenching performance and assist in operations. **Figure 9** shows a typical jet sled



Figure 9: Typical jet sled

Upon completing the cable-laying operations, a post-lay inspection and burial will be conducted using a remotely operated vehicle (ROV) equipped for cable trenching. This inspection aims to review sections of the cable ship route where laying operations might have encountered challenges. These challenges include plow failure, unexpected cable repairs, uncontrolled cable payout, branching unit or joint placement, or other unforeseen events. If burial corrections are necessary, the ROV will perform jet burial, similar to the method used by a jet sled, to trench the cable. The ROV will be remotely operated from the cable-laying ship, generating pulsed sounds and utilizing cameras for precise positioning and orientation.

3.2.3 SUBMARINE TRUNK AND BRANCH ROUTES (S1 – S3)

This section describes the primary segments of the proposed submarine cable routes for the trunk and branches, as illustrated in Figure 10. The main trunk route will terminate at an existing Cable Landing Station (CLS) in Nome and a new CLS in Naknek, with a branching unit extending service to a new CLS in Emmonak. The trunk route includes three submarine cable landings—Nome, Emmonak, and Naknek—and features one major river crossing of the Alagnak River along

the T4 terrestrial segment from King Salmon to Igiugig, which includes buried and/or surface-laid terrestrial cable connecting Naknek to Igiugig, as well as community buildouts (aerial and buried) in Emmonak, Naknek, and Igiugig.

Additionally, a dedicated branch line from the NTHE subsea trunk will extend service to Hooper Bay, terminating at a new CLS constructed within the Native Village of Hooper Bay. This submarine spur will include a new Beach Manhole (BMH) at the landing site and a short terrestrial segment connecting to the CLS. This buildout will enable the delivery of middle mile fiber capacity directly to Hooper Bay, supporting a FTTP last-mile deployment throughout the community.

The approximate cable segment distances and design specifications are outlined in Table 3 and are based on Quintillion's current engineering plan. These details remain subject to refinement following completion of the marine survey, environmental review, and permitting phases. Recommendations and conditions identified during these stages may result in modifications to the final route alignment or construction methodology as described in this report.

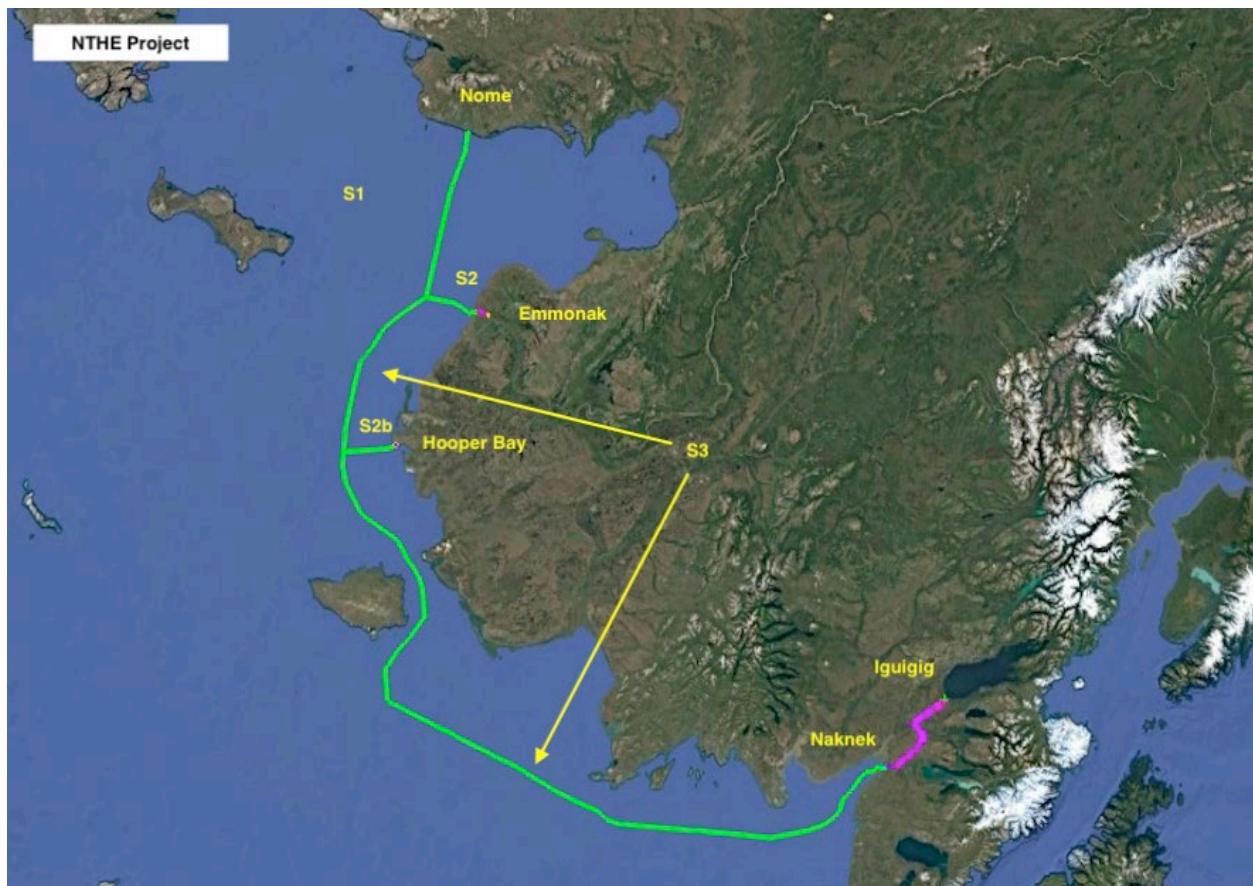


Figure 10: Submarine FOC segments

System Component	Project Area	Seg. ID	From	To	Length (mi.)
Submarine FOC	Bering Sea	S1	Nome BMH	Emmonak BU	113.53
Submarine FOC	Bering Sea	S2	Emmonak BU	Emmonak BMH	35.65
Submarine FOC	Bering Sea	S3	Emmonak BU	Naknek BMH	656.48
Submarine FOC	Bering Sea	S2b	Hooper Bay BU	Hooper Bay BMH	32.33
				Total	837.99

Table 3: Submarine cable segments

3.2.4 SHORE-END INSTALLATION (MLW TO BMH)

Shore-end construction includes segments of the cable route between MLW and a BMH at each landing point. Shore-end construction would occur concurrently with marine construction, at each shore-end, the cable would be trenched within the shoreline between MLW and the BMH. A BMH is an enclosed underground structure that houses the splice between the incoming submarine cable and outgoing terrestrial cable that would connect to the CLS. BMHs are positioned above the high tide line (HTL) and typically measure 3 ft by 4 ft by 4 ft for unpowered cable segments and 4 ft by 6 ft by 6 ft for powered landings (Nome and Naknek). Shore-end trenching would be conducted with either a rock saw or backhoe. When deemed necessary, additional protection may be provided to the cable at landing point locations with split pipe articulated armor (**Figure 11**). Two 4-inch conduits would be buried at no deeper than 36 inches and extend from the BMH to the beach area above MLW, allowing the bank to be disturbed only once. Conduit installation would be conducted in a controlled manner using best management practices prior to the arrival of the cable ship.

**Figure 11:** Articulated Pipe being installed

While conducting shore-end construction, care would be taken to protect shorelines from future erosion. Additionally, best practices would be employed to address stormwater runoff concerns. For all intertidal work (MLW to HTL), construction operations would occur only during low tide. When constructing on shorelines without firm sediments such as large boulders, heavy equipment would be placed on mats to protect the substrate from slumping and erosion. Alterations to shorelines would be temporary. Best management practices to minimize the impact of landfall construction on the environment will be provided in the Environmental Assessment report.

3.2.5 HORIZONTAL DIRECTIONAL DRILLING (HDD)

In locations where Submarine FOC may be disturbed by human activities and/or at risk of damage, burial may be required. The burial depth is determined based upon local conditions (e.g., soil type, anticipated activities in the area, environmental conditions, and operational needs).

Burial is achieved by a variety of means, and includes Horizontal Directional Drilling (HDD), which is typically employed when the submarine cable is landed at the BMH. Specifically, where there are areas of environmental sensitivity and/or risk to the submarine FOC. HDD is accomplished using a large-tracked bore machine (**Figure 12**) to bore a steel conduit underground for the cable.



Figure 12: Bore Machine

When conducting HDD operations, it's common to utilize excavators (**Figure 12**) with an approximately 2–3-foot bucket to excavate bore entry, move equipment and material around the operations site.

3.2.6 BMH LOCATIONS

Beach landing facilities, including the BMH and seaward conduit, would be constructed on public and state tidelands and submerged tidelands using a “mini-sized” tracked excavator. Where conditions preclude the seaward duct from being buried by an excavator at low tide, the seaward duct may be pinned to the seabed or otherwise anchored to a submerged concrete bulkhead to provide seaward stability and prevent the duct from floating off the seabed.

The total time to place a pre-cast concrete BMH vault and construct a seaward conduit is estimated at 4-5 days at each landing, except where HDD will be utilized at Nome (HDD operations may take 3-4 weeks). Staging of equipment and materials would occur on-site and would be compliant with local construction permit requirements obtained at each location. **Table 4** lists the BMH locations/coordinates, and the following sections describe the BMH construction plan and location.

Beach Manholes	Location Coordinates
Nome	64.486583 -165.3207
Emmonak	62.80051 -164.78216
Naknek	58.72439 -157.05553
Hooper Bay	61.51135, - 166.13467

Table 4: BMH locations and coordinates

3.2.7 NOME

A new BMH would be constructed at the Nome landing point (**Figure 13**) to support the new submarine cable landing, as well as a power feed equipment (PFE) communication shelter with standby generator and fuel storage. In addition, HDD seaward conduit may be required to further protect the submarine FOC. An HDD bore machine will be used to cross the Nome-Counsel highway and beach/intertidal area. The existing gravel pad will be expanded to allow construction of a new communication shelter. An excavator would be used for setting BMH, other vaults, installing duct, and fiber. Construction would be completed in Spring/Summer (pending environmental approval).



Figure 13: Nome Landing Point - BMH Location

3.2.8 EMMONAK

A new CLS is proposed in both Emmonak and Naknek. Quintillion, or a contracted field crew, would install fiber along main corridors near anchor institutions and last-mile communication companies within the local communities of Emmonak and Naknek. The installation crew would consist of personnel supported by light duty vehicles (i.e., crew and service trucks), one or two bucket trucks (**Figure 14**), tools, equipment, and possibly traffic control devices and signage.



Figure 14: Bucket Truck

The front haul route for Emmonak, which is the portion of the route extending from the BMH to the CLS in Emmonak (**Figure 15**), is planned to be surface laid across land managed by Emmonak Corporation. The cable would be installed where existing poles exist (from Alaska Village Electric Cooperative) in Emmonak to reach the proposed CLS. Quintillion would communicate proactively with property owners in the area to inform them of its installation schedule, and coordinate work as necessary.

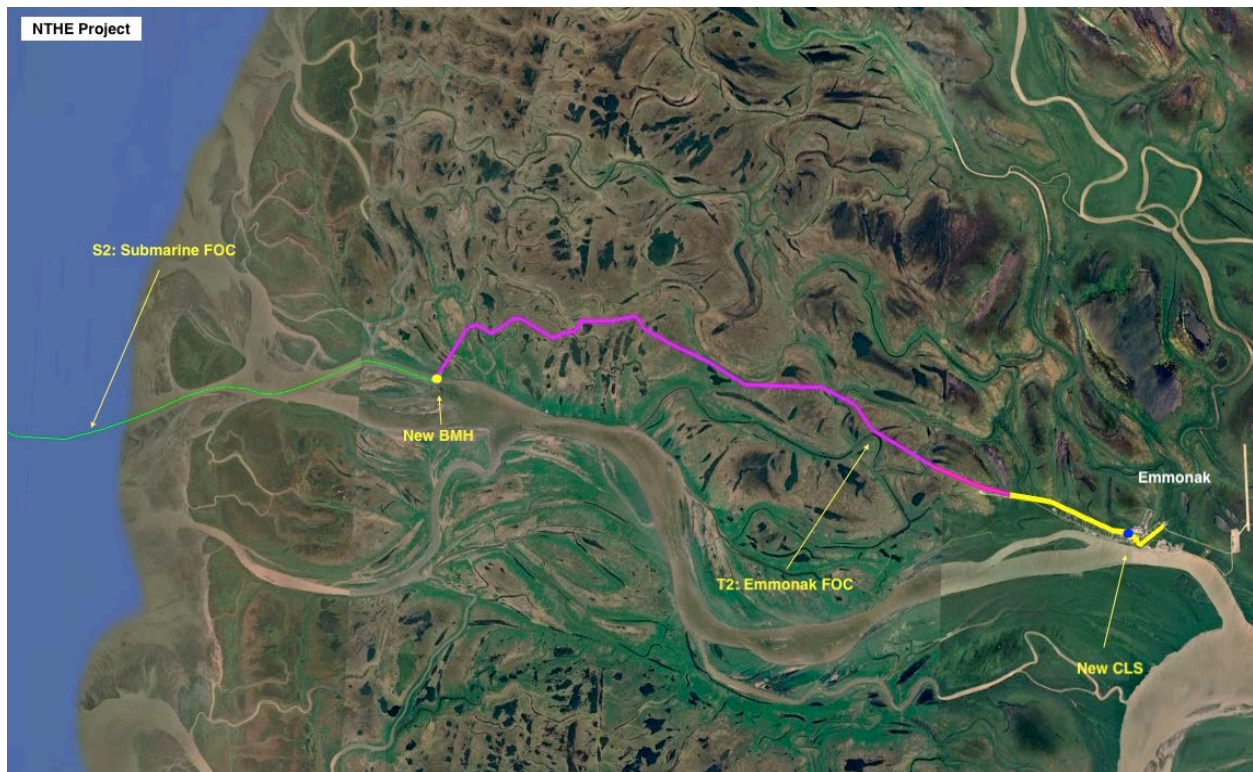


Figure 15: Emmonak Landing Point – BMH location

3.2.9 NAKNEK

The Naknek landing (**Figure 16**) is planned to be located near the existing wastewater treatment plant at Cape Suwarof. This location avoids other tidal users and leverages existing access infrastructure. A new BMH and HDD conduit from the BMH to a concrete headwall would be placed near the base of the bluff. HDD is preferred to avoid erosion of the bluff. The cable would be buried from the headwall seaward with mini excavator. A new CLS facility will be constructed in Naknek to house submarine line terminal and power feed equipment. Cabling between the BMH and CLS would be installed via conventional burial within existing utility ROW to the extent feasible. Buried ground anodes would be placed nearby the BMH to serve as a system ground for the submarine cable.



Figure 16: Naknek Landing Point – BMH location

3.2.10 HOOPER BAY

The Hooper Bay landing (**Figure 17**) is planned to be located south of the airport. This location avoids other tidal users and a wide gravel shoreline below HTL. This spur will come ashore at a new BMH, extend inland to a newly constructed CLS, and support the deployment of a full FTTP last-mile network. A new CLS facility will be constructed in Hooper Bay to house submarine line terminal and power feed equipment.

The new BMH would be placed above HTL. Buried ground anodes would be placed nearby the BMH to serve as a system ground for the submarine cable. HDD conduit would be trenched from the BMH across DOT&PF airport property and then surface laid to the airport road. The cable would be trenched along the airport road for approximately 0.66 mile to a power pole with a mini excavator. From this power pole, the FOC would be aerial to the CLS and throughout the community.



Figure 17: Hooper Bay Landing Point – BMH location

3.3 TERRESTRIAL FOC

As described in **Figure 3** in section 3.1, the terrestrial route starts at the BMH and extends to the CLS, in most cases, and can in some cases extend beyond the CLS to allow last-mile providers easier access to the Submarine cable system. The terrestrial FOC components include the front haul, CLS and some back haul. The following sections describe the proposed terrestrial FOC construction activities.

3.3.1 FRONT HAUL SEGMENTS

The proposed submarine cable would include the construction of several front haul segments to include Nome, Emmonak, Naknek, Homer, and Hooper Bay. The term “front haul” is used in the submarine cable system industry to describe the segment of cable from the BMH to the CLS. The BMH is the point where the submarine cable is spliced or transitions to terrestrial cable, which is constructed from the BMH to the CLS, where the FOC is terminated. **Table 5** lists the fronthaul segments and associated facilities.

System Component	Project Area	Segment ID	Distance (mi.)	Associated Facilities
Fronthaul	Nome	T1	0.00	Existing BMH and CLS, and new BU
Fronthaul	Emmonak	T2	9.11	New BMH and New CLS
Fronthaul	Naknek	T3	3.20	New BMH and New CLS
Fronthaul	Hooper Bay	T7	1.95	New MBH and New CLS

Table 5: Fronthaul segments (BMH to CLS)

3.3.2 CABLE LANDING STATION & COMMUNICATION SHELTER LOCATIONS

The CLS is a building that provides the enclosure for the submarine line terminal equipment, terrestrial transmission equipment, any required power feed equipment, network monitoring equipment, and building management equipment. The terrestrial FOC from the BMH terminates in the CLS and connects to the submarine line terminal equipment. The NTHE project would utilize an existing CLS at Nome and Homer. A new CLS building is proposed at Emmonak, Naknek, and Hooper Bay, as well as a small communication building in the Igiugig area. Table 6 lists the CLS locations/coordinates, while **Figure 18** illustrates a typical CLS building.

CLS	Existing or New	Location Coordinates
Nome	Existing CLS	64.486538 -165.320710
Emmonak	New CLS	62.778093 -164.534843
Naknek	New CLS	58.731087 -157.993489
Igiugig	New Communication Shelter	59.307638 -155.911942
Homer	Existing CLS	59.641613 -151.545950
Hooper Bay	New CLS	61.526920, -166.110252

Table 6: CLS location/coordinates

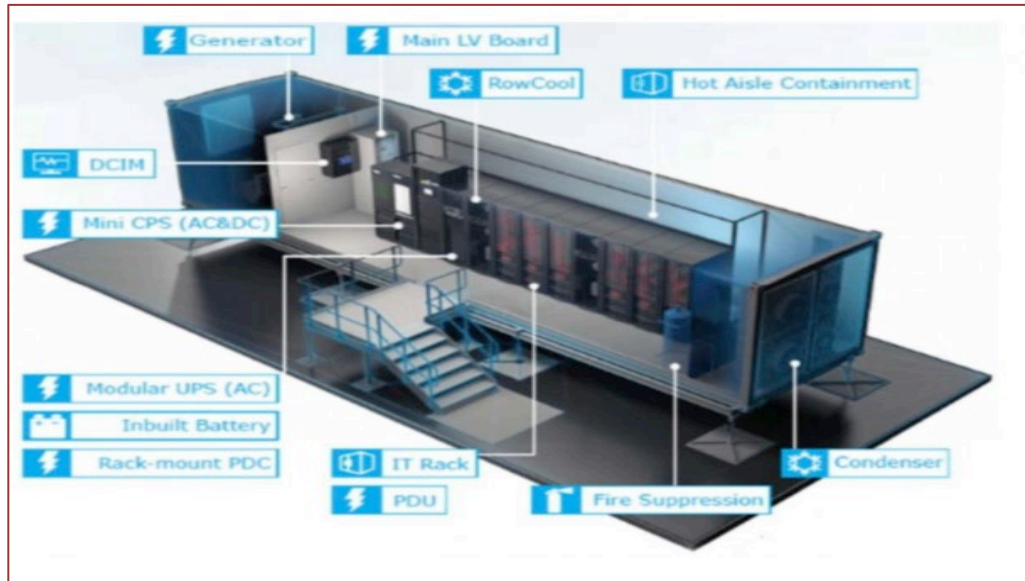


Figure 18: Typical CLS internal configuration

3.3.3 CONSTRUCTION METHODOLOGY

Terrestrial route segments crossing extensive wetlands would be installed during winter months, when the substrate is frozen, to minimize ground disturbances. Wetland segments would use a lightweight submarine cable provided in drums or containers that are towed by light tracked vehicles. Lightweight submarine cables would be coated in high-density polyethylene and measure approximately 0.5 inch in diameter. A splice joint case approximately 10 inches in diameter would be located along the route, approximately every 6.81 miles along the route, to join cable segments. Additional slack would be provided when laying the cable to allow it to settle on the vegetation and conform to changing surface features and environmental conditions. When crossing overland sections, the cable would either be laid across the ground surface or trenched. Placing the cable directly on the ground surface significantly reduces wetland impacts and is the preferred installation method. The cable would be buried where the route is close to trails, crosses streambanks and riverbanks, or is in other locations where the cable may be susceptible to damage. Additionally, unless the cable is being routed on riser poles, it would be trenched within 0.6 mi of each community. If permafrost is present during trenching with any method, the trenching would only occur within the vegetative mat above the permafrost, and the permafrost would be left intact.

The process of laying cable within wetlands would begin by removing deep snow from the cable route. Buried cable segments over wetlands would then be excavated and the cable laid directly within the trench. Trench depth would be targeted at a minimum of 12 inches and would vary with the terrain, with maximum depth of 48". Submarine cable would be used to cross streams and rivers. The cable would be spliced with the terrestrial FOC and buried into each stream bank below the ordinary high-water level. Split pipe articulated armor and driven cable anchors may be deployed in stream crossings for extra stabilization and protection.

Natural sediment transport would passively bury the cable. Additionally, the cable would be equipped with an outer plastic covering to avoid frazil (loose, randomly oriented) ice buildup. Care would be taken to position the crossings on stable banks to provide erosion protection. When constructing on soft and unstable sediments, heavy equipment would be placed on mats (**Figure 19**). The position of the laid cable would be recorded with a survey-quality Global Positioning System (GPS). Post-lay inspection for terrestrial components would be conducted following snow and ice melt. Any cable left suspended after the snow melt would be repositioned so as not to be hazardous for humans or animals. Cable repositioning would be done manually by moving the installed slack cable accordingly. If needed, the cable would be pinned to the ground using small duckbill anchors that would be installed using a hammer and drive pin. Cable left on the vegetation would sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Helicopter and walking inspections would be conducted on an annual basis to monitor erosion and bank failure.



Figure 19: Drill mat “road”

In general, equipment used across overland routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Small bulldozer or other tracked machine to remove snow
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Rock saw

- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Small utility boat for larger rivers
- Splicing equipment, small genset, and splicing tent

The method of construction is determined by considering environmental impact, cost, logistical feasibility, and weather conditions. An effective method to mitigate environmental impacts is to conduct construction during specific weather windows, summer vs winter, which are in some cases dictated by permitting agencies. The NTHE project has two project areas that have weather windows as represented in the **Figure 20** for T2 Emmonak, and **Figure 21** for T4 King Salmon to Igiugig.



Figure 20: Construction weather window for T2 Emmonak

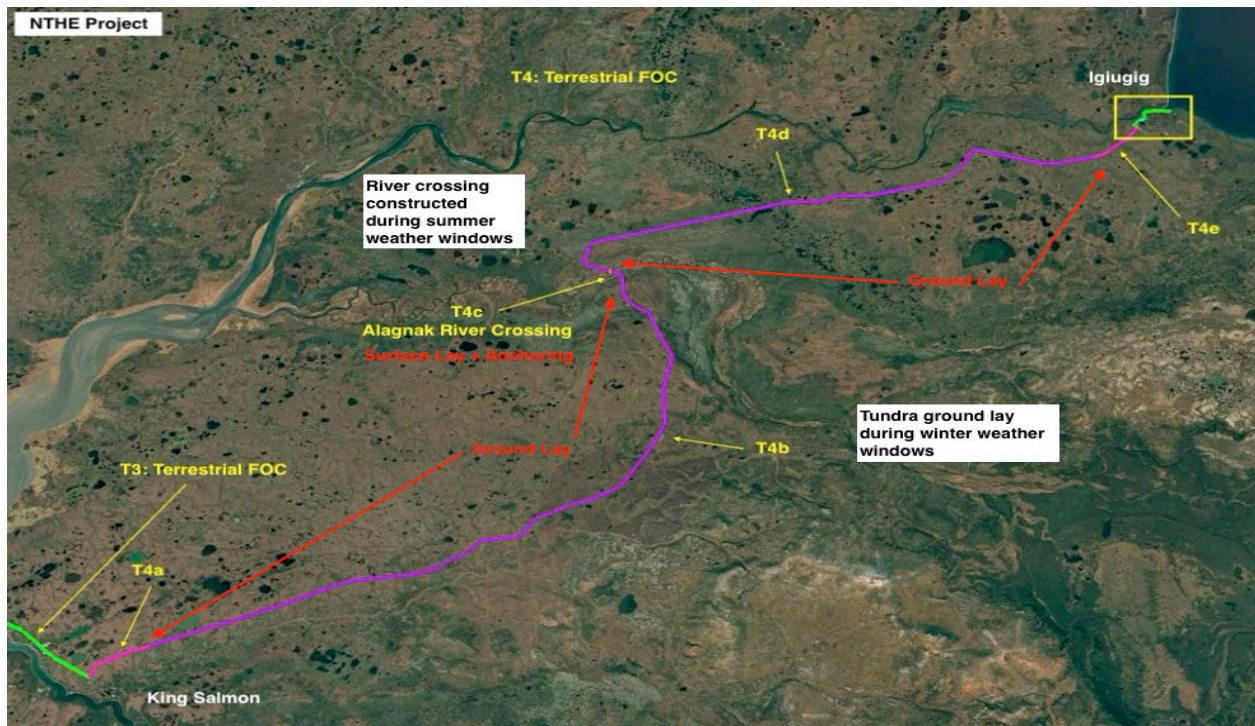


Figure 21: Construction weather window for T4 King Salmon to Igiugig

3.3.4 SURFACE LAY

In previously undisturbed areas along the cable route, Quintillion aims to limit disturbances and impacts to the environment by laying the cable on the surface where feasible, anchoring where needed. Due to the remote nature of some of the cable route's segments, surface-laid cable would not be at risk of damage from other users or their activities.

The terrestrial segment between greater Naknek and Igiugig is currently an undisturbed area. Due to its remote location and the difficulty of bringing heavy equipment on-site, Quintillion proposes to surface-lay the cable in the winter months, when the substrate is frozen, to minimize ground disturbance. The risk of damage to the cable is low in this area with few other ongoing activities. The frozen ground helps protect vegetation while also being stable enough to support heavy equipment. Surface lay overland segments will use a lightweight submarine cable provided in large spools that are towed by light tracked vehicles. Over the course of several freeze and thaw cycles, it is anticipated that the cable will become embedded into the surface layer or achieve a shallow self-bury.

In areas where land managers or other stakeholders prefer burial, Quintillion proposes to shallow-bury the cable by trenching within the upper 12-18 inches of the surface, with a minimum depth of approximately 12 inches depth (if achievable). This method would require much less excavation and lighter equipment than a typical buried cable, minimizing impacts to the environment, while remaining feasible to mobilize such equipment on-site at these locations. The cable will also be shallow buried when the route is near trails, crosses streambanks and riverbanks, or is in other places where the cable may be susceptible to damage. Additionally, unless the cable is being routed on poles, it will be buried within 0.6 mi of each receiving community. Trenching activities will be conducted with a backhoe along streams and riverbanks. All other winter trenching activities will be completed with a rock saw.

3.3.5 BURIAL

Burial is achieved by a variety of means, most commonly, telecommunications cables are buried by plowing, trenching, and horizontal directional drilling, and include the installation of conduits in some scenarios. For newly buried construction along existing rights-of-way (ROW), Quintillion would follow storm water pollution prevention plans (SWPPP), and other requirements associated with this installation effort. Burial will include conduits where appropriate, and following conduit installation, fiber optic cable would be pulled or “blown” into place. Hand holes would be placed along the route as necessary to provide future access points to the fiber system and splice cable segments together. The location and spacing of the hand holes will be subject to final design.

Due to the anticipated landscape conditions of the NTHE project (i.e., tundra), conventional trenching is likely not feasible. In undisturbed tundra conditions, a shallower trench would be excavated using a rock saw or chain trencher to cut a narrow slot, with the cable buried to a minimum of approximately 12 inches below grade. Performing this trenching during winter conditions allows the local environment to better withstand impacts from the heavy machinery in the area, such as tracked chain trenchers or rock saw for installation. Inspections would be conducted in summer to verify trench cover and would then be backfilled by hand as required.

3.3.6 TRENCHING

Trenching techniques will vary, depending on local conditions and the presence of other utilities near the NTHE cable route. A trenched burial is typically to a depth of 12-48 inches (minimum 12 inches if achievable), depending on the conditions. Due to the anticipated landscape conditions of the NTHE project (i.e., tundra), conventional trenching is likely not feasible. In undisturbed tundra conditions, a shallower trench would be excavated using micro-trenching, with the cable buried to a minimum of approximately 12 inches below grade. Performing this trenching during winter conditions allows the local environment to better withstand impacts from the heavy machinery in the area, such as tracked chain trenchers or rock saw (**Figure 22**) for installation. Inspections would be conducted in summer to verify trench cover and backfill as required.



Figure 22: Rock saw trencher

In areas accessible for summer construction, backhoes and excavators would be utilized to excavate and backfill a trench for placement of conduit. Non-mechanical trenching would be employed as necessary to install buried cable near other utilities. Excavators (**Figure 23**) with an approximately 2–3-foot bucket are utilized to trench an opening for laying the conduit, installing CVs, and moving materials around the construction site.



Figure 23: Excavator

Associated with burial are handholes and cable vaults, which are used to house extra cable, splice points and access points for further distribution of the FOC. **Figure 24** is a typical hand hole, while **Figure 25** illustrates a typical cable vault.



Figure 24: Handhole with FOC and splice case



Figure 25: Cable Vault with extra FOC cable

3.3.7 HORIZONTAL DIRECTIONAL DRILLING (HDD)

HDD is commonly utilized where there are congested areas with other utilities, and to reduce environmental impact. HDD is accomplished using a small-tracked bore machine (**Figure 26**) to bore a conduit underground for the cable. While HDD is a good construction method to reduce environmental impact, it must be noted that in the remote tundra areas of Alaska, utilization of this method is limited due to logistics and the harsh environmental conditions that may prohibit the use.



Figure 26: HDD rig utilized in terrestrial boring

In general, equipment used at each landfall location may include:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Chain trencher or cable plow (optional)
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Winch or turning sheave
- Small utility boat to run the pull line to the beach
- Splicing equipment, small genset, and splicing tent

3.3.8 AERIAL INSTALLATION

Aerial installation involves mounting the cable between poles. Where there is pre-existing pole infrastructure, Quintillion will seek to utilize it to the greatest extent feasible to minimize additional disturbances and construction activity. Additionally, aerial installation will be considered for areas where burial or surface-laid cable cannot be achieved. Quintillion's crews would use a highway-based boom truck (flatbed truck with a boom crane) and bucket truck (**Figure 27**), a cable trailer, traffic control lighting, and light vehicles for crew and tools, where necessary, for any aerial installations.



Figure 27: Aerial Pole Construction

When crossing anadromous waterbodies, the cable installation would include shallow burial across shallow channels and vegetated areas in winter, and armored cable laid on the riverbed's main channel after opening of the ice. The FOC will be surface laid and anchored by driven stakes to secure the cable in the river flow. The crossing methodology will be determined by the final design, accounting for feedback from land managers and other stakeholders.

3.3.9 TERRESTRIAL FOC ROUTES

Terrestrial segments are located at Nome (T1), Emmonak (T2), Naknek to King Salmon (T3), King Salmon to Igiugig (T4), and Hooper Bay (T7) as listed in **Table 7**. In Nome the construction plan expands the existing BMH and landing point site to include PFE shelter and larger BMH. The Emmonak segment includes front haul from the BMH to the CLS but also extends the cable beyond the CLS to provide access to the FOC for ACIs. At Naknek the terrestrial FOC segment includes fronthaul but also extends the system beyond Naknek to Igiugig to a point just short of King Salmon, where the cable turns north to Igiugig. The King Salmon to Igiugig segment begins at the turning point at King Salmon and includes the Alagnak river crossing, extending the system to Igiugig, where the Terrestrial FOC will interconnect with the leased fiber pairs at the GCI CLS. The Hooper Bay segment includes front haul from the BMH to the CLS but also extends the cable beyond the CLS to provide FTTP for the community through aerial installation.

The following table summarizes the terrestrial routes:

Segment Type	Project Area	Seg ID	from	to	Length (mi.)
Terrestrial FOC	Nome	T1	BMH	Power Hut	0
Terrestrial FOC	Emmonak	T2	Emmonak BMH	End of Route	9.46
Terrestrial FOC	Naknek – King Salmon	T3	Naknek BMH	King Salmon	10.33
Terrestrial FOC	King Salmon – Igiugig	T4	King Salmon	End of Route	68.89
Terrestrial FOC	Hooper Bay	T7	Hooper Bay BMH	FTTP	6.12
				Total Length	94.80

Table 7: Terrestrial segment distances

3.3.10 NOME

As described in previous sections, there will be a new BMH, PFE shelter, and HDD pipe installed at the landing point. However, there is no need to construct a terrestrial FOC from the BMH to the existing CLS.

The CLS in Nome is an existing structure in operation currently. New equipment may be placed in the CLS. No physical alterations to the building are planned. The existing gravel pad will be expanded, and a new facility will be constructed at the existing BMH site to house PFE for the cable extending between Nome and Naknek.

3.3.11 EMMONAK (T2)

In Emmonak, a terrestrial fiber optic cable will extend from the BMH to a new CLS to be constructed in Emmonak, as shown in **Figure 28**. This fiber optic route will consist of a surface laid submarine type cable across undisturbed tundra from the BMH to a point near the Emmonak waste disposal area, where a CV would be placed prior to transitioning to conventional aerial attachment on existing utility poles for the remainder of the route to the CLS (**Table 8**).

The FOC route in Emmonak will also extend past the CLS, providing strategically placed access points to serve anchor institutions, passing less than 1000ft from three Anchor Institutions. The Emmonak Community Center, Emmonak Clinic, and Emmonak School. Quintillion will work with landowners and tribal communities to identify future anchor institutions, and consider these needs, if any additional needs are identified.

Segment	ID	Distance (mi.)	Construction Method
T2	A	0.64	TGL – Tundra Ground Lay
T2	B	0.13	Anchored Water Crossing
T2	C	0.33	TGL – Tundra Ground Lay

T2	D	0.07	Anchored Water Crossing
T2	E	4.18	TGL – Tundra Ground Lay
T2	F	0.18	Anchored Water Crossing
T2	G	0.97	TGL – Tundra Ground Lay
T2	H	0.28	Anchored Water Crossing
T2	I	0.93	SBT – Shallow Bury Trench
T2	J	1.34	Aerial Pole Line
T2	K	0.01	Aerial Pole Line
T2	L	0.34	Aerial Pole Line

Table 8: Segment T2 Construction Method by segment ID**Figure 28:** Terrestrial Segments Emmonak

Regarding the CLS In Emmonak, we will modify an existing building into our CLS or replace an existing structure with a communications shelter. Our fiber optic cable will be buried along the main road and will have buried vaults that allow us to branch off to Community Anchor Institutions. One of these vaults will be near our chosen CLS location, with the connecting fiber to be buried and inside conduit where it connects to the building.



Figure 29: Communications Shelter

3.3.12 NAKNEK TO KING SALMON (T3)

In Naknek, we will place a telecommunications shelter along our fiber route and install equipment to serve as our CLS. Our fiber optic cable will be buried along the main road and will have buried vaults that allow us to branch off to CAIs. One of these vaults will be near our chosen CLS location, with the connecting fiber to be buried and inside conduit where it connects to the building. See **Figure 29** above for a sample shelter.

The terrestrial segment would travel east out of Naknek, beyond the CLS to a turning point near King Salmon before turning north to Igiugig across an undeveloped tundra environment (**Figure 30**). In Naknek, the cable would be installed via conventional burial, and directional boring (**Table 9**), leveraging existing utility ROW to the extent possible. Beyond the developed area of Naknek, the cable is planned as a half-inch armored type, surface-laid directly on the tundra or shallow-buried during winter. Installation methodology is subject to final design, determined in part by feedback from the land managers and other stakeholders.

Segment	ID	Distance (mi.)	Construction Method
T3	A	0.96	Standard Burial
T3	B	0.84	Standard Burial
T3	C	0.04	DB -Directional Bore
T3	D	0.02	Standard Burial
T3	E	0.06	DB -Directional Bore
T3	F	0.12	Standard Burial
T3	G	0.57	DB -Directional Bore
T3	H	0.04	Standard Burial
T3	I	0.51	DB -Directional Bore
T3	J	0.003	Standard Burial
T3	K	0.27	DB -Directional Bore
T3	L	0.37	Standard Burial
T3	M	0.13	DB -Directional Bore
T3	N	0.19	Standard Burial

T3	O	0.06	DB -Directional Bore
T3	P	0.66	Standard Burial
T3	Q	0.10	DB -Directional Bore
T3	R	0.03	Standard Burial
T3	S	0.13	DB -Directional Bore
T3	T	0.06	Aerial Pole Line
T3	U	0.41	DB -Directional Bore
T3	V	1.86	Standard Burial
T3	W	0.06	DB -Directional Bore
T3	X	0.36	Standard Burial
T3	Y	0.05	DB -Directional Bore
T3	Z	2.06	Standard Burial

Table 9: Segment T3 Naknek Construction Method by segment ID



Figure 30: Terrestrial Segments from Naknek to King Salmon

3.3.13 KING SALMON TO IGIUGIG (T4)

At a point near King Salmon, the FOC route turns north to Igiugig across an undeveloped tundra environment (**Figure 31**). Beyond the developed area at this turning point, the cable is planned as a half-inch armored type, surface-laid directly on the tundra or shallow-buried during winter (**Table 10**). Installation methodology is subject to final design, determined in part by feedback from the land managers and other stakeholders.

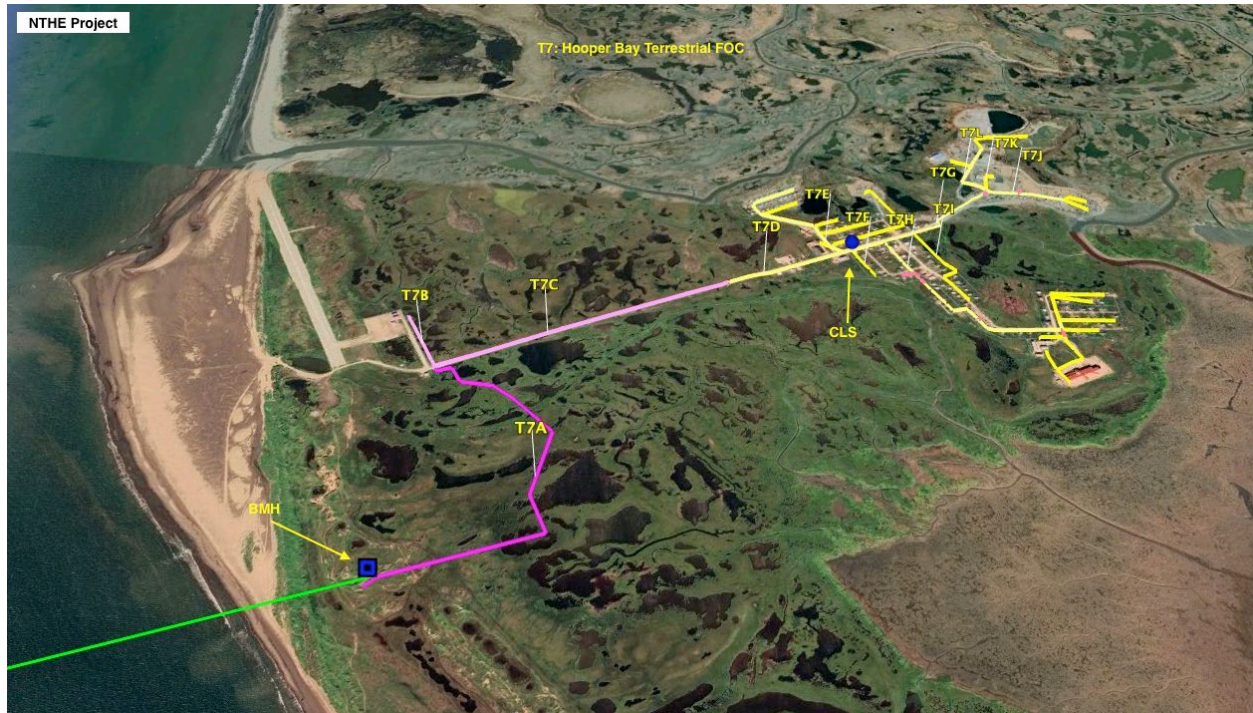
This route would cross the Alagnak River on lands managed by the U.S. Bureau of Land Management (BLM). The proposed installation would include shallow burial across shallow channels and vegetated areas in winter, and armored cable laid on the riverbed's main channel after opening of the ice. The FOC will be laid on the surface and anchored by driven stakes to secure the cable in the river flow.

A small communications shelter is planned for Igiugig to house the required amplifier equipment due to the distances from Igiugig to Homer. This equipment will amplify the signal at this intermediate point between these locations. In addition, a terrestrial FOC (1 mi.) will be installed from the communications shelter to the GCI CSL, and another distribution cable from the communication shelter to a vault just short of Iliamna Lake for future access to community CAIs. This distribution FOC provides fiber access points are strategically planned along the route for future services to CAIs and local service providers. The planned FOC route will be roughly 1500ft from the Camai Community Health Center and the Bristol Bay School District building and roughly 1200ft from the Naknek Health Clinic. In Igiugig, the FOC will pass the airport and will be about 25ft from the school.

Segment	ID	Distance (mi.)	Construction Method
T4	A	0.88	SBT – Shallow Bury Trench
T4	B	0.06	Anchored Water Crossing
T4	C	0.30	SBT – Shallow Bury Trench
T4	D	0.03	Anchored Water Crossing
T4	E	0.90	SBT – Shallow Bury Trench
T4	F	2.32	TGL – Tundra Ground Lay
T4	G	0.05	Anchored Water Crossing
T4	H	1.11	TGL – Tundra Ground Lay
T4	I	0.09	Anchored Water Crossing
T4	J	00.89	TGL – Tundra Ground Lay
T4	K	0.04	Anchored Water Crossing
T4	L	2.31	TGL – Tundra Ground Lay
T4	M	0.05	Anchored Water Crossing
T4	N	0.89	TGL – Tundra Ground Lay
T4	O	0.07	Anchored Water Crossing
T4	P	0.30	TGL – Tundra Ground Lay
T4	Q	0.05	Anchored Water Crossing
T4	R	0.90	TGL – Tundra Ground Lay
T4	S	0.10	Anchored Water Crossing
T4	T	0.52	TGL – Tundra Ground Lay
T4	U	0.10	Anchored Water Crossing
T4	V	6.69	TGL – Tundra Ground Lay
T4	W	0.12	Anchored Water Crossing
T4	X	1.39	TGL – Tundra Ground Lay

T4	Y	0.06	Anchored Water Crossing
T4	Z	3.61	TGL – Tundra Ground Lay
T4	Aa	0.03	Anchored Water Crossing
T4	Ab	2.77	TGL – Tundra Ground Lay
T4	Ac	0.06	Anchored Water Crossing
T4	Ad	5.18	TGL – Tundra Ground Lay
T4	Ae	0.11	Anchored Water Crossing
T4	Af	2.31	TGL – Tundra Ground Lay
T4	Ag	0.02	Anchored Water Crossing
T4	Ah	2.32	TGL – Tundra Ground Lay
T4	Ai	0.02	Anchored Water Crossing
T4	Aj	1.37	TGL – Tundra Ground Lay
T4	Ak	0.17	Anchored Water Crossing
T4	Al	0.16	TGL – Tundra Ground Lay
T4	Am	0.07	Anchored Water Crossing
T4	An	1.14	TGL – Tundra Ground Lay
T4	Ao	0.06	Anchored Water Crossing
T4	Ap	0.32	TGL – Tundra Ground Lay
T4	Aq	0.08	Anchored Water Crossing
T4	Ar	9.69	TGL – Tundra Ground Lay
T4	As	0.09	Anchored Water Crossing
T4	At	0.54	TGL – Tundra Ground Lay
T4	Au	0.06	Anchored Water Crossing
T4	Av	1.92	TGL – Tundra Ground Lay
T4	Aw	0.03	Anchored Water Crossing
T4	Ax	2.95	TGL – Tundra Ground Lay
T4	Ay	0.09	Anchored Water Crossing
T4	Az	1.50	TGL – Tundra Ground Lay
T4	Ba	0.07	Anchored Water Crossing
T4	Bb	0.58	TGL – Tundra Ground Lay
T4	Bc	0.12	Anchored Water Crossing
T4	Bd	2.19	TGL – Tundra Ground Lay
T4	Be	2.08	SBT – Shallow Bury Trench
T4	Bf	0.03	Anchored Water Crossing
T4	Bg	1.67	TGL – Tundra Ground Lay
T4	Bh	1.34	SBT – Shallow Bury Trench
T4	Bi	0.06	Anchored Water Crossing
T4	Bj	1.23	SBT – Shallow Bury Trench
T4	Bk	0.09	Standard Burial
T4	Bl	0.01	DB -Directional Bore
T4	Bm	0.00	Standard Burial
T4	Bn	0.14	Standard Burial
T4	Bo	0.01	DB -Directional Bore

T7	J	0.30	Aerial – Existing Pole Line
T7	K	0.09	Aerial – Existing Pole Line
T7	L	0.48	Aerial – Existing Pole Line

Table 11: Segment T7 Hooper Bay Construction Method by segment ID**Figure 32:** Terrestrial Segments Hooper Bay

Regarding the CLS In Hooper Bay, we will construct the CLS on a small gravel pad. Our fiber optic cable will be aerial throughout the community for FTTP with pedestals attached to the base of power poles.

3.4 CABLE ROUTE SURVEY

Prior to finalizing the submarine cable routes, a geophysical and geotechnical survey of the entire proposed submerged segments will be conducted. Survey work would include beach topographic, and offshore geophysical, and geotechnical surveys. The topographic survey would be to determine the precise cable landing points, BMH locations, shore tide line, and all other necessary topography features. The marine geophysical and geotechnical survey of the planned marine cable segments is required to identify suitable cable routes for these segments along the seabed. Data to be collected include geophysical (multibeam echo sounder, side scan sonar, sub bottom profiler) and geotechnical (cone penetration tests (CPTs), gravity cores and grab samples) data to identify seabed bathymetry and bathymetric features, surface and subsurface geology, and any seafloor and substrate obstructions or limitations. This data is needed to identify the best and most environmentally sensible cable routes. The data will also be evaluated to locate feasible burial conditions to better protect the cable based on site specific conditions. This survey data will assist with the review under the National Environmental Policy Act (NEPA) and supporting documents.

Bottom samples would be taken using a combination of cone penetration tests (CPTs), gravity core or similar, and/or grab sampler. Samples would be taken either every 3.1 or 6.2 miles, based on data collected during the geophysical portion of the survey. These samples would provide an understanding of the nature of the sediment type of the seafloor. Samples would be discarded over the side of the ship after analysis is completed. Findings from this offshore survey would be used to develop a suitable route for the submarine section of the NTHE network. The submarine cable segments are planned to be 100% buried at a minimum depth of approximately 3 feet. In the event there are other submarine cables in the vicinity, the marine survey contractor will collect magnetometer survey data and side scan sonar data to identify the existing cable systems, and crossing agreements with in-service cable owners will be created per industry standards for cable crossings.

Terrestrial surveys may also occur in the form of in-field investigations where cultural resources and/or any critical habitats are identified. No construction activities would be conducted during any survey efforts.

4. STAKEHOLDER AND TRIBAL ENGAGEMENT

Quintillion has commenced government, public, and industry engagement activities regarding the project and intends to continue ongoing engagement as the project progresses.

4.1 APPLICATION PERIOD OUTREACH

Quintillion conducted community outreach and engagement during the grant application preparation period. This included coordinating with local stakeholders to gain feedback. This effort consisted of postings on the Quintillion website, emails to key Stakeholders, meetings and attendance of community council meetings. The Stakeholders included various community entities, such as tribal councils, corporations and landowners. The program sought stakeholder feedback and specifically any concerns with that project that needed to be addressed. The communities support the project and are interested in the benefits that this system will bring to the area. In addition, Quintillion is also continuing the outreach, as we progress the project through environmental assessment and permitting process, seeking stakeholder acceptance of the plan. Quintillion will contact community leaders in Hooper Bay to post flyers in the community center with information about the project and signing up for service.

4.2 TRIBAL/ALASKA NATIVE CLAIMS SETTLEMENT ACT STAKEHOLDER SUPPORT

Quintillion continues ongoing coordination with tribal members to define positive impacts to tribally- and Alaska Native Claims Settlement Act (ANCSA)-owned facilities and land, and the sociocultural benefits of broadband availability.

4.3 CONTINUED STAKEHOLDER ENGAGEMENT

Quintillion intends to continue sharing key project milestones as the project (**Figure 33**) progresses. This would occur through bilateral communication with tribes and local government, as well as press releases and announcements.

Following environmental and regulatory approvals, Quintillion would announce an update to its project schedule, which is dependent upon the timing of the NEPA and environmental approval processes. Prior to terrestrial construction, Quintillion would notify communities of upcoming construction activities and would coordinate with property owners on the build-out of local community fiber networks.

5. NATIONAL ENVIRONMENTAL POLICY ACT

The projects are funded by grants awarded by NTIA and the RUS, and is therefore subject to evaluation under NEPA. NTIA will serve as the lead federal agency for NEPA compliance, with RUS and the Bureau of Land Management (BLM) participating as cooperating agencies. NTIA will coordinate the environmental review process, including the determination of whether the project qualifies for a categorical exclusion, requires an Environmental Assessment (EA), or necessitates a more comprehensive Environmental Impact Statement. At this time, preparation of an EA is anticipated.

Documentation submitted for NEPA evaluation would address the project's purpose and need, a reasonable range of alternatives, environmental impacts of the proposed action and alternatives, consultations with stakeholders, and ultimately determines whether the action has the potential to cause significant effects on the environment. This process would include consultations with National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) on protected species and habitat (i.e., Endangered Species Act [ESA], Essential Fish Habitat [EFH]), as well as consultations with the Alaska Department of Archaeology and Historic Preservation (i.e., the State Historic Preservation Office [SHPO]) on cultural resources. If the agencies determine that the action would not have significant impacts on environmental and cultural resources, NTIA will issue a FONSI. However, if the environmental review determines that the environmental impacts of a proposed Federal action would be significant, a Notice of Intent to prepare an EIS would be issued.

Although submarine cable systems are considered low-impact projects and environmentally benign, the permitting process will involve coordination with multiple federal, state, and local agencies. A summary of anticipated permits and approvals is provided in Table 11, with the final list to be confirmed in consultation with the relevant regulatory authorities.

Land status is a key consideration in permitting. The marine segments of the project will involve coordination with agencies such as the U.S. Army Corps of Engineers (USACE), U.S. Fish & Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Bureau of Land Management (BLM) and the Alaska Department of Natural Resources (ADNR). Terrestrial cable segments will be located within existing rights-of-way (ROW) managed by the Alaska Department of Transportation and Public Facilities (DOT-PF), BLM, and ADNR. Fiber will be installed utilizing various construction methods, including ground lay, shallow burial, standard burial, and directional boring, as well as some aerial on existing utility poles to minimize disturbance and remain within the existing ROW to the greatest extent possible.

Responsible Agency	Permit or Approval	Regulated Activity
USACE	Nationwide permit (NWP) #6 Survey Activities NWP #57 Utility Line Activities	Geophysical sediment sampling. Construction of utility lines and associated facilities provided the activity does not result in the loss of greater than ½-acre of waters of the U.S. for the complete project.
	Federal Section 10 Permit <i>River and Harbors Act of 1899</i>	Construction of artificial islands, installations, and other devices on the seabed, to the seaward limit of the outer continental shelf, pursuant to Section 4(f) of the CWA, as amended (see 33 CFR 320.2(b).)

	Section 404 Permit <i>Clean Water Act (CWA)</i>	Discharge of dredged or fill materials in navigable waters of the U.S., including marine waters.
NMFS	ESA Consultation / EFH Assessment	Potential to cause harm to ESA-listed species, EFH species, and/or affect their respective habitat.
USFWS	ESA Consultation	Potential to cause harm to threatened and endangered species.
U.S. Coast Guard	Local Notice to Mariners	Notification of activity during surveying and cable laying.
DNR	Public Utility Easement	Required for placing a cable on state-owned tide and submerged lands over the long term.
	State Lands Lease	Required for the construction of permanent structures on State lands.
Alaska Dept. of Environmental Conservation	Section 401 of CWA – Water Quality Certificate (WQC)	Regulatory authority to review federal actions in or affecting the quality of waters of the State. Required before USACE can issue Section 404/Section 10 permits. If USACE issues an NWP, a separate 401 WQC is not needed.
	Section 402 of CWA – APDES General Construction Permit	Required for construction sites that disturb 1 or more acres and discharge into waters of the U.S.
DNR Office of History and Archaeology (OHA)	Section 106 of National Historic Preservation Act of 1966 (NHPA)	NHPA requires federal and state agencies to consider the effects of their undertakings on historic and cultural resources and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.
	Alaska Historic Preservation Act (AHPA)	AHPA requires a review of State public construction projects to determine if historic, prehistoric, or archaeological sites may be adversely affected.
Alaska Dept. of Fish & Game (ADFG)	Fish Habitat Permit	Work within or across a specified anadromous waterbody.

	Special Area Permit	Work that would use land or water within a Special Area in the state
DOT-PF	Utility Permit	Utility construction activities in DOT-PF right-of-way
Alaska Dept. of Public Safety, Fire, and Safety	State Fire Marshal's office review	Required for construction of any building/structure
Borough	Building Permit	Required for construction of a CLS
	Land Lease	Required for placing cable/construction on Borough-owned land over the long term

Table 12: Anticipated Permits, Consultations, and Approvals to Install the NTHE Cable System

Appendix B – Community Engagement

Table B-1. Community Engagement List

Stakeholder	Name	Title
NTIA	Andrew Bielakowski	Environmental Program Officer
Advisory Council on Historic Preservation	Emily Choi	Assistant Program Analyst
SHPO	McKenize Herring	Archaeologist I - Review and Compliance
USACE	John Sargent	Regulatory Project Manager, Biologist
Alaska Village Council Presidents	Clarence Daniel-Harley Sundow	Director
Bristol Bay Native Corporation	Dan Cheyette	Land Manager
Calista Corporation	Mary Martinez Tisha Kuhns	Land Manager V.P. of Calista Lands Department
City of Emmonak	David Roland	Manager
Emmonak Tribe/Tribal Council	Charles Augustine	President
Igiugig Native Corporation	Christina Salmon	Administrator
Igiugig Tribal Village Council	Karl Hill	Director of Maintenance
Levelock Native Corporation	Kyle Belleque	General Manager
Naknek Native Village Council (NNVC)	Michael Peters / Casey Rangel	Tribal Admin. / Finance Director
Native Village of Hooper Bay	Edgar Tall	Chief
Sea Lion Corporation	Michael Cipriano	CEO
Alaska DNR	Austin Michels / Clifford Larson	
Alaska DOT & PF	Scott Maybrier	Engineering Assistant III
Bristol Bay Borough	James Wilson	Manager
Chuloonawick Native Village	Michael Jimmy	President
Emmonak Corporation	Adeline “Aucha” Kameroff	Chair
King Salmon Tribe	Ralph Angasan	President
Lake & Peninsula Borough	Nathan Hill Kate Conley	Manager Planner
Nome Eskimo Community	Emma Pate	Executive Director
Paug-Vik Incorporated Limited	Bill Hill	President
Chickaloon Village Traditional Council	Gary Harrison Stephanie Houser	Chief Administrative Assistant

Table B-2. Summary of Community Members Engaged

Entity	Point of Contact	Notes
Alaska Peninsula Corporation (APC)	Adrienne Christensen	Initial Communication Early 2023 to 2024 - Quintillion sent a formal email invitation for APC to participate in the Programmatic Agreement (PA) process. The invitation included background information on the project and outlined the purpose and structure of the PA. 07.2024 - Letter of Support (LOS) requested. 08.2024 - Met with Dave McAlister and Adrienne Christensen. Quintillion attended board meeting and presented NTHE project details. 08.22.2024 - APC issued a resolution to support project. 04.29.2025 - 05.01.2025: Continued Engagement.
Alaska Village Council Presidents (AVCP)	Clarence Daniel, Director	Initial Communication 03.12.2025 - Quintillion sent a formal email invitation for AVPC to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Quintillion Follow-Up Quintillion followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.12.2025 - left voicemail at 907-543-7304 (executive secretary). No response was received.
Bristol Bay Borough (BBB)	James Wilson, Manager	Initial Communication Quintillion sent a formal email invitation to BBB to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.11.2025 - Left voicemail with Sherrie at BBB. 03.12.2025 - Left message for Phill. Phill returned the call and sent a secondary email. 04.30.2025 and 05.05.2025 - A follow-up call occurred, and an email was sent. No response was received.
Bristol Bay Native Corporation (BBNC)	Dan Cheyette, Land Manager	Initial Communication Quintillion sent a formal email invitation to BBNC to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up 07.24.2024 - Emailed sent. Received out of office response.

Entity	Point of Contact	Notes
		08.13.2024 - Held first meeting to review and discuss the construction plan. Worked to provide route KMZ files, presentation, land parcel table, and cultural concerns table. Next step was to seek and resolve all concerns with the construction plan. 09.11.2024, 09.16.2024 - Kristina sent emails requesting concerns with the project. 10.15.2024 - Met with Dan to clarify concerns and respond to those concerns. 10.29.2024 - A LOS was provided from BBNC supporting the project.
Calista Corporation	Mary Martinez; Land Manager Tisha Kuhns, V.P. of Calista Lands Department	Initial Communication Quintillion sent a formal email invitation for Calista Corporation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.12.2025 - Left voicemail for Tisha.
Chuloonawick Native Village		Initial Communication Quintillion sent a formal email invitation for Chuloonawick Native Village to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.12.2025 - Left voicemail and sent email.
City of Emmonak	David Roland, Manager	Initial Communication 03.12.2025 - Quintillion sent a formal email invitation to the City of Emmonak to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.11.2025 - Left Dave a voicemail. 03.12.2025 - Called Dave again.

Entity	Point of Contact	Notes
Emmonak Corporation	Janet James Kamerof, President	Initial Communication 03.12.2025 - Quintillion sent a formal email invitation for the Emmonak Corporation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.12.2025 - James was not available, left a message with Martha. 05.05.2025 – Was told to call Achua; Achua requested an email.
Emmonak Tribe/Tribal Council	Charles Augustine, President	Initial Communication Quintillion sent a formal email invitation for the Emmonak Tribe / Tribal Council to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.12.2025 - Spoke with Janice, who was going to review the email about this project.
City of Hooper Bay	Sandra Tall-Lake Roy	Initial Communication Spring 2025 - Quintillion formally engaged the City of Hooper Bay, extending an invitation to participate as a concurring party in the Section 106 consultation process. The outreach introduced the project scope, described the permitting and cultural review processes, and outlined opportunities for the City of Hooper Bay to be actively involved during the consultation period. Follow-Up and Outcome Summer 2025 - Throughout Summer 2025, Quintillion followed up with the City of Hooper Bay to answer questions, provide additional project details, and encourage participation in upcoming consultation activities. Hooper Bay City acknowledged the invitation and remained engaged through email exchanges, helping establish a cooperative relationship that will support ongoing coordination during environmental review and permitting phases.
Sealion Corporation, Hooper Bay	William Naneng Michael Cipriano	Initial Communication Spring 2025 - Quintillion initiated engagement with the Sealion Corporation, extending a formal invitation to participate as a concurring party in the Section 106 consultation process for the NTHE project and its Hooper Bay segment. The invitation outlined the project scope, regulatory framework, and opportunities for Sealion to participate in cultural resource and permitting discussions.

Entity	Point of Contact	Notes
		Follow-Up and Outcome Summer 2025 - In the months following the initial outreach, Quintillion maintained communication with Sealion to provide project updates and ensure their inclusion in consultation activities. Sealion acknowledged the invitation and indicated interest in staying informed on the project's progress. This engagement helped establish a channel for future collaboration during environmental review and permitting stages.
Igiugig Native Corporation	Christina Salmon, Administrator	Initial Communication Quintillion sent a formal email invitation for the Igiugig Native Corporation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.11.2025 – Email sent to Christina, AlexAnna and Karl. AlexAnna came back with a yes.
Igiugig Village Council	Karl Hill, Director of Maintenance	Initial Communication Quintillion sent a formal email invitation for the Igiugig Village Council to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.11.2025 - Emailed Christina, AlexAnna and Karl. AlexAnna came back with a yes.
Iliamna Development Corporation	Steve Reimers, CEO	Initial Communication May to June 2024 - Quintillion initiated contact with the Iliamna Development Corporation in May 2024, introducing the NTHE project and requesting a community meeting to present the project scope and proposed route. Throughout May and June, Quintillion exchanged several introductory emails to coordinate logistics, provide background information, and establish points of contact for future engagement. Follow-Up and Outcome Summer 2024 - Following the initial outreach, Quintillion worked with Iliamna representatives to plan a community presentation to share more details on the project's anticipated construction timeline and permitting process. This engagement set the foundation for ongoing coordination, with Iliamna expressing interest in continued dialogue as the project advanced into the permitting and construction phases.

Entity	Point of Contact	Notes
King Salmon Tribe	Buck Angasan, Administrator	Initial Communication 03.11.2025 - Quintillion sent a formal email invitation for the King Salmon Tribe to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Quintillion Follow-Up Quintillion followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.11.2025: RuthAnn, at King Salmon Tribe was contacted.
Lake & Peninsula Borough	Nathan Hill, Manager Kate Conley, Planner	Initial Communication Quintillion sent a formal email invitation to the Lake & Peninsula Borough to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Quintillion followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.11.2025 - A phone call occurred with Kate, which she forwarded to Nathan.
Levelock Native Corporation	Kyle Belleque, General Manager	Initial Communication Quintillion sent a formal email invitation for the Levelock Native Corporation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 04.2025 - Email was sent. 04.15.2025 - Second email was sent, Kyle responded with a yes.
Naknek Native Village Council (NNVC)	Michael Peters, Tribal Admin/ Finance Director	Initial Communication Quintillion sent a formal email invitation to NNVC to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary The following engagement was recorded: Voicemail, phone call returned with a verbal confirmation to participate.

Entity	Point of Contact	Notes
Native Village Of Tyonek	Johann Bartels, President	Initial Communication Quintillion sent a formal email invitation to NNVC to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Date not recorded. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary No response received after initial invitation request sent.
Nome Eskimo Community		Initial Communication Date not recorded: Quintillion sent a formal email invitation for the Nome Eskimo Community to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.12.2025 - Teresa answered and transferred, Rena spoke and emailed. 05.05.2025 - A reminder email was sent.
Paug-Vik Incorporated Limited	Robert (Bob) Burnett, General Manager	Initial Communication 03.12.2025 - Quintillion sent a formal email invitation for the Paug-Vik Incorporated Limited to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions. Phone Contact Summary 03.12.2025 - Phone discussion; Kristina called Bill and they are looking at having someone sit on the Conquering Party but don't generally support the project, which will be brought up later this month. They meet on the 25th. Team will attend to help field questions. 05.05.2025 - Follow up call made and Bill Hill confirmed request to address concerns.

Entity	Point of Contact	Notes
Salamatof Native Association Inc.	Curtis McCubbins, IT Director	Initial Communication A formal email invitation was sent to present a detailed project overview of the NTHE project. The presentation was well received. 09.10.2024 - Met with Curtis in person. Quintillion Follow-Up Personalized emails were sent to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.
Seldovia Native Association Inc (SNAI)	Carolyn Kuckertz Crystal Necklace, Office Bishop	Initial Communication 08.29.2024 - Quintillion initiated engagement by sending a formal email to present a detailed overview of the NTHE project. The presentation was well received. A meeting was held with Don Kashevaroff, Desiree Edenshaw, Carolyn Kuckertz. Follow-Up Quintillion followed up responding to concerns onlead in FOC this was resolved and answered. And response to their CEO Chris Manfor concerns were addressed as well.
Tyonek Native Corporation (TNC)	David Kroto, Lands Manager Jamie Marunde	Initial Communication June to July 2024 - Quintillion initiated engagement with the TNC in June 2024, sharing proposed subsea and terrestrial route maps and requesting feedback on any overlaps with Tyonek lands. In July 2024, the project team held a construction planning meeting with TNC to walk through the Nome to Homer Express project scope, timeline, and proposed route, and to answer questions related to land use and permitting. Follow-Up and Outcome August to November 2024 - In November 2024, TNC issued a LOS for the project. This letter confirmed their understanding of the proposed route and expressed support for Quintillion's efforts, contingent on continued coordination during permitting and construction activities. This outcome established a clear path for collaboration and aligned expectations for future engagement.
Notes: ADOT = Alaska Department of Transportation; APC = Alaska Peninsula Corporation; AVCP = Alaska Village Council President; Alaska Village Electric Cooperative; BBB = Bristol Bay Borough; BBNC = Bristol Bay Native Corporation; BBTC = Bristol Bay Telephone Cooperative; BMH = Beach Manhole; CEO = Chief Executive Officer; CLS = Cable Landing Station; DCRA = Division of Community and Regional Affairs; ADNRR = Alaska Department of Natural Resources; EA = Environmental Assessment; IT = Information Technology; KMZ = Keyhole Markup Language file; LLC = Limited Liability Company; Naknek Native Village Council; NPS = National Park Service; NTIA = National Telecommunications Information Administration; SNAI = Seldovia Native Association Inc.		

Table B-3. Comments Received During the Draft Environmental Assessment 30-day Public Comment Period:

Comment Submitter / Comment Text	Disposition (Accept/ No Change)	Response
<i>U.S. Environmental Protection Agency:</i> The EA mentions the nature of the habitats along the submarine portions of the route. How was that determined? If this is more than desktop, is it possible to include the survey report or at least reference it so the reader knows how these determinations were derived?	Accept	This information was developed using both desktop resources as well as incorporating survey data collected along the route in 2024. Additional text has been added to Section 2.3.
<i>U.S. Environmental Protection Agency:</i> In the alternatives section, the original route that crosses the wild and scenic river is mentioned and then suggested that the proposed route crosses the same river but not at a sensitive portion. Can this discuss or at least include reference to elsewhere in the EA as to what specific BMPs are being used to protect the river and why the proposed crossing will not impact the sensitive area downstream?	Accept	Text was added to Sections 2.3 and 4.4.1 detailing why the proposed crossing would avoid the WSR and references the BMPs to be used.
<i>Joint Letter from Paug-Vik Inc., Ltd, Levelock Natives Limited, Igiugig Native Corporation, and Bristol Bay Native Corporation:</i> Project seeks to minimize potential environmental impacts by proposing to install the terrestrial portion of the fiber during winter months when most of the impacted lands would be covered by snow. While we support this approach, winter construction will not eliminate all the construction impacts, and the EA should provide a more thorough identification and discussion of them. For example, the EA notes that installation activities would lead to the loss of some vegetation, increased soil compaction and potential wildlife impacts; it does not adequately describe the potential consequences of these impacts to the environment or to the residents who rely on these lands for subsistence.	No Change	We agree that winter conditions do not eliminate all effects but aim to minimize effects to the greatest extent practicable. The EA provides the level of analysis required under NEPA by identifying the potential for temporary vegetation disturbance, soil compaction, and wildlife displacement, and evaluating the extent, duration, and context of those effects. The EA describes how winter conditions, project design, and implementation measures minimize the scale of disturbance and limit consequences to both the environment and subsistence users. Based on this analysis, the EA concludes that these impacts would be temporary, localized, and not expected to result in significant adverse effects. A summary of the impacts analysis is presented in Table 4-4 of the document.

Comment Submitter / Comment Text	Disposition (Accept/ No Change)	Response
<i>Joint Letter from Paug-Vik Inc., Ltd, Levelock Natives Limited, Igiugig Native Corporation, and Bristol Bay Native Corporation:</i> A primary concern for our shareholders is noise impacts. The people of the region do a significant amount of trapping and hunting during winter months. Winter construction would most certainly cause noise impacts to the wildlife that is targeted by these activities and yet the EA is mostly silent on this important topic.	No Change	Section 4.1 of the EA includes an analysis of anticipated noise associated with construction activities, including expected sound levels, attenuation over distance, and comparison to baseline ambient conditions. As described in that section, noise generated during construction would be temporary, localized, and expected to diminish rapidly with distance from the work area. Section 4.5.1 addresses potential wildlife impacts from winter construction, noting that temporary disturbance could cause short-term displacement of terrestrial mammals. These impacts are expected to be brief and confined to the immediate project footprint due to the linear, moving nature of installation activities. Taken together, the analyses in Sections 4.1 and 4.5.1 describe that noise and associated wildlife disturbance from winter construction would be temporary, localized, and not expected to result in significant or long-term impacts.
<i>Joint Letter from Paug-Vik Inc., Ltd, Levelock Natives Limited, Igiugig Native Corporation, and Bristol Bay Native Corporation:</i> The Project proposes to construct much of the terrestrial portion of the network by surface laying the fiber on top of the tundra and allowing it to gradually sink into the tundra and get buried. The EA describes this construction method as “a safe and effective cable installation method due to the minimal risk of damage and its reduced impact on the natural environment.” While this may be true in some respects or overtime, it is nevertheless also the case that a surface lay construction approach will present impacts that should be considered in the EA. The main form of winter transportation between communities is by snowmachine. As is discussed in the prior paragraph, residents of the region widely participate in several subsistence activities during the winter months and do so utilizing snowmachines for transportation, both close to their communities and much further afield. Given these realities, there is the real potential for a snowmachine ski to hook onto a fiber cable that is installed on the surface potentially damaging the fiber or injuring the rider. This risk must be acknowledged and better addressed in the EA.	Accept	Potential interactions between surface-laid fiber and winter snowmachine travel are now more clearly described in the EA, Section 4.6.3. Construction would occur during winter, and the installed fiber is expected to be covered by snowfall and buried as seasonal snowpack accumulates in the following days. Vegetation and surface conditions are expected to support natural settling of the cable into the underlying organic layer when seasonal thaw occurs and when snowmachine use is not anticipated. In subsequent years, the cable will be fully under snowpack. Based on these factors and the temporary, localized nature of the installation, a significant risk to snowmachine users is not expected.

Comment Submitter / Comment Text	Disposition (Accept/ No Change)	Response
<i>Joint Letter from Paug-Vik Inc., Ltd, Levelock Natives Limited, Igiugig Native Corporation, and Bristol Bay Native Corporation:</i> On numerous prior occasions, our corporations have asked Quintillion to bury the terrestrial portion of the fiber cable. We are saddened to see these requests have largely been ignored. In the “Project Description” Quintillion opines that the fiber cable would not pose a threat to people or activities due to the “remote nature” of the terrestrial segment. But that is a mischaracterization of the area due to the widespread prevalence of subsistence activities by residents. There will be more than a negligible amount of snowmachine activity in the area and it is incumbent on Quintillion to take these potential impacts and risks into account. We once again ask Quintillion to consider burying the terrestrial segment of the fiber rather than utilizing a surface lay installation.	No Change	Quintillion has thoroughly investigated the risks, impacts, and timing of trenching portions of remote tundra environments, with 3 separate agencies, 2 distinct environmental and permitting contractors, 2 engineering design firms, and 3 tribal entities in collaboration and consultation for two full years in making the final decision to ground lay fiber. The targeted areas are best served by an efficient, non-ground disturbing method that preserves the landscape and upper layer of vegetation. Research has shown that ground laid cable settles naturally into the tundra over time, even within 6 months in some conditions. Performing this work during the frozen ground season ensures minimal landscape impact. Trenching in these areas would likely create depressions in the softer soil, thereby creating greater potential risk to snow machines or ATV travel and negatively impacting vegetation, creating a scar that will take many years to naturally repair. Fiber markers will be placed periodically along the route to ensure visibility and aid in safely traversing the area. Quintillion performed outreach to local communities and obtained several maps (files) of snow machine travel for hunting and recreation and has directly translated the frequently used trails and corridors identified in the files to areas where the cable will be buried. Quintillion continues to perform outreach with these local communities, meeting regularly, and as needed, to discuss these sorts of issues and concerns, and ways to address their comments. We trust that this method of working with local area users and planning mitigation strategies has been seen as a positive collaboration.
<i>Joint Letter from Paug-Vik Inc., Ltd, Levelock Natives Limited, Igiugig Native Corporation, and Bristol Bay Native Corporation:</i> Ironically, Quintillion’s “Project Description” states Quintillion would shallow-bury the cable utilizing 12”-18” trenching where “land managers of other stakeholders prefer burial...” Project Description, p. 31. There is something we have asked Quintillion to do in past comments.	No Change	Quintillion has identified portions of the route where travel has been documented and has prescribed burial as the construction method on and near these routes. If any new selected areas are deemed as high travel corridors and pose a safety risk, Quintillion will work with local users on solutions to mitigate risks. One option discussed was the placement of traditional telephone poles for certain segments, and the risk to air travel was deemed to be too high. Other options include increased fiber marker placement, and limited burial where necessary and permitted.

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Appendix C – Maintenance and Decommissioning Plan

Assumptions

The following indicative schedule and cost assumptions demonstrate Quintillion’s planning for long-term operations, maintenance, and responsible decommissioning of the Nome-to-Homer fiber project. These assumptions are illustrative and will be refined as project design, permitting, and operational experience evolve.

Maintenance Schedule (Indicative)

Activity	Frequency	Responsible Party	Notes / Dependencies
Network Operations Center (NOC) monitoring	Continuous (24/7)	Quintillion NOC	Automated OTDR & telemetry monitoring; immediate alert for anomalies
Terrestrial route inspections	Semi-annual	Field Operations / Contractor	Spring and fall inspections for vaults, poles, and ROW condition
Power and HVAC systems at CLS and regeneration sites	Quarterly	Facilities / Site Techs	Includes battery checks, filter replacement, and generator testing
Vegetation management and ROW clearing	Annual	Local maintenance contractor	As needed in summer/fall season; coordinate with landowners
Emergency repair drills / response validation	Annual	Operations & Safety Teams	Verify vessel charter readiness and spares inventory
Maintenance Plan review and update	Every 5 years	Quintillion	Update based on operational data and environmental change

Estimated Maintenance Cost Assumptions

Cost Category	Estimated Annual Cost (2025 US\$)	Description / Basis
NOC Operations (monitoring & analytics)	\$450,000	Includes 24/7 monitoring staff, system software, and alert management
Routine terrestrial inspections and repairs	\$300,000	Travel, labor, small-scale excavation, and fiber splicing materials
Marine maintenance agreement	\$600,000	Annual retainer for repair vessel standby service under ASMCMA or equivalent
Site power and HVAC maintenance	\$150,000	Generators, battery systems, HVAC servicing, spare parts
Preventive vegetation and ROW work	\$50,000	Clearing, erosion control, and access restoration
Environmental and compliance reporting	\$25,000	Annual reporting, inspections, and agency coordination
Total Estimated Annual Maintenance	~\$1.6 million	Based on steady-state operation

Decommissioning Cost Assumptions (End of Life)

Component	Estimated Cost Range	Description / Basis
Preparation and permitting	\$150,000–\$250,000	Develop Decommissioning Plan, agency coordination
Nearshore removal (2–3 landing sites)	\$500,000–\$800,000	Excavation, cable removal, shoreline restoration
Marine isolation and survey	\$15–\$18 million	Vessel mobilization, cable cutting/capping, ROV survey
Terrestrial facility de-energization	\$250,000	Power disconnection, vault sealing, site restoration
Post-decommissioning monitoring	\$75,000–\$100,000	Follow-up surveys over 3–5 years
Total Estimated Decommissioning Cost	\$2.2–\$3.4 million	Depending on scope, access, and market rates

These estimates are illustrative and intended to demonstrate proactive lifecycle planning. Actual costs will be refined during detailed design, permitting, and operational phases. The schedule and cost assumptions account for Alaska-specific logistics, seasonal access, and regional market rates for labor and marine vessels.

Appendix D – Best Management Practices and Invasive Species Management

General Commitments

The following is a list of all environmental commitments and mitigation measures included in the Proposed Action.

- i. Re-vegetation of disturbed areas will occur as soon as practicable with local and native species.
- ii. The activity may not use unsuitable material (e.g., trash, debris, car bodies, asphalt). Material used for construction or discharge must be free from toxic pollutants in toxic amounts (see CWA § 307).
- iii. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.
- iv. Heavy equipment working in wetlands or mudflats must be placed on mats.
- v. A stormwater pollution prevention plan (SWPPP), when needed, would be developed to outline appropriate soil erosion and sediment controls to be used and maintained in effective operating conditions during construction.
- vi. All exposed soil and other fills, as well as any work below OHWM or high tide line, will be permanently stabilized at the earliest practicable date. When possible, work within waters of the U.S. (WOTUS) will be performed during periods of low flow or no flow, or during low tides.
- vii. Temporary fills will be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas will be revegetated, as appropriate. Proper seeding of all areas under threat of erosion or unstable soil post-project shall be seeded with appropriate grass seed such as northern tufted hair grass to maintain solid soil stability. Any areas of vegetation will be revegetated to the greater standard among the permit, SWPPP, or EA standards.

Fish Habitat Mitigation Measures

- i. All instream activity below OHWM in the Alagnak River shall be conducted from May 15 to July 15.
- ii. Vehicles and equipment shall not be fueled or serviced below the OHWM in the Alagnak River; and vehicles with fuel, oil, or hydraulic fluid leaks, shall not be operated or moved near the river.
- iii. The ADF&G Habitat Section must be contacted by phone or email at least three days prior to beginning permitted activities.

Mitigation and Commitments Specific to the National Marine Fisheries Service

The Proposed Action will incorporate the following mitigation measures:

- For all reporting that results from implementation of these mitigation measures, NMFS will be contacted using the contact information specified in (Table D-1). In all cases, notification will reference the NMFS consultation tracking number (e.g., AKRO-2024-01522).

Table D-1. Summary of Agency Contact Information for Marine Mammal-Related Incidences

Reason for Contact	Contact Information
Consultation Questions and Unauthorized Take	AKR.prd.section7@noaa.gov and Consultation Biologist (angela.tallman@noaa.gov)
Reports & Data Submittal	AKR.section7@noaa.gov (include NMFS AKROtracking number in subject line)
Stranded, Injured, or Dead Marine Mammal (not related to project activities)	Stranding Hotline (24/7 coverage): 877-925-7773
Oil Spill & Hazardous Materials Response	U.S. Coast Guard National Response Center: 1-800424-8802 and AKRNMFSspillResponse@noaa.gov
Illegal Activities (not related to project activities [e.g., feeding, unauthorized harassment, or disturbance to marine mammals])	NMFS Office of Law Enforcement (AK Hotline): 1-800-853-1964
Notes: AK = Alaska; NOAA = National Oceanic and Atmospheric Administration, NMFS = National Marine Fisheries Service	

General

- i. The project proponent will inform NMFS of impending in-water activities a minimum of one week prior to the onset of those activities (email information to akr.prd.records@noaa.gov).
- ii. If construction activities occur outside of the time window specified in this letter, the applicant will notify NMFS of the situation at least 60 days prior to the end of the specified time window to allow for reinitiation of consultation.
- iii. In-water work will be conducted at the lowest points of the tidal cycle when feasible.
- iv. Consistent with AS 46.06.080, trash will be disposed of in accordance with state law. The project proponent will ensure that all closed loops (e.g., packing straps, rings, bands, etc.) will be cut prior to disposal. In addition, the project proponent will secure all ropes, nets, and other marine mammal entanglement hazards so they cannot enter marine waters

PSO Requirements

- i. At least one PSO will have either prior experience as a PSO in AK or will have taken a NMFS-approved PSO or marine mammal observer training course.
- ii. PSO training will include:
 - a) field identification of marine mammals and marine mammal behavior;
 - b) ecological information on marine mammals and specifics on the ecology and management concerns of those marine mammals;
 - c) ESA and MMPA regulations.
 - d) proper equipment use;
 - e) methodologies in marine mammal observation and data recording and property reporting protocols; and
 - f) an overview of PSO roles and responsibilities.

- iii. PSOs will be individuals independent from the project proponent and must have no other assigned tasks during monitoring periods.
- iv. The action agency or its designated non-federal representative will provide resumes or qualifications of PSO candidates to consultation biologist and akr.prd.records@noaa.gov approval at least one week prior to in-water work. NMFS will provide a brief explanation of lack of approval in instances where an individual is not approved.
- v. PSOs will:
 - a) collectively be able to effectively observe the entirety of the monitoring zone;
 - b) be able to identify marine mammals and accurately record the date, time, and species, of all observed marine mammals in accordance with project protocols;
 - c) be able to identify listed marine mammals that may occur in the action area, at a distance equal to the outer edge of the applicable monitoring zone and determine marine mammal's location and distance from sound source;
 - d) have the ability to effectively communicate orally, by radio or in person, with project personnel to provide real-time information on listed marine mammals;
 - e) possess a copy of mitigation measures; and
 - f) possess data forms.
- vi. PSOs will not scan for marine mammals for more than four hours without at least a one-hour break from monitoring duties between shifts. PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.

PSO Procedures

- vii. PSOs will have the ability, authority, and obligation to order appropriate mitigation response, including monitoring, to avoid takes of listed marine mammals.
- viii. Two PSOs will perform PSO duties onsite throughout the authorized activity.
- ix. Where a team of three or more PSOs are required, a lead observer or monitoring coordinator will be designated.
- x. During cable laying operations, it is unfeasible and unsafe to stop activities, so there are no shut down procedures for this project. However, two PSOs will continuously monitor marine waters within 2,000-m (6,561 ft) of the vessel during all daylight hours, and report sightings to NMFS via monthly reports (cable-laying activities will take place 24 hours/day).
- xi. For each in-water activity, PSOs will monitor all marine waters within the indicated monitoring zone radius for that activity (2,000 m [6,561 ft] for both cable laying and grapnel clearing activities).
- xii. PSOs will be positioned such that they will collectively be able to monitor the entirety of each activity's monitoring zone.
- xiii. Prior to commencing any cable laying or grapnel clearing activity, PSOs will scan waters within the appropriate monitoring zone and confirm no listed marine mammals are within the monitoring zone for at least 30 minutes immediately prior to initiation of the in-water activity. If one or more listed marine mammals are observed within the monitoring zone, the in-water activity will not begin until the listed marine

- mammals exit the monitoring zone of their own accord, or the monitoring zone has remained clear of listed marine mammals for 30 minutes immediately prior to the commencement of the activities.
- xiv. The on-duty PSOs will continuously monitor the monitoring zone and adjacent waters during any of the activities for the presence of listed marine mammals.
 - xv. Cable laying and grapnel clearing will only take place:
 - a) between sunrise and sunset;
 - b) during conditions with a Beaufort Sea State of 4 or less; and
 - c) when the entire monitoring zone and adjacent waters are visible (e.g., monitoring effectiveness is not reduced due to rain, fog, snow, haze, or other environmental/atmospheric conditions).
 - xvi. If visibility degrades such that PSOs can no longer ensure that the monitoring zone remains devoid of listed marine mammals during cable laying or grapnel clearing, the crew will stop activities until the entire monitoring zone is visible and the PSOs has indicated that the zone remained devoid of listed marine mammals for 30 minutes.
 - xvii. The PSOs will order ongoing activities to immediately cease if one or more listed marine mammals has entered, or appears likely to enter, the monitoring zone.
 - xviii. If cable laying or grapnel clearing are shut down for less than 30 minutes due to the presence of listed marine mammals in the monitoring zone, the activities may commence when the PSOs provides assurance that listed marine mammals were observed exiting the monitoring zone. Otherwise, the activities may only commence after the PSO provides assurance that listed marine mammals have not been seen in the monitoring zone for 30 minutes (for cetaceans) or 15 minutes (for pinnipeds).
 - xix. If a listed marine mammal is observed within a monitoring zone or is otherwise harassed, harmed, injured, or disturbed, the PSO will immediately report that occurrence to NMFS.
 - xx. Prior to commencing cable laying or grapnel clearing, or at changes in watch, PSOs will establish a point of contact with the construction crew. The PSO will brief the point of contact as to the monitoring procedures if the PSO observes that listed marine mammals are likely to enter or enter the monitoring zone. If the point of contact goes “off shift” and delegates their duties, the point of contact must inform the PSO and brief the new point of contact.

Grapnel/Underwater Excavating (Plow and Jet) Activities

- xxi. All vessels involved in grapnel clearing and underwater excavating operations, including survey vessels, will transit at velocities ≤ 10 knots.
- xxii. Grapnel and underwater excavating activities will slow the vessel whenever a listed marine mammal enters or appears likely to enter the applicable monitoring zone.
- xxiii. Following a lapse of grapnel and underwater excavating activities of more than 30 minutes, the PSO will authorize resumption of the activity only after the PSO provides assurance that listed marine mammals have not been present within the monitoring zone for at least 30 minutes immediately prior to resuming operations.

Project-Dedicated Vessels (vessel and crew safety should never be compromised)

- xxiv. Vessel operators will:
- a) maintain a watch for marine mammals at all times while underway;
 - b) stay at least 91 m (100 yards) away from listed marine mammals, except that they will remain at least 460 m (500 yards) away from endangered North Pacific right whales;
 - c) travel at less than 5 knots when within 274 m (300 yards) of a whale;
 - d) avoid changes in direction and speed within 274 m (300 yards) of a whale, unless doing so is necessary for maritime safety;
 - e) not position vessel(s) in the path of a whale, and will not cut in front of a whale in a way or at a distance that causes the whale to change direction of travel or behavior (including breathing/surfacing pattern);
 - f) reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 km (1 mi.) or less; and
 - g) adhere to the AK Humpback Whale Approach Regulations when vessels are transiting to and from the project site: (see 50 CFR 216.18, 223.214, and 224.103(b); these regulations apply to all humpback whales). Specifically, the pilot and crew will not:
 - i. approach, by any means, including by interception (i.e., placing a vessel in the path of an oncoming humpback whale, within 91 m (100 yards) of any humpback whale;
 - ii. cause a vessel or other object to approach within 91 m (100 yards) of any humpback whale; or
 - iii. disrupt the normal behavior or prior activity of a humpback whale by any other act or omission.
- xxix. If a whale's course and speed are such that it will likely cross in front of a vessel that is underway, or approach within 91 m (100 yards) of the vessel, and if maritime conditions safely allow, the engine will be put in neutral and the whale will be allowed to pass beyond the vessel, except that vessels will remain 460 m (500 yards) from North Pacific right whales.
- xxx. Vessels will not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear.
- xxxi. Project-specific barges will travel at 12 knots or less.

Vessel Transit, Western DPS Steller Sea Lions, and their Designated Critical Habitat

- xxxii. Vessels will not approach within 5.5 km (3 nautical miles) of rookery sites listed in 50 CFR 224.103(d); and
- xxxiii. Vessels will not approach within 914 m (3,000 feet) of any Steller sea lion haulout or rookery.

Data Collection

PSOs have the following responsibilities for data collection:

- xxxiv. PSOs will record observations on data forms or into electronic data sheets.

- xxxv. The project proponent will ensure that PSO data will be submitted electronically in a format that can be queried such as a spreadsheet or database (i.e., digital images of data sheets are not sufficient).
- xxxvi. PSOs will record the following:
- Project name, date, shift start time, shift stop time, and PSO identifier;
 - date and time of each reportable event (e.g., a listed marine mammal observation, operation modification, reason for operation change (e.g. speed reduction, path change), change in weather conditions);
 - weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state where the Beaufort Wind Force Scale will be used to determine sea state (<https://www.weather.gov/mfl/beaufort>);
 - species, numbers, and, if possible, sex and age class of observed listed marine mammal;
 - the predominant anthropogenic sound-producing activities occurring during each listed marine mammal observation;
 - observations of listed marine mammal behaviors and reactions to anthropogenic sounds and presence;
 - geographic coordinates of initial, closest, and last location of listed species, including distance from observer to the listed species, and minimum distance from the predominant sound-producing activity to listed species; and
 - whether the presence of a listed species necessitated the implementation of mitigation measures to avoid acoustic impact (i.e., speed reduction, avoidance measures), and the duration of time that normal operations were affected by the presence of listed species.

Reporting

Unauthorized Take

- xxxvii. If a listed marine mammal is determined by the PSO to have been disturbed, harassed, harmed, injured, or killed (e.g., a listed marine mammal is observed entering a monitoring zone before operations can be shut down, or is injured or killed as a direct or indirect result of the action), the PSO will report the incident to NMFS within one business day, with information submitted to akr.prd.records@noaa.gov. These PSO records will include:
- digital, queryable documents containing PSO observations and records, and digital, queryable reports;
 - the date, time, and location of each event (provide geographic coordinates);
 - description of the event;
 - number of individuals of each listed marine mammal species affected;
 - the time the animal(s) was first observed or entered the monitoring zone, and, if known, the time the animal was last seen or exited the zone, and the fate of the animal;
 - mitigation measures implemented prior to and after the animal was taken.

- g) if a vessel struck a listed marine mammal, the contact information for the PSO on duty on the vessel or the contact information for the individual piloting the vessel; and
- h) photographs or video footage of the animal(s), if available.

Stranded, Injured, Sick or Dead Listed Species (not associated with the project)

xxxviii. If the PSO observes an injured, sick, or dead marine mammals (i.e., stranded), they will notify the AK Marine Mammal Stranding Hotline at 877-925-7773. The PSOs will submit photos and available data to aid NMFS in determining how to respond to the stranded animal. If possible, data submitted to NMFS in response to stranded marine mammals will include date/time, location of stranded marine mammal, species and number of stranded individuals, description of the stranded marine mammal's condition, event type (e.g., entanglement, dead, floating), and behavior of live-stranded marine mammals.

Incident Reporting Procedures

In the unlikely event of a vessel strike with a marine mammal, the PSO would document the conditions at the time of the incident, including the following:

- Latitude and longitude of the vessel at the incident location.
- Date and time of the incident.
- Speed and bearing of the vessel at the time of the incident.
- Approximate size of the animal (length) and take a photo if possible.
- Condition of the animal (alive, dead, wounded, bleeding, etc.).
- Environmental conditions at the time of the incident, including wind speed and direction, swell height, visibility in miles, percent cloud cover, and presence or absence of precipitation or fog.
- The names of the vessel, vessel operator, vessel owner, and captain or officer in charge of the vessel at the time of the incident.

If a collision takes place, the vessel must stop (if it is safe to do so) and attempt to evaluate the condition of the animal for reporting purposes. All vessel strikes must be reported immediately by telephone communications to National Oceanographic and Atmospheric Administration (NOAA) Fisheries AK Statewide 24-hour Stranding Hotline:

AK Statewide Marine Mammal Stranding Hotline: (877) 925-7773

Vessel operators are not permitted to aid injured marine mammals or recover a carcass unless specifically asked to do so by the Stranding Coordinator.

Illegal Activities

- xxxix. If the PSO observes listed marine mammals or other marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS AK Region Office of Law Enforcement; 1-800-853-1964).
- xl. Data submitted to NMFS will include date/time, location, description of the event, and any photos or videos taken.

North Pacific Right Whales

- xli. All observations of North Pacific right whales will be reported to NMFS within 24 hours. Photographs and/or video should be taken if possible to aid in Photo ID of individual animals. Reports will include all applicable information that will be included in a final report.

Extralimital Sightings

- xlii. All observations of ESA-listed marine mammal species not considered in this consultation will be reported to NMFS within 24 hours. Photographs and/or video should be taken, if possible, to aid in Photo ID of individual animals. Reports will include all applicable information that would be included in a final report.

Final Report

- xliii. A final report will be submitted to NMFS within 90 calendar days of the completion of the project summarizing the data recorded by emailing it to akr.prd.records@noaa.gov. The report will summarize all in-water activities associated with the Proposed Action, and results of PSO monitoring conducted during the in-water activities.
- xliv. The final report for projects will include:
 - a) summaries of monitoring efforts, including dates and times of construction, dates and times of monitoring, dates and times and duration of operation modifications due to listed marine mammal presence;
 - b) dates and times of listed marine mammal observations, geographic coordinates of listed marine mammals at their closest approach to the project site, including date, water depth, species, age/size/gender (if determinable), and group sizes;
 - c) number of listed marine mammals observed (by species) during periods with and without project activities (and other variables that could affect detectability);
 - d) observed listed marine mammal behaviors and movement types versus project activity at the time of observation;
 - e) numbers of marine mammal observations/individuals seen versus project activity at time of observation;
 - f) any photos or videos taken of marine mammals; and
 - g) digital, queryable documents containing PSO observations and records, and digital, queryable reports.

Mitigation and Commitments Specific to the U.S. Fish and Wildlife Service

Quintillion will implement the following BMPs to help avoid and minimize potential effects on ESA listed species:

- i. If Protected Species Observers are employed, they will be informed of and include Steller's eiders and spectacled eiders in their procedures while monitoring the mitigation zone. This includes the vessel crew that are assigned monitoring duties. See the enclosed 'ESA Listed Bird Identification' guide. If there are any incidents involving Steller's eider or spectacled eider, contact the Southern AK Fish and

- Wildlife Field Office as soon as possible. Any observation reports will also be submitted to the office upon project completion.
- ii. Project vessels will down shield lighting to help reduce Steller's eider and spectacled eider collisions.

Commitments Specific to the ADF&G

Quintillion will follow the following stipulations to help avoid and minimize potential effects on anadromous fish-bearing rivers:

1. Alteration of the streambanks of the water body are prohibited. Disturbed shoreline and streambank areas attributable to this project shall be restored to pre-project contours and stabilized to prevent erosion and sedimentation.
2. Equipment shall not be fueled or serviced, and fuel shall not be stored within ordinary high water (OHW) of the waterbodies referenced above. Vehicles leaking fuel, hydraulic fluids or other pollutants shall not be operated within ordinary high water (OHW) of the waterbodies referenced above.
3. Structures or materials shall not be placed into a stream to facilitate crossings. Construction of ice bridges is not authorized by this permit.
4. Winter crossings shall only be completed if ice thickness is sufficient to support the equipment. Open water crossings with equipment and vehicles in winter are not authorized by this permit.
5. The stream crossings shall be made directly from bank-to-bank in a direction substantially perpendicular to the stream flow. Vehicles or equipment shall not be driven upstream or downstream below the OHW mark of the stream.
6. Removal of insulating snow or ice cover over deep-water pool areas supporting overwintering fish is prohibited.

Required Operating Procedures and Stipulations Specific to the Bureau of Land Management

Quintillion will implement the following ROPs and stipulations on BLM-managed lands to help avoid and minimize potential effects:

ROP	Applicable
ROP Veg-1c: In addition to the guidance provided by BLM Manual Section 1745 and Executive Order 13112, site re-vegetation schemes and plans will include the selection of appropriate plant species, seasonal planting considerations, site preparation, planting techniques, temporary site protection methods, monitoring and supplemental actions. Plant species and revegetation planning and procedures that foster a moderate to high likelihood of success as determined by project analysis with consideration of the sensitivities associated with the ecoregion (arctic, sub arctic or coastal environments) will be used. Restoration or rehabilitation of site function and minimization of site impacts will be accomplished with the following priority order and preference for re-vegetation: 1. Foster natural re-vegetation where the site will recover naturally and become fully revegetated with native species within a reasonable period of time (typically 3 – 5 years). This protocol is appropriate where there is little to no risk of erosion, permafrost degradation or the introduction of invasive non-native plants or noxious weeds. 2. When vegetation recovery is not expected to occur naturally, plant or seed as appropriate. 3. Use locally adapted native plant materials when practicable. See restrictions on the use of non-native material in BLM manual section 1745. 4. Seed used on BLM lands in Alaska will be certified “Noxious Weed Free.” Prior to spreading or releasing seed, seed packages will be tested for weed content at official state seed analysis labs, Manual Section 9015 and EO#13112. 5. Seeding or planting should be repeated until re-vegetation is successful and accepted by the authorized officer.	X
Veg-1-e: Operators must prevent and control invasive non-native plant and noxious weed introduction or spread by conducting a pre-disturbance site assessment of the presence of nonnative plants or noxious weeds and by cleaning equipment (removing all mud, dirt, oil grease or other material that could carry seed) prior to moving onto BLM-managed lands.	X
Veg-2d: Where possible use existing roads and trails. In the absence of road or trail access or water or aircraft access, winter is the preferred season of access	X
Veg-2e: Winter trails or ice roads will be located and designed to minimize compaction of soils and the breakage, abrasion, compaction, or displacement of vegetation. Offsets may be required to avoid using the same route or track in subsequent years.	X
Veg-2f: Where possible, ground operations, including heavy equipment overland moves, will occur when frost and snow cover are at sufficient depths to prevent long-term damage to tundra or wetland vegetation and soils. Ground operations will be avoided during spring break up.	X
Veg-3a: All use authorizations involving ground disturbance will include weed prevention stipulations.	X
Water-1a: Projects will be designed to protect water quality and to comply with Federal and State water quality standards.	x
Water-1b: Human use will be managed to achieve and maintain water quality standards and to avoid management problems and water quality impacts. Specific management practices will include public education and construction of toilet facilities where appropriate.	X
Water-1c: All mining operations shall include plans for surface water discharge (Surface Water Pollution Prevention Plans), acid drainage, tailings, and short and long-term containment pond management.	X
Water-1d: With the exception of necessary extraction operations, mining operations and mineral development support facilities and infrastructure, including but not limited to roads, bunkhouses, offices, ore processing facilities and equipment storage and maintenance facilities and other support operations should be sited in upland areas.	N/A

ROP	Applicable
Water-1e: Streams must be diverted around mining operations using appropriately sized bypass channels.	N/A
Water-1f: All process water and ground water seeping into the area of a mining operation must be diverted into settling pond systems for treatment prior to re-entering natural water systems.	N/A
Water-1g: Settling ponds will be cleaned out and maintained at appropriate intervals. Fine sediment captured in settling ponds will be protected from washout.	N/A
Water-1h: Settling ponds must be stabilized and secured prior to seasonal mine closures.	N/A
Water-1i: Overburden should be placed on uplands or on the upland side of mine pits.	N/A
Water-1j: Fuel and other petroleum products and hazardous materials will be stored in containers designed to hold that product. All fuel containers, including barrels, propane tanks, and hazardous material containers shall be marked with the responsible party's name and contact information, product type, and the year filled and purchased.	X
Water-1k: Fueling operations and storage of fuel, chemicals or hazardous materials on the public lands require secondary containment made from a material that is impervious to the chemical stored. Secondary containment must have sufficient free space to contain 150% of the volume of the largest single container stored within the secondary containment.	X
Water-1l: The storage of fuel drums, the establishment of stationary fuel storage facilities, and the storage of hazardous material will not occur within riparian zones (from the ordinary high water mark to the outer edge of riparian vegetation) or 100 feet of a water body whichever is greater nor within 500 feet of the active floodplain of any fish-bearing water body.	X
Water-1m: With the exception of watercraft or aircraft, fueling operations for motorized apparatus will not occur in riparian zones (from the ordinary high water mark to the outer edge of riparian vegetation) or 100 feet of a water body whichever is greater nor within 500 feet of the active floodplain of any fish-bearing water body.	X
Water-1n: With the exception of watercraft or aircraft, there shall be no servicing or repair of vehicles or equipment within riparian zones (from the ordinary high water mark to the outer edge of riparian vegetation) or 100 feet of a water body whichever is greater nor within 500 feet of the active floodplain of any fish-bearing water body.	X
Water-1o: With the exception of watercraft or aircraft, no vehicles or motorized equipment shall be left unattended within the floodplain or below the ordinary high water mark of any river, lake or stream.	X
Water-2a: Projects requiring water withdrawal, diversion or de-watering will be designed to maintain sufficient quantities of surface and contributing ground water to sustain processes that affect fresh water resources, and to support fish, wildlife and other beneficial uses. Water withdrawal, diversion and de-watering regimes are subject to constraints developed through project-specific NEPA analysis.	N/A
Water-3a: Activities in wetlands will comply with Federal and State permit requirements.	X
Water-3b: It is preferred that access and human activity in wetlands occur in the winter months with sufficient snow cover and ground frost to avoid wetland vegetation and soil disturbance. Ground operations in wetlands will be avoided during spring break up.	X
Water-3c: In snow free months, vehicle and equipment use in wetlands should be limited to low ground pressure vehicles and equipment.	X
Water-3d: Avoid motorized vehicle use in road-less or trail-less wetlands.	X
Water-3e: Light vehicle (less than 2,000 lb. GVW) use in wetlands is restricted to established roads and trails in the absence of sufficient snow and frost depth to prevent wetland vegetation or soil damage. Light vehicle (less than 2,000 lb. GVW) use in wetlands, regardless of the presence of established roads and trails, will be avoided during spring break-up.	X
Water-3f: Avoid overland heavy equipment moves through floodplains, riparian zones or wetlands. If alternative routing is not feasible, overland moves of heavy equipment through floodplains, riparian zones or wetlands are subject to constraints developed through project	X

ROP	Applicable
specific NEPA analysis. Overland heavy equipment moves will be avoided during spring breakup.	
Water-3g: Heavy, commercial or exploratory equipment working in wetlands must be placed on mats, or other measures must be taken to mitigate or prevent vegetation and soil disturbance, e.g. ice roads, ice pads, 24 inches of snow cover and 12 inches of ground frost, use of low ground-pressure equipment, etc. Ground operations will be avoided during spring break-up.	X
Water-3h: New structures will be located away from riparian zones or wetlands if the proposed structures conflict with achieving or maintaining riparian zone or wetland function. Existing structures will be used in a way that does not conflict with riparian zone or wetland functions and should be relocated or modified when incompatible.	X
Water-3i: Avoid new road construction or trail development in floodplains, riparian zones or wetlands. Establishment of permanent or semi-permanent access routes in or through floodplains, riparian zones, wetlands or Federal Public Lands is subject to constraints developed through project-specific NEPA analysis and/or application of the provisions of 43 CFR §§ 3802.3-1, 3802.3-2(g), 3802.4-2. Permanent or semi-permanent access routes, regardless of purpose, shall be routed and concentrated to minimize habitat fragmentation.	X
Water-4a: Operations will be conducted in such a manner as not to block any stream or drainage system.	X
Water-4b: Streams altered by channeling or diversion will be restored to a condition that will allow for proper functioning of stream channels, riparian zones, wetlands and watersheds. Active streams will be returned to their natural watercourse or a new channel will be created that approximates the old natural channel in shape, gradient, and meander frequency using a stable channel design. New channels will be designed to enhance the ecological capabilities of the reclaimed site and watershed.	X
Water-4c: Crossing of water courses will be made using a low-angle (perpendicular) approach. Snow and ice bridges will be removed, breached, or slotted before spring break-up. Ramps and bridges will be substantially free of soil and debris.	X
Water-5a Generally, riparian zones (the areas to the outer edges of riparian vegetation) will be maintained as buffer areas between surface disturbing activities and watercourses to protect the integrity of stream banks, regulate light and temperature conditions, and filter sediment. Where riparian zone disturbance is necessary, it will be kept to a minimum and it will be subject to constraints developed through project-specific NEPA analysis. Minimally, NEPA analysis will: • include analysis of the proposed riparian zone disturbance from a holistic watershed perspective with a focus on the hydrological, biological and chemical functions of the watershed's ecosystems and the ecologic processes that affect fresh water resources; • identify the most sensitive areas of the affected watershed and the impacts of the proposed riparian zone disturbance on those areas; and • identify the most vulnerable times of the year for the proposed riparian zone disturbance with regard to fisheries, erosion control, habitat use, etc.	X
Water-5b: Riparian vegetation, if removed during operations, will be re-established. See ROP Veg-1c for guidance.	
Water-5c: Structural and vegetative treatment in floodplains, riparian zones and wetland areas will be compatible with the ecological capability of the site, including the system's hydrologic regime, and will contribute to the maintenance or restoration of natural and proper functioning conditions.	X
Water-5d: New structures will be located away from riparian zones or wetlands if their development conflicts with achieving or maintaining riparian zone or wetland function. Existing structures will be used in a way that does not conflict with riparian zone or wetland functions and should be relocated or modified when incompatible.	X
Water-5e: The establishment of permanent mining operations or oil and gas facilities within the area from the ordinary high water mark or the mean high water mark of water bodies to the outer edge of riparian vegetation or 500 feet, whichever is greater, will be approved only if it can be demonstrated to the satisfaction of the authorized officer that impacts to fish, water quality, and aquatic and riparian habitats will be minimal.	X

ROP	Applicable
Water-6a Development within floodplains will be avoided. The following predevelopment actions are required where there is no practical alternative to floodplain development: • determine whether the proposed development will occur within a floodplain; • consider alternatives to avoid adverse effects and incompatible development in floodplains; • design or modify a development proposal to minimize potential harm to or within a floodplain; • prepare and circulate a public notice containing an explanation of why the development is proposed for location in a floodplain.	X
SS-1a: Within the migratory range of Steller's eiders, habitat in the project area will be assessed prior to commencing activity to determine if eiders are likely to use the area. Consistent with U.S. Fish and Wildlife Service recommendations, the following activities will be prohibited within 650 feet (200 meters) of flocking, molting or staging Steller's eiders: 1) ground level activity (by foot or vehicle) from April 15 through October 1; 2) construction of permanent facilities, placement of fill, or alteration of habitat; and 3) introduction of high noise levels, April 15 through October 1. Activities that may also be restricted include but are not limited to blasting, discharge of firearms, and compressor stations. See ROP FW-3c for recommended aircraft operations.	X
SS-1b: Within the breeding range of Kittlitz's murrelet, habitat in the project area will be assessed prior to commencement of the activity to determine if Kittlitz's murrelet's are likely to use the area for nesting. Where nests are found, ground-level disturbance and activity will be minimized from mid-May to late August.	X
FW-3a: Operations requiring vegetation clearing should avoid migratory bird-nesting areas when birds are present and likely to be nesting/fledging. Approximate dates are: • April 10 to July 15 in forest and woodland habitats; • May 1 to July 15 in open and shrub habitats; May 10 to September 15 in seabird colony habitat; and • April 10 to August 10 in raptor habitat. If no feasible alternative exists, qualified personnel will conduct a preliminary site survey within two weeks of an activity's projected start date to establish species' presence. If present, short-term activities will be delayed until the species have left the habitat. Approval of long term or permanent activities is dependent upon NEPA analysis, the extent and duration of impacts and the ability to devise appropriate mitigation measures. (FWS Advisory: Recommended Time Periods for Avoiding Vegetation Clearing in Alaska in order to Protect Migratory Birds. 2007).	X
FW-3b: Minimize human interference with the Mulchatna, Northern Alaska Peninsula or Nushagak caribou herds during the following critical periods: • Calving aggregations (May 15 to June 15), • Post calving aggregations (June 15 to July 15) or • Insect relief aggregations (June 15 to August 31) If no feasible alternative exists, qualified personnel will conduct a preliminary site survey within the two-week period prior to an activity's projected start date to establish caribou presence. Additionally, the presence of caribou at the time of commencement of a temporary activity will result in the delay of temporary activities until caribou have left the area. Approval of long term or permanent activities is dependent upon NEPA analysis, the extent and duration of impacts, particularly habitat fragmentation and the propensity to displace the animals, and the ability to devise appropriate mitigation measures.	X
FW-3c: Follow Federal Aviation Administration Advisory Circular (AC) No: 91-36D for voluntary practices in wildlife habitat: a. Avoidance of noise-sensitive areas, if practical; is preferable to over flight at relatively low altitudes. b. Pilots operating noise producing aircraft (fixed-wing, rotary-wing and hot air balloons) over noise-sensitive areas should make every effort to fly not less than 2,000 feet above ground level (AGL), weather permitting. For the purpose of this AC, the ground level of noise-sensitive areas is defined to include the highest terrain within 2,000 feet AGL laterally of the route of flight, or the uppermost rim of a canyon or valley. The intent of the 2,000 feet AGL	X

ROP	Applicable
recommendation is to reduce potential interference with wildlife and complaints of noise disturbances caused by low flying aircraft over noise sensitive areas. c. Departure from or arrival to an airport, climb after take-off, and descent for landing should be made so as to avoid prolonged flight at low altitudes near noise-sensitive areas. d. This advisory does not apply where it would conflict with Federal Aviation Regulations, air traffic control clearances or instructions, or where an altitude of less than 2,000 feet AGL is considered necessary by a pilot to operate safely.	
FW-3e: From May 1 through August 31, avoid human intrusion within one-quarter mile of trumpeter swan nests and rearing ponds. If no feasible alternative exists, no activity will commence prior to May 15 and qualified personnel will conduct a preliminary site survey within the two-week period prior to an activity's projected start date to establish trumpeter swan presence. If present, short-term activities will be delayed until after nesting trumpeter swans and cygnets have left the habitat. Approval of long term or permanent activities is dependent upon NEPA analysis, the extent and duration of impacts, particularly the propensity to displace the animals, and the ability to devise appropriate mitigation measures.	X
FW-3f: From April 1 to August 31, human intrusion within 200 meters (656 feet) of bald eagle nests is prohibited absent written approval from the United States Fish and Wildlife Service. See ROP FW-3c regarding aircraft use.	X
FW-4b: Establishment of permanent or semi-permanent ingress and egress into or through Federal Public lands is subject to constraints developed through project specific NEPA analysis and/or application of the provisions of 43 CFR §§ 3802.3-1, 3802.3-2(g), 3802.4-2. Permanent or semi-permanent access routes, regardless of purpose, shall be routed and concentrated to minimize habitat fragmentation.	X
Soils-1a: All organic material will be saved in a separate area from overburden for future use.	X
Soils-1b: All overburden will be stockpiled and saved for respreading over tailings.	N/A
Soils-1c: All overburden piles will be shaped and stabilized to prevent erosion.	X
Soils-1d: Final shape of respread tailing and overburden will approximate the shape of the surrounding terrain.	X
Soils-1e: Disturbed stream banks will be recontoured, revegetated, or other protective measures will be taken to prevent soil erosion into adjacent waters.	X
Soils-1f: At the conclusion of operations, roads, well pads, and other disturbed areas will be recontoured and revegetated as per an approved reclamation plan or Plan of Operations. Revegetation will occur through seeding of native seed or by providing for soil conditions that allow the site to re-vegetate naturally, whichever provides the most effective means of reestablishing ground cover and minimizing erosion. The final land surface will be scarified to provide seed traps and erosion control. See ROP Veg-1c for further revegetation guidance.	X
Soils-1g: Surface disturbing proposals involving construction on slopes greater than 25% will include an approved erosion control strategy, topsoil segregation/restoration plan, be properly surveyed and designed by a certified engineer, approved by the BLM prior to construction and maintenance and require "Notices to Proceed" before engaging in development.	X
Soils-2a: Roadways will be ditched on uphill side and culverts or low water crossings installed at suitable intervals. Spacing of drainage devices and water bars will be dependent on road gradient and soil erosion class.	N/A
Soils-2b: Roads and trails will be sited and designed for minimal disruption of natural drainage patterns.	X
Soils-2c: Roads and trails will be designed to avoid areas with wetland, unstable or fragile soils.	X
Soils-2d: Water bars will be placed across reclaimed roads.	N/A

Invasive Species

An invasive species is defined as a species that is (1) nonnative to the ecosystem under consideration, and (2) whose introduction causes or is likely to cause economic or environmental harm or harm to human health (EO No. 13112, 1999). According to the AK Department of Fish and Game (ADF&G),

“Nonnative species become invasive in a new environment when the natural predators, diseases, or other biological mechanisms that kept the species in check within its former habitat are missing in its new environment. Lacking this biological balance, the invading species effectively changes the biodiversity of a locale. This can often cause millions of dollars in damage to local economies.”

In AK, multiple agencies work together to manage invasive species. These include ADF&G, BLM, NPS, USFWS, and ADNR, among others. Effective management often depends on early detection and rapid response, particularly in Alaska where the short growing season allows invasive species to establish quickly. Species that spread easily, such as dandelions that disperse seeds through air currents, must be addressed at their source before they can spread widely (NPS 2022a). Different agencies and organizations minimize the presence of invasive species according to their goals and capacity and also collaborate to accomplish their tasks.

Table D-2 outlines invasive species that multiple agencies, including the Alaska Exotic Plant Information Clearing House, list online as prioritized to remove. This list is not exhaustive, and species presence depends on local ecosystem characteristics and seasonality. BMPs, such as those discussed in [BLM Alaska Invasive Plant Prevention and Management Policy](#), would be implemented when performing construction activities to reduce the probability of introducing a new invasive species source to an area.

Table D-2. Invasive Species of Priority in Alaska

Common Name	Scientific Name	Agency
Amphibians		
Red-legged frog	<i>Rana aurora</i>	ADF&G
Birds		
European starling	<i>Sturnus vulgaris</i>	ADF&G
Rock dove	<i>Columba livia</i>	ADF&G
Fishes		
Atlantic Salmon	<i>Salmo halls</i>	ADF&G
Northern Pike	<i>Esox Lucius</i>	ADF&G
Fungi		
Chytrid fungus	<i>Batrachochytrium dendrobatidis</i>	ADF&G
Invertebrates		
Carpet sea squirt	<i>Didemnum vexillum</i>	ADF&G
Chinese Mitten Crab	<i>Eriocheir sirensis</i>	ADF&G
European Green Crab	<i>Carcinus maenas</i>	ADF&G
Gypsy Moth	<i>Lymantria dispar</i>	ADF&G

Common Name	Scientific Name	Agency
Invasive Tunicates	<i>Botrylloides violaceus</i> <i>Botryllus schlosseri</i>	ADF&G
New Zealand Mudsails	<i>Potamopyrgus antipodarum</i>	ADF&G
Quagga Mussels	<i>Dreissena bugensis</i>	ADF&G
Zebra mussels	<i>Dreissena polymorpha</i>	ADF&G
Mammals		
Norway Rat	<i>Rattus norvegicus</i>	ADF&G
Plants		
Bird Vetch	<i>Vicia cracca</i>	BLM
Black Bindweed / Wild Buckwheat	<i>Fallopia convolvulus</i> , syn. <i>Polygonum convolvulus</i>	BLM
Bohemian Knotweed	<i>Fallopia X bohemica</i>	BLM
Canada Thistle	<i>Cirsium arvense</i>	BLM
Common Burdock	<i>Arctium minus</i>	BLM
Common Dandelion	<i>Taraxacum officinale</i>	BLM
Common Tansy	<i>Tanacetum vulgare</i>	BLM
Common Mullein	<i>Verbascum Thapsus</i>	BLM
Dalmatian Toadflax	<i>Linaria dalmatica</i>	BLM
Dame's Rocket	<i>Hesperis matronalis</i>	BLM
Elodea - "Canadian waterweed"	<i>Elodea canadensis</i>	NPS
European Bird Cherry	<i>Prunus padus</i>	BLM
Field Bindweed	<i>Convolvulus arvensis</i>	BLM
Giant Knotweed	<i>Fallopia sachalinensis</i>	BLM
Hawkbitt /Fall Dandelion	<i>Leontodon autumnalis</i>	BLM
Hempnettle	<i>Galeopsis sp. z o.o.</i>	BLM
Hoary Alyssum	<i>Berteroa incana</i>	BLM
Japanese Knotweed	<i>Japonic knotweed var. japonica</i>	BLM
Japanese wireweed	<i>Sargassum muticum</i>	ADF&G
Leafy Spurge	<i>Euphorbia esula</i>	BLM
Musk Thistle	<i>Carduus nutans</i>	BLM
Orange Hawkweed	<i>Hieracium aurantiacum</i>	BLM
Oxeye Daisy	<i>Leucanthemum vulgare</i>	BLM
Perennial Sow Thistle	<i>Sonchus arvensis</i>	BLM
Poison Hemlock	<i>Conium maculatum</i>	BLM
Purple Loosetrife	<i>Lythrum salicaria</i>	BLM
Quackgrass	<i>Elymus repens</i>	BLM
Reed Canary Grass	<i>Phalaris arundinacea</i>	BLM
Spotted Knapweed	<i>Centaurea stoebe</i>	BLM
St. Johnswort	<i>Hypericum perforatum</i>	BLM

Common Name	Scientific Name	Agency
Sweetclover, White	<i>Melilotus albus</i> ,	BLM
Sweetclover, Yellow	<i>M. alba</i> ,	BLM
Sweetclover	<i>M. officinalis</i>	BLM
Tall Buttercup	<i>Ranunculus acris</i>	BLM
Tansy Ragwort	<i>Jacobaea vulgaris</i>	BLM
Waterweed	<i>Elodea sp.</i> (aquatic plant)	BLM
White and Yellow Sweet Clover	<i>Melilotus officinalis</i>	NPS
Wild Oats	<i>Fatua Oatmeal</i>	BLM
Yellow (Meadow) Hawkweed	<i>Hieracium caespitosum</i>	BLM
Yellow Toadflax	<i>Linaria vulgaris</i>	BLM
Notes: ADF&G = Alaska Department of Fish and Game; BLM = Bureau of Land Management; NPS = National Park Service Source: ADF&G 2024, NPS 2022a, BLM 2024b		

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Appendix E – Surface Water Crossings Along the Proposed Cable Route

Segment	Waterbody Name	Anadromous	Crossing Width (ft.)	Method	Lat, Long
T-2	Kwiguk Pass	No	16	Anchored	62.80310, -164.77560
T-2	Kwiguk Pass	No	37	Anchored	62.80523, -164.77021
T-2	Kwiguk Pass	No	198	Anchored	62.80605, -164.76705
T-2	Kwiguk Pass	No	50	Anchored	62.80644, -164.76517
T-2	Kwiguk Pass	No	116	Anchored	62.80707, -164.76210
T-2	Kwiguk Pass	No	20	Anchored	62.80786, -164.75828
T-2	Kwiguk Pass	No	32	Anchored	62.80867, -164.75434
T-2	Kwiguk Pass	No	46	Anchored	62.80907, -164.75081
T-2	Kwiguk Pass	No	582	Anchored	62.80949, -164.72849
T-2	Kwiguk Pass	No	125	Anchored	62.80866, -164.72057
T-2	Kwiguk Pass	No	203	Anchored	62.80828, -164.71719
T-2	Kwiguk Pass	No	292	Anchored	62.80788, -164.71374
T-2	Kwiguk Pass	No	177	Anchored	62.79634, -164.63333
T-2	Kwiguk Pass	No	163	Anchored	62.78944, -164.60745
T-3	Leader Creek	Yes	254	Aerial	58.74694, -156.94389
T-4	Pauls Creek	No	6	Anchored	58.73981, -156.80929
T-4	Pauls Creek	No	83	Anchored	58.74313, -156.80244
T-4	Pauls Creek	No	6	Anchored	58.77316, -156.73311
T-4	Pauls Creek	No	6	Anchored	58.78362, -156.70632
T-4	Pauls Creek	No	6	Anchored	58.79218, -156.68578
T-4	Pauls Creek	No	6	Anchored	58.79668, -156.67544
T-4	Pauls Creek	No	185	Anchored	58.80300, -156.66090
T-4	Pauls Creek	No	107	Anchored	58.80571, -156.65468
T-4	Pauls Creek	No	203	Anchored	58.80900, -156.64710
T-4	Pauls Creek	No	1,450	Anchored	58.81938, -156.62453
T-4	Pauls Creek	No	304	Anchored	58.82467, -156.61316
T-4	Pauls Creek	No	967	Anchored	58.88358, -156.46977
T-4	Pauls Creek	No	6	Anchored	58.89277, -156.43310
T-4	Coffee Creek	No	6	Anchored	58.93148, -156.37031
T-4	Coffee Creek	No	22	Anchored	58.96727, -156.33690
T-4	Alagnak River	No	6	Anchored	59.04102, -156.34891
T-4	Alagnak River	No	6	Anchored	59.06887, -156.38695
T-4	Alagnak River	No	11	Anchored	59.08739, -156.43512
T-4	Alagnak River	No	19	Anchored	59.09925, -156.44755
T-4	Alagnak River	Yes	286	Anchored	59.09934, -156.45849

Segment	Waterbody Name	Anadromous	Crossing Width (ft.)	Method	Lat, Long
T-4	Alagnak River	Yes	193	Anchored	59.09938, -156.46036
T-4	Alagnak River	No	35	Anchored	59.09891, -156.46696
T-4	Alagnak River	No	88	Anchored	59.10485, -156.49398
T-4	Kvichak River	No	6	Anchored	59.18744, -156.27226
T-4	Kvichak River	No	10	Anchored	59.20278, -156.20691
T-4	Kvichak River	No	50	Anchored	59.22448, -156.13348
T-4	Kvichak River	No	6	Anchored	59.24206, -156.10586
T-4	Kvichak River	No	435	Anchored	59.25144, -156.10043
T-4	Ole Creek	Yes	27	Anchored	59.26368, -155.99326
T-4	Ole Creek	No	6	Anchored	59.26624, -155.98594
T-4	Pecks Creek	Yes	43	Anchored	59.29177, -155.92887

Appendix F – Cultural Programmatic Agreement

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**PROGRAMMATIC AGREEMENT
BETWEEN THE
NATIONAL TELECOMMUNICATION AND INFORMATION ADMINISTRATION AND
THE ALASKA STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE NOME TO HOMER EXPRESS AND HOOPER BAY BROADBAND PROJECTS**

RECITALS

WHEREAS, the National Telecommunications and Information Administration (“NTIA”), an operating bureau of the U.S. Department of Commerce, is principally responsible for advising the President of the United States on telecommunications and information policy issues and administers grant programs that further the deployment and use of broadband and other technologies in America; and

WHEREAS, established by the Infrastructure Investment and Jobs Act of 2021, NTIA is charged with providing funding to encourage the expansion and extension of middle mile infrastructure to reduce the cost of connecting unserved and underserved areas to the backbone of the internet and to promote broadband connection resiliency through the creation of alternative network connection paths that can be designed to prevent single points of failure on a broadband network through the Enabling Middle Mile Broadband Infrastructure Program (“MM Program”); and

WHEREAS, the NTIA on July 1, 2023, issued a financial assistance award through the MM Program to QSH Parent Holdco LLC (“Quintillion”), an Alaska middle-mile provider, to install a fiber optic network connecting three communities (Emmonak, Naknek, and Igiugig) within Quintillion’s regional network to provide much-needed infrastructure to rural communities, referred to as the Nome to Homer Express Project (“NTHE”); and

WHEREAS, the Rural Utilities Service (“RUS”), an operating unit of the U.S. Department of Agriculture, Rural Development agency, administers grant programs that provide much-needed infrastructure or infrastructure improvements to rural communities, in the areas of water and wastewater, electric power, and telecommunications services, which play a critical role in helping to expand economic opportunities and improve the quality of life for rural residents; and

WHEREAS, established by the Consolidated Appropriations Act, 2018, RUS is charged with providing loans, grants, and loan/grant combinations to facilitate broadband deployment in rural areas that will facilitate the expansion of broadband services and infrastructure and fuel long-term rural economic development through the Rural eConnectivity Program (“ReConnect Program”); and

WHEREAS, the RUS on December 18, 2024, issued a financial assistance award through the ReConnect Program to Quintillion to install a fiber optic network to the Native Village of Hooper Bay, Alaska, referred to as the Hooper Bay Broadband Project; and

WHEREAS, the NTHE and Hooper Bay Broadband Projects are considered connected undertakings because the Hooper Bay Broadband Project has a logical relationship to the NTHE Project as it could not function without the NTHE Project and does not have independent utility; therefore, it is being included in the overall Area of Potential Effects (“APE”); and

WHEREAS, collectively, the NTHE and Hooper Bay Broadband Projects (“Undertaking” or “Project”) consist of installation of approximately 932.79 miles of submarine, buried, and aerial fiber optic cable (“FOC”) in western Alaska, interconnecting existing fiber telecommunication networks in Nome, Alaska with competitive fiber networks in Igiugig, Alaska, as depicted on the map in **Attachment A** and described in **Attachment B**; and

WHEREAS, NTIA and RUS have determined that the obligation of federal financial assistance would make this Undertaking subject to review under Section 106 of the National Historic Preservation Act (“NHPA”), as codified at 54 USC 306108, and NTIA and RUS have determined that the Undertaking has the potential to affect historic properties per 36 CFR § 800.5(a)(1); and

WHEREAS, the Signatories and Invited Signatories agree that NTIA is the lead agency responsible for administering the PA pursuant to 36 CFR § 800.2(a)(2); and

WHEREAS, the NTIA has consulted with the Alaska State Historic Preservation Office (“SHPO”) pursuant to its responsibilities under Section 106 of the NHPA and its implementing regulations at 36 CFR § 800 and notified the SHPO that it will act as lead federal agency pursuant to 36 CFR § 800.2(a)(2); and

WHEREAS, Quintillion has applied for a federal right-of-way (“ROW”) grant and associated permits from the Bureau of Land Management (“BLM”), an operating bureau within the U.S. Department of the Interior, through lands BLM manages to the north and south of the Alagnak River corridor; and

WHEREAS, to complete the Undertaking, Quintillion is seeking an authorization from the U.S. Army Corps of Engineers (“USACE”), a military engineering branch of the U.S. Department of Defense, U.S. Army, under Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act; and

WHEREAS, the NTIA has invited the RUS, BLM, and USACE to participate as Invited Signatories¹ in the PA pursuant to 36 CFR § 800.6(c)(2)(i); and

WHEREAS, in accordance with 36 CFR § 800.3(a), NTIA, in consultation with the SHPO, RUS, BLM, and USACE, established the Undertaking’s Area of Potential Effects (“APE”) for direct and indirect effects and terrestrial and submarine construction activities as described in **Stipulation IV**; and

WHEREAS, in a January 17, 2024, delegation memo, NTIA authorized Internet for All award recipients, including MM Program awardees, to gather information to identify and evaluate historic properties and to work with stakeholders to assess effects consistent with 36 CFR § 800.2(c)(4); and

WHEREAS, the NTIA is phasing identification and evaluation of historic properties, and application of the criteria of adverse effect in accordance with 36 CFR §§ 800.4(b)(2) and 800.5(a)(3), respectively because the remote and rural location of the Undertaking has resulted in incomplete information² regarding the nature, location, distribution, and horizontal and vertical extent of cultural resources within the APE of the Undertaking; and

WHEREAS, the NTIA has completed desktop assessment and consultation efforts to ascertain the potential for various areas of the APE to contain historic properties and to gain consensus on how adverse impacts can be avoided or minimized on eligible or National Register of Historic Places (“NRHP”)-listed sites within the APE (**Attachment C**); and

WHEREAS, NTIA has developed a Cultural Resources Management Plan (“CRMP”) identifying measures to avoid, minimize, or mitigate potential adverse effects on known and unknown historic properties that Quintillion will follow in implementing the Undertaking (**Attachment C**); and

WHEREAS, in accordance with 36 CFR § 800.14(b)(1)(ii), the NTIA has determined that execution of this PA is appropriate because effects on historic properties cannot be fully determined prior to approval of this Undertaking; and

WHEREAS, the SHPO has participated in the development of this PA pursuant to 36 CFR § 800.14(b) and is a Signatory to this PA; and

¹ A *Signatory* is a party that has formally executed the PA, giving it a legally binding authority to amend or terminate it. An *Invited Signatory* is a party invited by the lead agency to sign, also gaining the power to amend or terminate the PA. A *Concurring Party* has participated in the consultation, agrees with the PA's outcome, and is invited to concur with it, but does not have the inherent authority to amend or terminate the agreement.

² At the time of execution, the Alaska Heritage Resources Survey (“AHRS”) database lists 10 cultural resources located within the APE, including five contributing, eligible, or listed on the NRHP, two determined not eligible, and three unevaluated resources.

WHEREAS, NTIA notified the Advisory Council on Historic Preservation (“ACHP”) on March 7, 2025, regarding the development of this PA, and the ACHP declined to participate on June 2, 2025; and

WHEREAS, the NTIA has invited Quintillion to be an Invited Signatory to this PA pursuant to 36 CFR § 800.6(c)(2)(iii) and Quintillion has elected to participate and agreed to carry out the stipulations in this PA; and

WHEREAS, NTIA recognizes that the Federal Government has a unique legal relationship with Tribes set forth in the U.S. Constitution, and that the implementing regulations require NTIA to consult with Tribes so that they may identify concerns about historic properties, advise on the identification and evaluation of historic properties of traditional religious, spiritual, or cultural importance, articulate their views on the Undertaking’s effects on such properties, and to participate in the resolution of adverse effects, pursuant to 36 CFR § 800.2(c)(3)(ii); and

WHEREAS, NTIA has made a good faith effort to consult with Tribes³ and has invited Tribal participation in the development of this PA pursuant to 36 CFR § 800.2(c)(2)(ii)(A) (**Attachment D and E**); and

WHEREAS, NTIA has made a good faith effort to consult with local governments and other interested parties to participate in the development of this PA pursuant to 36 CFR § 800.2(c)(2-5) and 36 CFR § 800.2(c)(5) (**Attachment D and E**); and

WHEREAS, NTIA and Quintillion have contacted 30 state and federal agencies, federally recognized tribes, Alaska Native Claims Settlement Act Corporations and non-profit tribal corporations, and city and borough governments to consult about the Undertaking, and those organization names and their responses are listed in **Attachments D and E**; and

WHEREAS, the NTIA has invited various organizations to participate as Concurring Parties in the PA, pursuant to 36 CFR § 800.6(a)(2), and the Bristol Bay Native Corporation, Calista Corporation, City of Emmonak, City of Hooper Bay, Emmonak Corporation, Igiugig Village Council, and the Native Village of Hooper Bay have elected to participate; and

WHEREAS, NTIA has made a good faith effort to consult with the public to participate in the Section 106 of the NHPA process pursuant to 36 CFR § 800.2(d). Per 36 CFR § 800.2(d)(4), NTIA used the National Environmental Policy Act (“NEPA”) public review and comment process as its opportunity to notify and consult with the public under NHPA. The Draft Environmental Assessment included information obtained from the Section 106 of NHPA consultation process

³ Throughout this document, the term “Tribe” or “Tribes” is consistent with the definition found at 36 CFR § 800.16(m) and refers to a tribe, band, nation, or other organized group or community, including a native village, regional corporation, or village corporation, formed pursuant to Section 3 of the Alaska Native Claims Settlement Act (“ANCSA”) (43 USC 1602).

and discussed the affected environment, potential effects, and the PA process that will be used to conclude the Section 106 of NHPA process for the Undertaking; and

WHEREAS, the University of Alaska Museum of the North (“UAMN”) is the designated repository for materials collected during the Undertaking; however, landowners or land managers may choose to curate these materials in an alternative repository; and

NOW THEREFORE, the NTIA and SHPO agree that the Undertaking shall be implemented in accordance with the following stipulations to take into account the Undertaking's potential effects on historic properties and to comply with Section 106 of the NHPA.

STIPULATIONS

The following stipulations shall apply to all measures stipulated in this PA. The NTIA shall ensure that the following stipulations are carried out according to the provisions set forth herein:

I. ROLES AND RESPONSIBILITIES

- A. Signatories and Invited Signatories have legally binding authority to amend or terminate the PA.
- B. NTIA, as the federal agency providing financial assistance for the Undertaking through the MM Program, retains the following responsibilities:
 - i. *Legal Responsibility*. NTIA retains legal responsibility for all Section 106 findings and determinations under NHPA and its implementing regulations (36 CFR Part 800) for the Undertaking.
 - ii. *Government-to-Government Consultation*. NTIA will conduct all requested government-to-government consultations with Tribes for the Undertaking in accordance with 36 CFR § 800.2(c)(2)(ii) and other applicable authorities.
 - iii. *Participation in the Section 106 Process*. NTIA will lead consultation with Consulting Parties for matters concerning:
 - a. the APE;
 - b. identification and evaluation of historic properties;
 - c. reporting and determination of effects to historic properties;
 - d. resolution of adverse effect to historic properties; and
 - e. post-review discoveries.
 - iv. *Dispute Resolution*. If there are disputes or differences of opinion between any Parties to this PA that cannot be resolved, NTIA will follow the process discussed in **Stipulation XII**.
 - v. *Oversight*. NTIA will ensure the PA’s stipulations are carried out according to the provisions set forth herein and included as a binding provision of Quintillion’s funding.

- C. Quintillion, as a financial assistance award recipient proposing the Undertaking, is responsible for the following:
- i. This PA and all its requirements are binding on Quintillion, and its successors, heirs, and assigns. Quintillion shall include a provision requiring compliance with the PA in any contract of sale or transfer of ownership or management of the Project.
 - ii. Quintillion shall be responsible for funding and implementing, either directly or through qualified consultants or contractors, the work to ensure compliance with the terms of this PA. This work will be completed on behalf of and at the direction of NTIA.
 - iii. Quintillion shall ensure that any persons conducting or supervising cultural resources work on their behalf hold all appropriate federal and/or state permits and/or authorizations for that work and meet **Stipulation III**.
 - iv. Quintillion shall notify NTIA if material changes to the Project scope or design are contemplated that may alter the APE, have the potential to affect historic properties, or change the effects determinations of historic properties.
 - v. Quintillion will not retain sensitive information that the Consulting Parties authorize them to collect beyond the time needed to complete compliance with the terms of the PA. Sensitive information may include, but is not limited to, information about archaeological resources, sacred objects, features, artifacts, items of cultural patrimony, landscapes, locations, or other types of information that have been determined by the Consulting Parties to be confidential and not for public disclosure.
- D. SHPO, as the state agency responsible for reflecting the interests of Alaska and its citizens in the preservation of their cultural heritage, is responsible for the following:
- i. SHPO shall advise and assist NTIA and the other Parties in carrying out their Section 106 responsibilities and cooperate to ensure that historic properties are taken into consideration at all levels of Project development and PA execution.
 - ii. SHPO shall review, provide comment, and concur or not concur on the APE, survey methodologies, eligibility determinations and effects findings, resolutions of adverse effect, and post-review discoveries.
 - iii. SHPO will receive all technical reports and will retain location information about all cultural resources and historic properties, including properties of religious, spiritual, or cultural significance to Tribes identified during the Undertaking. This approach is consistent with its mission to identify and maintain inventories of cultural resources and historic properties (Section 101 of the NHPA [54 USC 302301] and Alaska Statutes (AS) 41.35.070(a)).
 - iv. SHPO will be included as a point of contact in any Inadvertent Discovery of Cultural Resources Plan, as described in **Stipulation X**.

- E. RUS, BLM, and USACE, with funding, land management, and/or other permitting authorities, as Invited Signatories, shall:
 - i. Review components of the APE subject to their permitting authority as described in the attached APE map and under the provisions set forth in **Stipulation IV**.
 - ii. Review, provide comment, and concur or not concur on survey methodologies, eligibility determinations and effects findings, resolutions of adverse effect, and post-review discoveries on federally managed lands, subject to their permitting authority, and/or otherwise under their jurisdiction.
 - iii. Be included as a point of contact in any Inadvertent Discovery of Cultural Resources Plan instances covering jurisdictional land, as described in **Stipulation X**.
- F. Concurring Parties shall participate in the consultation, have agreed with the PA's outcome, and have been invited to concur with it, but do not have the inherent authority to amend or terminate the agreement.

II. ADMINISTRATIVE STIPULATIONS

- A. The terms of this PA shall apply to the Undertaking, including any future design and APE changes not specified in the current permits, permit applications, or other Project documents.
 - i. Quintillion will be responsible for submitting any subsequent Project design changes that expand or reconfigure the APE or may involve effects on historic properties modifications for review.
 - ii. Quintillion, in consultation with all other Signatories and Invited Signatories, may reevaluate the APE annually, should additional or new information on the Undertaking become available based on engineering design changes, revised information regarding environmental impacts, or other reasons deemed appropriate.
 - iii. Significant Project design changes which result in changes to the APE, or additional potential for effects to historic properties, will require an amendment to this PA (**Stipulation XIV**).
- B. The terms of this PA may be applied to any branch lines extended from the main FOC to additional communities not originally part of the Undertaking consistent with **Stipulation XIV** and provided that the PA has not expired.
- C. All references to “days” in this PA shall refer to calendar days, unless specifically identified as “business days.”
- D. Although NTIA is the lead federal agency, it is understood that while this PA makes reference to NTIA making final decisions, these decisions will be made in consultation with all other Signatories to this PA.
- E. Signatories, Invited Signatories, and, to the extent applicable, Concurring Parties shall enforce the terms of this PA within each agency’s scope and shall incorporate this PA and its terms into any decision document, permit, or authorization they issue. Each

agency shall notify the others within 5 days of identifying an instance of possible non-compliance with the terms and conditions of this PA or permit conditions as they relate to this PA. In such cases, NTIA, as the lead federal agency, will consult with the Parties to this PA, as needed to ensure that compliance is consistent with legal authorities.

- F. All Signatories recognize that certain information about historic properties and archaeological resources is protected from public disclosure under NHPA (54 USC 307103), the Archaeological Resources Protection Act (ARPA; 43 CFR § 7.18), and Alaska state law (as required by Public Law 96-95, AS 40.25.120(a)(4), and Policy and Procedure No. 50200). NTIA and SHPO shall ensure that all actions and documentation prescribed by this PA are consistent with the non-disclosure requirements of these laws to the extent of their authority.
- G. Any of the Signatories may seek qualified independent expert consultation, through a third-party consultant, in order to fulfill the responsibilities under this PA, provided that the consultant meets requirements listed below in **Stipulation III**.
- H. All Signatories to the PA shall provide contact information for this PA to NTIA. It is the responsibility of each of the Signatories to immediately notify NTIA of any change in name, mailing address, email address, or phone number for any Signatory. Once received, NTIA will forward this information to all Signatories by email or mail within 5 business days and will update the PA record of current contact names, organizations, and email addresses for all Signatories.
- I. Email shall be an acceptable form of communication between the Parties to this PA and is an appropriate method of “notification” or “in writing” where it is called for in this PA, unless otherwise described. If a Signatory or Tribe does not have access to email or consistently available internet service, then NTIA will ensure that other forms of communication are pursued.
- J. At any time prior to the end of any review period or submittal date associated with this PA, Signatories and Invited Signatories may request additional time for review of documentation, preparation of guidance documents or submittals, or any other time-sensitive materials outlined in this PA by submitting their request in writing to NTIA. NTIA will consider the request and notify the reviewing Parties of its decision to grant an extension at the earliest practicable time or within 5 days of its decision.
- K. If a Party does not provide written comments regarding a PA-related task or action within the designated time period, NTIA may determine a final decision on the action and proceed accordingly.
- L. At any time throughout the life of the PA, any outside entity not initially part of this PA, may contact NTIA and request to become an Invited Signatory or Concurring Party. NTIA will consider any such request and notify the Parties to this PA of the request. NTIA will consult the Parties to this PA, and NTIA will make a final decision. A new Party signing the PA will not require an amendment to the document, unless they are an Invited Signatory with amendment and termination abilities. Parties added under

this stipulation will be included in any and all distributions of reports, notices, or other communications outlined in this PA.

- M. In the event that another federal agency, not initially a Party to this PA, receives an application for funding/license/permit for the Undertaking as described in this PA, that agency may fulfill its Section 106 responsibilities by stating in writing that it concurs with the terms of this PA and notifying NTIA that it intends to do so. Such a declaration shall be evidenced by execution of a Signature Page, which would be filed with the ACHP, and implementation of the terms of this PA. In the event another federal agency becomes a Party to this PA, NTIA may delegate distribution responsibilities of reports, notices, or other activities outlined in this PA to that agency upon completing an amendment to this PA.
- N. The Signatories may execute this PA in counterparts, with a separate page for each Signatory. NTIA will distribute a complete final copy to all Parties once the PA is signed by all Parties.
- O. For purposes of this PA, facsimile and electronic signatures of authorized representatives of any Parties to this PA, including such signatures in counterparts, are acceptable.
- P. Names and contact information for each Party to this PA are referenced in **Attachment F**.
- Q. Terms used are defined, as necessary, within the PA. All other terms not defined have the same meaning as set forth in ACHP's regulations at 36 CFR § 800.16, Section 301 of the NHPA.

III. STANDARDS AND REPORTING

- A. NTIA shall ensure that all work carried out pursuant to this PA meets the Secretary of the Interior's ("SOI") Standards and Guidelines for Archaeology and Historic Preservation (48 Federal Register ["FR"] 44716, September 29, 1983).
- B. NTIA shall ensure that all work carried out pursuant to this PA shall be done by or under the direct supervision of professionals who meet the SOI Professional Qualifications Standards for Historic Preservation (62 FR 33708, June 20, 1997). NTIA shall ensure that any persons conducting or supervising cultural resources work on their behalf hold all appropriate federal or state permits and authorizations for that work, and access to lands.
- C. Native American traditional knowledge is to be considered expert opinion. It is the knowledge, philosophies, beliefs, traditions, skills, and practices that are developed, embedded, and often safeguarded by or confidential to individual Native Americans, Indian Tribes, or the Alaska Native organizations. Tribes are invited to participate in and contribute to the identification, documentation, and reporting of historic properties, including but not limited to properties of religious, spiritual, or cultural significance to Tribes.

- D. All cultural resources documentation, including field documentation, site evaluation, identification and evaluation reports, data recovery reports, archaeological monitoring reports, treatment plans, and any other associated documentation, shall conform to the standards outlined in 36 CFR § 800.11, be consistent with the SOI Standards and Guidelines for Archaeology and Historic Preservation, and also meet current professional State standards (Office of History and Archaeology Standards and Guidelines for Investigating and Reporting Archaeological and Historic Properties in Alaska (Historic Preservation Series #11 [2023])).
- E. Pursuant to 36 CFR 800.4(c), National Register determinations of eligibility and any formal National Register nominations to the NPS shall follow the SOI Standards and Guidelines for Evaluation of Historic Properties/National Register criteria (36 CFR § 63) and NPS Bulletin 16A, *How to Complete the National Register Registration Form*, respectively.
- F. NTIA will protect information about historic properties to the extent allowed by Section 304 of the NHPA (54 USC 470), 36 CFR § 800.11(c), and other applicable laws and regulations. Section 304 requires consultation with the ACHP and the Keeper of the NRHP. Under the provisions of ARPA (54 USC 470hh) and the NHPA, site location information is restricted in distribution, disclosure of such information may be exempt from requests under federal and state freedom of information laws. NTIA is responsible for returning information to Tribes and for determining acceptable methods of information distribution.

IV. AREA OF POTENTIAL EFFECTS

- A. The NTIA, in consultation with RUS, SHPO, BLM, USACE, Quintillion, and other Consulting Parties, has determined the APE based on direct and indirect effects⁴. The APE will apply to all areas that may be affected by the Undertaking. Although an overview of the Undertaking is depicted on the map in **Attachment A**, detailed maps of the APE are provided in **Appendix i of the CRMP (Attachment C)**.
 - i. Direct Effects APE
 - a. The APE for direct effects from the terrestrial installation of the fiber optic cable (“FOC”) is 100 feet in width, 50 feet from either side of the FOC centerline.

⁴ As stated in **Stipulation IV.A.ii.a**, some construction activities do not have the potential for an expanded indirect effects APE outside the direct effects APE. In turn, some types of historic properties may be more or less affected by certain types of construction activities (*i.e.*, archaeological versus architectural). Thus, “effects” are based on causation rather than physicality, and the type of effect is neither more or less important as to the effect it creates to a historic property. Therefore, within this PA, the terms direct and indirect refer to the type of effect as all must be considered and would be the result of the Undertaking. Here, direct effects means physical and indirect effects means visual, audible, and atmospheric.

- b. The APE for direct effects associated with project areas that are outside the project corridor, such as staging areas or any other areas that have the potential for ground disturbance, is the project area footprint plus 50 feet.
 - c. The APE for direct effects from the submarine installation of the FOC is 820 feet in width, 410 feet from either side of the FOC centerline.⁵
- ii. Indirect Effects APE
 - a. Some construction activities do not have the potential for an expanded indirect effects APE outside the direct effects APE. These include all types of buried cable, surface lay, and submarine cable. For these construction activities, the indirect effects APE will be the same as the direct effects APE.
 - b. The APE for indirect effects considers visual, audible, and atmospheric elements that could diminish the integrity of cultural resources for which setting, feeling, and/or association are qualifying characteristics of NRHP eligibility. Project components with the potential to have indirect effects outside the direct effects APE, such as newly constructed aerial FOC, will use the indirect effects APE, which is 200-feet in width, 100 feet from either side of the FOC centerline, in urban settings, and which is 400-feet in width, 200 feet from either side of the FOC centerline, in rural settings.
 - c. Where the APE for visual, audible, or atmospheric effects includes historic properties for which setting, feeling, and/or association contributes to eligibility, especially traditional cultural properties (“TCP”) or properties of traditional religious and cultural importance, additional analysis may be required, and the APE may be modified according to **Stipulation IV.A.iii** below.
- iii. Modifying the APE
 - a. Quintillion will be responsible for submitting any subsequent Project design changes that expand or reconfigure the APE or may involve effects on historic properties modifications for review.
 - b. Quintillion, in consultation with the Parties to this PA, may reevaluate the APE annually, should additional or new information on the Undertaking become available based on engineering design changes, revised information regarding environmental impacts, or other reasons deemed appropriate.
 - c. NTIA may modify the APE at the request of Quintillion or any Consulting Party who provides written justification. The NTIA will forward the modification proposal to all Consulting Parties and consult with them for fifteen (15) days. If all Parties cannot agree to the proposal, then the NTIA will follow the dispute resolution procedures in **Stipulation XII**. Due to this

⁵ This atypical width is due to the conversion from meters to feet used by the nautical industry (*i.e.*, 250 meters equals 820 feet).

review process, the agreement to modify the APE will not require amendment of this PA.

V. IDENTIFICATION AND EVALUATION OF HISTORIC PROPERTIES

- A. Due to the timing of the commencement of Section 106 consultation and the availability of resources to conduct survey, NTIA has determined that it is not possible to conduct standard identification and evaluation surveys within the Undertaking's APE prior to overall Undertaking permitting and approvals.
- B. The cultural resources desktop assessments of the terrestrial portion of the Undertaking identified cultural resources and historic properties throughout the study area and within the APE.⁶ Due to the nature of FOC construction and flexibility in rerouting, adverse effects to cultural resources are expected to be avoided; however, construction and construction-related activities have the ability to affect historic properties. Therefore, various cultural resources survey methods have been proposed for the Undertaking depending on the construction activities' potential to cause ground disturbance as discussed below and in the CRMP (**Attachment C**).
- C. The cultural resources desktop assessment of the submarine portion of the Undertaking did not identify any shipwrecks or other notable cultural resources within the APE. Quintillion will collect remote sensing data when performing subsea cable-laying and plowing operations. Any identified obstacles, whether natural or cultural, identified from the data will be avoided by adjusting the FOC burial location to provide adequate separation between the cable and obstacle. This cable lay protocol protects the buried FOC as well as avoids any potential cultural resources (**Attachment C**).
- D. A predictive model was not conducted in the CRMP based on a lack of high-quality aerial photography for the APE. Likewise, complete construction methodology information was not available at the time of the CRMP due to timing of detailed engineering and routing. Instead, the Undertaking's proposed construction activities were ranked based on the ability to affect historic properties. The four categories used include: no potential, low potential, medium potential, and high potential. In turn, these four categories were then paired with an appropriate level of cultural resources survey method. These range from no potential areas that would not require survey and allow for construction activities under the Undertaking's inadvertent discovery plan, to high potential areas that would require pedestrian survey and/or subsurface testing at the discretion of an SOI-qualified archaeologist, given its location and accessibility for survey. For instance, if the Undertaking is proposed for standard burial in undisturbed ground (i.e., high potential area), but the location is in a wetland, the SOI-qualified archaeologist can make the determination that Phase I survey is not possible in this location. Details of the cultural resources survey requirements for each of these categories and survey methods are outlined in the CRMP (**Attachment C**).

⁶ The study area for the desktop assessments was a one-mile-wide corridor, centered on the FOC alignment.

- E. As explained in the CRMP, standard cultural resource survey methods will be required for the terrestrial portion of Undertaking, except in the areas where alternate methods have been approved. Through consultation with the Consulting Parties, it was determined that alternative cultural resource methods (*i.e.*, operating under the Undertaking's Inadvertent Discovery of Cultural Resources Plan or post-construction survey) are appropriate for specific activities/areas in T-1 Nome, T-2 Emmonak, T-3 Naknek, and T-7 Hooper Bay (**Section 8.2 of the CRMP; Attachment C**). All other Project areas or construction activities, including the segment on BLM lands, are subject to summer survey once field conditions allow for standard survey methods to be performed as specified in **Section 8.1 of the CRMP (Attachment C)**. Details of the cultural resources survey requirements for each of these activities/areas are outlined in the CRMP (**Attachment C**).
- F. Quintillion will follow recommendations from the CRMP (**Attachment C**) for the Undertaking regarding areas to be surveyed, survey types, and survey methodologies.
- G. Quintillion will retain SOI-qualified consultants to conduct archaeological surveys and testing within the areas identified in the CRMP prior to initiation of ground disturbing activities during that phase of the Undertaking. Fieldwork will be guided by the protocols and procedures outlined in the attached CRMP (**Attachment C**).
- H. Portions of the APE may be surveyed in a phased approach depending on the type of construction proposed, recommendations from the CRMP (**Attachment C**), and the availability of appropriate field conditions.
- I. Determination of archaeological site boundaries within the direct APE is required. Identified cultural resources exceeding the direct APE that are either linear or extremely large, must be inventoried and recorded to the same extent as those sites that are fully within the direct APE. However, given the potential for extremely large sites, Quintillion shall record such resources up to 100 feet beyond the boundary of the direct APE, provided access is authorized, or to the boundary of the resource beyond the direct APE, whichever is closer.
- J. For every cultural resource within the direct APE, Quintillion, through their SOI-qualified professional, will provide recommendations for NRHP eligibility and effect to NTIA, SHPO, and the land managing agency, as applicable, pursuant to 36 CFR 800.4(c)(I), following National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluation*. Once reviewed by NTIA, SHPO, and the land managing agency, as applicable, NTIA will distribute to the other Consulting Parties as discussed in **Stipulation VI**.
- K. Recommendations for eligibility will be completed for those potential historic properties located within the indirect APE that, in the opinion of the SOI-qualified consultant may be affected by the proposed undertaking. DOEs will not be completed for cultural resources located within the indirect APE that will not be affected by the

- Undertaking. The recommendations of the SOI-qualified consultant will be subject to review by NTIA, SHPO, and the land managing agency, as appropriate.
- L. A “treat-as-eligible” approach may be used for certain sites, if it can reasonably be determined, due to the nature of the work, that an adverse effect is unlikely. The reasoning for this approach shall be clearly documented in the cultural resources report submittal.
 - M. If, after execution of this PA, Quintillion refines the alignment of the FOC outside of the APE, Quintillion will retain a SOI-qualified consultant to conduct a desktop review of the new alignment changes and consult with NTIA, SHPO, and the land managing agency, as appropriate, to determine if a field survey is warranted or whether no further work is needed. The Parties will have fifteen (15) days to respond and make recommendations. Based on this consultation, field survey, evaluation, finding of effect, and resolution of adverse effect will be conducted in the same ways described in **Stipulations V through VII**.

VI. REPORTING AND DETERMINATION OF EFFECTS TO HISTORIC PROPERTIES

- A. Portions of the APE may be surveyed and reported on in a phased approach depending on the type of construction proposed, recommendations from the CRMP (**Attachment C**), and the availability of appropriate field conditions.
- B. Reporting will be guided by the protocols and procedures outlined **Stipulation III** and in the CRMP (**Attachment C**). The cultural resource survey report(s) will include: relevant background information and historic context, research design and methodology, results of survey, recommendations for determinations of eligibility, discussion of effect, recommendations of effect, supporting photographic documentation, and maps. Reports shall be accompanied by new and/or updated copies of site forms for all sites within the direct APE. Reports will also be accompanied with GIS shapefiles of the direct and indirect APE, areas surveyed, areas excluded from survey, and newly recorded and previously recorded sites with the APEs with site boundaries for newly recorded sites and previously recorded sites with updated boundaries, as appropriate.
- C. Quintillion will submit the draft report and copies of all site forms to NTIA and the land managing agency, as appropriate, for a fifteen (15) day review. Once the federal agencies approve the report, NTIA will distribute the report by means of a "findings letter" to the SHPO and all Parties. All Parties will have thirty (30) days to review, regardless of the type of finding. Any lack of response will be considered concurrence with NRHP eligibility evaluations, effects recommendations, and management determinations.
 - i. If the SHPO concurs that the proposed activities would result in a finding of no effect or no adverse effect to historic properties, the proposed activities may

proceed, upon written authorization from NTIA, without further cultural resources work, unless monitoring as outlined in **Stipulation VIII** is a condition of the finding.

- ii. If the SHPO concurs that the proposed activities would have adverse effects to historic properties, consultation between NTIA, SHPO, and other applicable Consulting Parties will be undertaken to identify the appropriate mitigation as specified at **Stipulation VII**.
- D. Once all Parties have concurred on the findings and determinations, as required and applicable, NTIA will distribute a “Section 106 Conclusion Memo” to all Consulting Parties.
- E. Construction will not commence on a phase of the Undertaking until the expiration of the review period, and written notice that the requirements have been met for the purposes of Section 106 from NTIA, or a Notice to Proceed (“NTP”) from the relevant land managing agency, as appropriate (**Stipulation IX**).

VII. RESOLUTION OF ADVERSE EFFECTS

- A. To the extent practicable, Quintillion will develop or modify Undertaking design and construction methods to avoid historic properties. In the event that NTIA, in consultation with SHPO and the land managing agency, as appropriate, determines that an adverse effect may or will occur and cannot be adequately minimized or avoided through other measures, Quintillion and their cultural resource consultant will develop a proposed written treatment plan within 15 days of adverse effect notification by NTIA.
- B. Unless Quintillion is directed otherwise through consultation with NTIA, SHPO, and the applicable land managing agency, Quintillion will propose one of the four standard mitigation actions listed below:
 - i. Direct adverse effect to an archaeological site
 - a. Data recovery with research design, artifact analysis, artifact curation, and production of a professional report (generally associated with properties eligible under Criterion D).
 - ii. Direct adverse effect to a historic built environment
 - a. Historic American Building Survey/Historic American Engineering Record/Historic American Landscape Survey documentation or rehabilitation and reporting as defined by the Secretary of Interior's Guidelines for Architectural and Engineering Documentation (as amended) (generally associated with properties eligible under Criterion C).
 - iii. Indirect adverse effect to a historic built environment
 - a. Document the building(s) and viewshed(s) photographically before construction. Collect and curate historic photographs of the building(s). Produce a professional product presenting this information within its

appropriate historic context. The product of this mitigation should be directed toward the public good and community oriented (generally associated with properties eligible under Criterion A or B).

- iv. Indirect adverse effect to a historic district or landscape
 - a. Document the historic district or landscape photographically before construction. Collect and curate historic photographs of the historic district or landscape. Produce a professional product presenting this information within its appropriate historic context. The product of this mitigation should be directed toward the public good and community oriented (generally associated with properties eligible under Criterion A or B).
 - b. Review and collect relevant oral history interviews, place names studies, GIS mapping, development of media, archival searches, and report preparation and publication (generally associated with properties eligible under Criterion A or B).
- C. In addition to a standard mitigation, NTIA, SHPO, or the land managing agency, as applicable, may determine that archaeological monitoring of ground-disturbing activities is necessary. In this case, Quintillion will follow the guidelines for monitoring found in **Stipulation VIII**.
- D. To the extent practicable, the standard mitigation measure should relate to the community in or near which the adverse effect will occur.
- E. NTIA, SHPO, and the applicable land managing agency, shall review and approve the treatment plan within 15 days.
- F. NTIA, as the lead agency, will coordinate invitations to Parties to this PA, in order to provide input on the treatment plan and recommended mitigation option.
- G. Parties to this PA will have 15 days to provide comments to NTIA and indicate if the treatment plan adequately resolves the adverse effect, or if additional information or modifications of the treatment plan are required.
- H. A non-standard, creative mitigation to address an adverse effect may be identified by Parties to this PA, in addition to or in lieu of mitigation listed in **Stipulation VII.B** above. In consultation with all Signatories, NTIA, SHPO, and land managing agency, as applicable, will have 15 days to concur or not concur with mitigation proposals. Examples of non-standard, creative mitigation include:
 - i. Oral history interviews;
 - ii. Place names studies;
 - iii. GIS mapping;
 - iv. Development of media;
 - v. Archival searches;
 - vi. Production and distribution of interpretive or educational materials such as pamphlets, booklets, or other K-12 learning materials;
 - vii. One-time grant in support of local or regional historic preservation programs;

- viii. One-time grant to a certified local government;
 - ix. One-time grant to the property owner to pay for restoration or repair in order to preserve the historic character of a historic building(s); or
 - x. Any other creative mitigation agreed to by NTIA, SHPO, the land managing agency, as applicable, and Quintillion.
- I. If, through consultation, it is determined that the mitigation does not require further documentation or cultural resources work in the area of the adverse effect, Quintillion may proceed with construction or other ground-disturbing activity before all elements of the specified mitigation are completed upon written authorization from the NTIA.
 - J. Where the mitigation does require further documentation or cultural resource work in the area of the adverse effect, Quintillion will submit a draft of the applicable mitigation product to NTIA, SHPO, and the land managing agency, as applicable, for review.
 - K. Within 15 days of receiving the draft mitigation report, NTIA, SHPO, and the land managing agency, as applicable, will review the report to determine if all required mitigation actions have been completed.
 - L. If NTIA, SHPO, and the land managing agency, as applicable, agree that that mitigation is complete, NTIA will provide the draft mitigation report to the Consulting Parties for a 15-day review.
 - M. If NTIA, in consultation with Consulting Parties, determines that mitigation is complete, the proposed activity may proceed without further cultural resources work, unless monitoring during construction is stipulated. Quintillion may not proceed with construction until it receives NTIA's written notice that the requirements have been met for the purposes of Section 106.
 - N. If the Consulting Parties determine that mitigation is not complete, Quintillion will consult with NTIA to determine what additional work is required to complete the required mitigation.
 - O. If all Parties cannot agree to the mitigation proposal or completeness of the mitigation, then the NTIA will follow the dispute resolution procedures in **Stipulation XII**.

VIII. MONITORING

- A. NTIA, in consultation with SHPO and the land managing agency, as applicable, may require monitoring of ground-disturbing activities.
- B. There will be at least one supervisory archaeological monitor that is SOI-qualified present at each site.
- C. Quintillion shall ensure that an adequate number of archaeological monitors are present to effectively monitor the proposed actions.
- D. The archaeological monitor(s) shall conduct a daily archaeological site sensitivity briefing for the contractors and/or personnel conducting the action to be monitored. This briefing will be informal and will be conducted as part of daily "tailgate safety briefings." The briefing will cover the following topics:

- i. Legal context for cultural resource protection;
 - ii. Applicable federal and state laws
 - iii. Penalties for disturbing cultural resources/human remains
 - iv. Cultural resources likely to be found in the project area;
 - v. Monitoring procedures and safety around heavy equipment; and
 - vi. Hand signals between monitors and equipment operators.
- E. At least one archaeological monitor will be present when/where ground disturbance is taking place.
- F. The archaeological monitor(s) have the authority to order a halt in the work to inspect and carry out an analysis of potential cultural resources.
- G. If cultural resources are discovered during monitoring, the SOI-qualified professional will halt all construction within 100 feet of the resources and examine them. If the resource is not modern (>50 years), the monitor will notify NTIA within 24 hours. NTIA will then consult with the SHPO and the land managing agency, as applicable, to determine if they are eligible for listing on the NRHP. If the discovery is made within a community, the relevant tribe shall be included in the consultation. Each of the Consulting Parties listed above will have three (3) days to reply to the NTIA's outreach.
- H. If NTIA and the Consulting Parties conclude that the identified resources are not eligible for listing on the NRHP, or do not warrant further consideration, NTIA may determine that work can continue after the cultural resource is documented. NTIA will make this determination within five (5) days of the discovery and send written authorization to Quintillion that they may resume construction.
- I. If NTIA and the Consulting Parties conclude that the cultural resource is eligible for listing on the NRHP, the SOI-qualified professional will consult with the on-site supervisor to determine if the proposed activity can be redesigned or relocated to avoid an effect on the identified historic property. The results of the consultation will be reported by the monitor to NTIA within 24 hours.
- J. If NTIA and the Consulting Parties, conclude that the redesign or relocation of the proposed activity would result in a finding of no historic properties affected, or no adverse effect to historic properties, NTIA will notify Quintillion in writing that they may resume construction at the site. NTIA will notify Quintillion within five (5) days of the re-design.
- K. If it is not possible to redesign or relocate the proposed action to avoid an adverse effect upon the historic property, Quintillion will notify NTIA and the Consulting Parties and begin consultation to identify appropriate mitigation (**Stipulation VII**).
- L. Human Remains discovered during archaeological monitoring will be treated in accordance with **Stipulation X** and **Attachment G** of this PA.
- M. All cultural resources gathered during monitoring will be curated in accordance with **Stipulation XI** of this PA.

- N. Archaeological monitoring may be required during construction and/or as a result of an inadvertent discovery. Additional requirements for monitoring are outlined in **Section 8.3.2 of the CRMP (Attachment C)**.

IX. INITIATION OF CONSTRUCTION

- A. Upon execution of this PA, Quintillion and their contractors may commence construction within portions of the Undertaking that have not been identified as requiring cultural resources survey, per the CRMP (**Attachment C**), provided that Quintillion and contractors, hired on their behalf, have obtained any and all necessary permits and authorizations. At the execution of the PA, NTIA will provide a “Section 106 Conclusion Memo” identifying those areas where construction may begin, while other areas are subjected to the survey procedures outlined above in **Stipulation V**.
- B. In the event that NTIA makes an adverse effect determination, and a treatment plan is developed in accordance with **Stipulation VII**, upon approval of the final treatment plan by NTIA, SHPO, and the land managing agency, as appropriate, NTIA will notify Quintillion in writing that the treatment plan may be executed. Construction within the affected location may commence once the treatment plan is fully executed and per the conditions of the treatment plan.

X. POST-REVIEW DISCOVERIES

- A. Items subject to NAGPRA will be handled in accordance with the implementing regulations found at 43 CFR § 10, and consistent with the BLM’s Plan of Action for the Native American Human Remains or Cultural Items Discovered or Excavated on Federal or Tribal Lands (**Attachment G**) and the Inadvertent Discovery of Human Remains and Funerary Objects Plan (**Section 8.4.2 of the CRMP**). NAGPRA items include Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony.
- i. Quintillion shall ensure that if Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony are discovered during implementation of the Undertaking, all work within 300 feet of the discovery will cease, the area will be secured, and the NTIA, SHPO, and land managing agency’s authorized official, where appropriate, will be contacted. Quintillion will also comply with applicable state and local laws regarding the discovery of human remains, including contacting the Alaska State Troopers or other law enforcement agency, as discussed in **Section 8.4.2 of the CRMP**.
- B. The Inadvertent Discovery of Cultural Resources Plan (**Section 8.4.1 of the CRMP**) for non-NAGPRA items includes the following provisions:
- i. Immediately halting all construction work involving subsurface disturbance in the area of the find and in the surrounding area (100-foot buffer) where further

subsurface finds can be reasonably expected to occur, and notifying NTIA, SHPO, and the land manager of the find within 24 hours.

- ii. A qualified professional, meeting the requirements in **Stipulation III** and confirmed by NTIA and the land managing agency, as applicable, will inspect the site within 48 hours and determine the area and nature of the affected find. Construction work may then continue in the area outside the find as defined by NTIA and land manager, as appropriate, in consultation with the SHPO and other Consulting Parties.
 - iii. Within 5 working days of the original notification, NTIA, in consultation with SHPO, land manager, and other Parties, as appropriate, will determine whether the find is eligible for the NRHP.
 - iv. If the find is determined eligible for listing in the NRHP, Quintillion will prepare a plan for its resolution of adverse effects in consultation with NTIA, SHPO, land manager, and other Parties, as appropriate. Any dispute concerning the proposed treatment plan will be resolved through the process in **Stipulation XII**.
 - v. Work in the affected area will not proceed until either: 1) The plan is implemented, and on-the-ground treatment measures are completed; or 2) The determination is made that the unanticipated find is not eligible for inclusion in the NRHP. Any disputes over the evaluation of unanticipated finds will be resolved in accordance with the requirements of 36 CFR § 800.4(c)(2) as appropriate.
- C. Quintillion may resume construction activities in the area of the discovery when NTIA has determined that implementation of the actions undertaken to address the discovery pursuant to this stipulation are complete.

XI. COLLECTION AND CURATION

- A. Legal requirements for curation of cultural materials vary depending upon (1) land status where the materials are collected (federal, state, private, Tribal); (2) whether or not the materials are subject to the provisions of the Native American Graves Protection and Repatriation Act of 1990 (“NAGPRA”), as amended; (3) whether or not the materials include human remains, funerary objects, sacred objects, or objects of cultural patrimony; and, (4) whether or not any human remains are subject to investigation by the Alaska State Troopers or other law enforcement agency with jurisdiction.
- B. Any materials collected as a result of implementing this PA, and not subject to NAGPRA, are the property of the applicable state or federal land-managing agency, or landowner if collected from privately owned property. On federal lands, any human remains, funerary objects, sacred objects, or objects of cultural patrimony, as defined in 43 CFR § 10.2(d), will follow disposition to lineal descendants or Tribe(s), following the procedures set forth in 43 CFR § 10, Subpart B.

- C. Pursuant to 36 CFR § 79.7(b) and applicable federal permit(s), Quintillion will assume all costs associated with the curation of any materials that are collected during the implementation of this PA, in perpetuity. Curation costs may include, but are not limited to, curation fees charged by approved institutions, acquisition of archival materials, shipping, cleaning, rehousing, and any other conservation action determined necessary by a qualified conservator or considered common/ethical practice by the industry.
- D. Federal land managing agencies shall ensure that curation of materials collected from federal lands, and not subject to the provisions of the NAGPRA, is completed in accordance with 36 CFR § 79, Curation of Federally Owned and Administered Archaeological Collections. Quintillion will submit all materials from federal lands for curation at the UAMN in Fairbanks, Alaska, but the materials will remain in federal ownership. During the permitting process, Quintillion will establish a provisional curation PA with the UAMN for collections, which Quintillion will finalize prior to submission of collections to the UAMN.
- E. Collections from state lands will comply with AS 41.35.020. Quintillion will submit all materials from state lands for curation at the UAMN, but the materials will remain in state ownership. During the cultural resource investigation process, Quintillion will establish a provisional curation PA with the UAMN for collections, which Quintillion will finalize prior to submission of collections to the UAMN.
- F. Quintillion, and any consultants hired on their behalf, will be responsible for submitting all materials recovered from state and/or federal lands to the UAMN within 1 year following completion of the fieldwork that generated the collection if the property will not require mitigation. All collections will be curation-ready, as determined by UAMN requirements. Prior to disposition, Quintillion, or any consultants hired on their behalf, will safeguard all materials from theft or damage by providing appropriate interim storage facilities and conservation actions, consistent with the requirements in 36 CFR § 79.9. Quintillion shall consult with UAMN staff regarding interim storage facilities and necessary conservation actions to be consistent with 36 CFR § 79.9(b)(4). Within 30 days following disposition, Quintillion will provide the land managing agency with all accession records and documentation associated with the transfer and curation of materials. The land managing agency will share the documentation with other landowners or managers, as appropriate.
- G. For collections recovered from private lands, Quintillion will work with private landowners to arrange for the disposition of materials. Quintillion will provide private landowners with information on the value of curation and will assume all costs of the materials, not to exceed standards set forth in 36 CFR § 79. If a landowner chooses to donate or loan the materials to the UAMN or another repository, Quintillion will provide NTIA with documentation of the transfer within 30 days following the transfer. In the event that a landowner chooses to retain a collection, Quintillion will provide documentation of this to NTIA.

XII. DISPUTE RESOLUTION

- A. Should any Party to this PA object at any time to the manner in which the terms of this PA are implemented, NTIA shall consult with such Party to resolve the objection. If NTIA determines that such objection cannot be resolved, NTIA will:
 - i. Forward all documentation relevant to the dispute, including NTIA's resolution to the ACHP. The ACHP is required to provide NTIA with its advice on the resolution of the objection within 30 days of receiving adequate documentation. Prior to reaching a final decision on the dispute, NTIA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the ACHP or other PA Signatories and provide them with a copy of this written response. NTIA will then proceed according to its final decision.
 - ii. If the ACHP does not provide its advice or comments regarding the dispute within the 30-day time period, NTIA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, NTIA shall prepare a written response that takes into account any timely comments regarding the dispute from the PA Signatories and provide them and the ACHP with a copy of such written response.
- B. NTIA's responsibility to carry out all other actions subject to the terms of this PA that are not the subject of the dispute remain unchanged.

XIII. ANNUAL REPORT AND MEETING

- A. On or before January 31 of each year, or until NTIA and SHPO determine that the terms of this PA have been fulfilled and all Signatories have been notified of such, Quintillion shall prepare and provide an annual report to all Parties to this PA addressing:
 - i. Undertaking status and PA implementation;
 - ii. Progress in construction work;
 - iii. Progress in cultural resource identification and evaluation, as applicable;
 - iv. Completed and in-progress mitigation measures, as applicable;
 - v. Coordination of work with planning and construction schedules;
 - vi. Any problems or unexpected issues related to this PA encountered during the year; and
 - vii. Any changes that NTIA, or any of the Signatories, believe should be made in implementation of this PA.
- B. NTIA will offer, and the Signatories will determine, if an annual meeting is necessary for the given year to discuss the previous year's activities, and activities scheduled for the coming year. The meeting should be conducted no later than March 31 each year. The meeting may be held virtually or at a physical location determined through consensus of the Signatories. Attendance in person at the location of the meeting shall be at the expense of the Parties. Minutes of the meetings will be distributed by NTIA

- within 15 days following the meetings. NTIA shall amend the minutes as a result of comments received within 15 days and distribute finalized minutes within 15 days.
- C. At the annual meeting or through the processes established in **Stipulation XIV**, The Signatories shall consider for review all parts of this PA to update outdated stipulations, best practices, and contact information, and to consider whether organizations who may have originally declined participation may wish to participate.

XIV. AMENDMENTS

- A. Signatories and Invited Signatories to this PA may propose to NTIA that this PA be amended, whereupon NTIA shall consult with the Signatories and Invited Signatories to seek consensus on such an amendment within 30 days. Any amendment to this PA shall become effective upon the signature of all the Signatories and Invited Signatories and will be filed with the ACHP.
- i. NTIA may update **Attachment A** at any time without a PA amendment. NTIA will notify all Signatories of any updates and provide the revised version of **Attachment A** in the Annual Report.
 - ii. The CRMP (**Attachment C**) may be updated without a PA amendment upon written approval from the SHPO and NTIA and notification to all Signatories, who will be provided a copy of the revised CRMP. Any PA Signatory may propose an amendment to the CRMP by submitting a request in writing to NTIA with the proposed CRMP language changes. If NTIA concurs that the amendment improves or updates the CRMP, NTIA will share the proposed amendment with all Signatories for a 30-day review and comment period. NTIA will consider all timely comments received, in consultation with the SHPO, and incorporate changes. NTIA will send a revised version of the CRMP to all Signatories following written approval. If any PA Signatories object to the changes, NTIA will follow the steps in **Stipulation XII**.
 - iii. NTIA may update the CRMP Contact List at any time without necessitating written approval from the SHPO. NTIA will provide any revisions to these exhibits in the Annual Report.
 - iv. NTIA may append documents to this PA, at any time without a PA amendment, as long as the documents are required by and/or developed under the terms of the PA, such as Inadvertent Discovery Plans, treatment plans, or other plans, and the addition is documented in **Attachment H, Amendment and Addendum Log**. Final Reports do not need to be appended to the PA.
- B. NTIA will document all amendments and addendums to the PA in **Attachment H**. NTIA will provide revised versions of the PA or attachments to all Signatories within 30 days of finalization, unless otherwise noted.
- C. Attachments to this PA may be amended through a streamlined process by submitting a request in writing to NTIA. If NTIA agrees that the attachment should be updated, it

- will distribute the proposal to all Signatories with a request to provide comments within 30 days. NTIA will consider all timely comments received and determine whether to accept the updated attachment. If no comments are received at the end of the review period, NTIA will distribute an updated version of the PA to the Signatories.
- D. In the event that another federal agency, not initially a Party to this PA, receives an application to fund, license, or permit an Undertaking related but not identical to the Undertaking described in the PA and notifies NTIA of its interest in and willingness to follow the terms of this PA, the PA Signatories may elect to amend the PA to add the related scope to the Undertaking and allow the agency to join the PA upon the execution of a Signature Page and filing with the ACHP. NTIA may delegate distribution responsibilities of reports, notices, or other activities outlined in this PA to that agency in such an amendment.

XV. TERMINATION

- A. If Quintillion determines that they cannot implement the terms of this PA, or if NTIA or SHPO determines that the PA is not being properly implemented, Quintillion, NTIA, or SHPO may propose to the Signatories and Invited Signatories to this PA that it be amended or terminated. If amendment is proposed, NTIA will consult with the other Signatories and Invited Signatories to attempt to develop an amendment per **Stipulation XIV**.
- B. This PA may be terminated by any of the Signatories and Invited Signatories in accordance with the procedures described in 36 CFR § 800.6(c)(8) after consultation to seek amendment. Upon termination, Quintillion shall submit a technical report detailing any cultural resource work done in furtherance of this PA up to and including the date of termination.

XVI. DURATION OF PA

- A. This PA shall continue in full force and effect until 5 years after the date of execution. At any time in the six-month period prior to such date, Signatories and Invited Signatories may request an amendment to extend or modify this PA. No extension or modification shall be effective unless NTIA and the SHPO have agreed to the extension in writing.
- B. Upon the completion of all stipulations to this PA, Quintillion shall circulate to NTIA, SHPO, and all other Signatories to this PA a signed memorandum documenting that Quintillion has fulfilled all of its responsibilities under this PA.

XVII. ANTI-DEFICIENCY ACT

- A. NTIA's obligations under this PA are subject to the availability of appropriated funds, and the stipulations of this PA are subject to the provisions of the Anti-Deficiency Act. NTIA will make reasonable and good faith efforts to secure the necessary funds to

implement this PA in its entirety. If compliance with the Anti-Deficiency Act alters or impairs NTIA's ability to implement the stipulations of this PA, NTIA shall consult in accordance with the amendment and termination procedures found at **Stipulations XIV and XV**.

- B. Execution of this PA by NTIA and SHPO, its submission to the ACHP in accordance with 36 CFR § 800.6(b)(1)(iv), and implementation of its terms, evidence that NTIA has taken into account the effect of this Undertaking on historic properties and has afforded the ACHP an opportunity to comment.

**PROGRAMMATIC AGREEMENT
BETWEEN THE
NATIONAL TELECOMMUNICATION AND INFORMATION ADMINISTRATION AND
THE ALASKA STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE NOME TO HOMER EXPRESS AND HOOPER BAY BROADBAND PROJECTS**

SIGNATORY 1 of 2

**AGENCY NAME: U.S. Department of Commerce, National Telecommunications and
Information Administration**

**DOUGLAS
KINKOPH**  Digitally signed by
DOUGLAS KINKOPH
Date: 2026.03.09
12:41:59 -04'00'

By: _____

DATE: _____

Douglas Kinkoph

Associate Administrator

Office of Internet Connectivity and Growth

**PROGRAMMATIC AGREEMENT
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NATIONAL TELECOMMUNICATION AND INFORMATION ADMINISTRATION AND
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SIGNATORY 2 of 2

AGENCY NAME: Alaska State Historic Preservation Office

By:



Sarah Meitl

Deputy State Historic Preservation Officer

Office of History and Archaeology

DATE: 3/10/26

**PROGRAMMATIC AGREEMENT
BETWEEN THE
NATIONAL TELECOMMUNICATION AND INFORMATION ADMINISTRATION AND
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THE NOME TO HOMER EXPRESS AND HOOPER BAY BROADBAND PROJECTS**

INVITED SIGNATORY 1 of 4

ENTITY NAME: QSH Parent Holdco LLC

By:  **DATE:** 3/9/2026

Mac McHale

President

**PROGRAMMATIC AGREEMENT
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REGARDING
THE NOME TO HOMER EXPRESS AND HOOPER BAY BROADBAND PROJECTS**

INVITED SIGNATORY 3 of 4

AGENCY NAME: U.S. Department of Interior, Bureau of Land Management

 Digitally signed by JACOB
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Date: 2026.03.04 11:29:58
-09'00'

By: _____ **DATE:** _____

Jacob Vialpando

Field Manager

BLM Anchorage Field Office

**PROGRAMMATIC AGREEMENT
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NATIONAL TELECOMMUNICATION AND INFORMATION ADMINISTRATION AND
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THE NOME TO HOMER EXPRESS AND HOOPER BAY BROADBAND PROJECTS**

INVITED SIGNATORY 4 of 4

AGENCY NAME: U.S. Army Corps of Engineers

By: *Janet Post*

Janet Post

North Branch Chief

Alaska District

DATE: 3/9/26

**PROGRAMMATIC AGREEMENT
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NATIONAL TELECOMMUNICATION AND INFORMATION ADMINISTRATION AND
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REGARDING
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CONCURRING PARTY

ENTITY NAME: BRISTOL BAM NATIVE CORPORATION

By: Daniel Cheyette

DATE: 3/6/26

REPRESENTATIVE NAME: Daniel Cheyette

TITLE: SUP LANDS : EXTERNAL AFFAIRS

DEPARTMENT: LANDS : EXTERNAL AFFAIRS

**PROGRAMMATIC AGREEMENT
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CONCURRING PARTY

ENTITY NAME: Calista Corporation

By:  _____

DATE: 03/31/2026

REPRESENTATIVE NAME: Tisha Kuhns

TITLE: Vice President, Land and Natural Resources

DEPARTMENT: Land and Natural Resources Department

**PROGRAMMATIC AGREEMENT
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NATIONAL TELECOMMUNICATION AND INFORMATION ADMINISTRATION AND
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CONCURRING PARTY

ENTITY NAME: City of Emmonak

By: David A. Aalav

DATE: 3/31/26

REPRESENTATIVE NAME:

TITLE: City Manager Emmonak

DEPARTMENT:

**PROGRAMMATIC AGREEMENT
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CONCURRING PARTY

ENTITY NAME: City of Hooper Bay

By:

Roy Joseph

DATE:

3/9/2026

REPRESENTATIVE NAME: Roy Joseph

TITLE: City Administrator

DEPARTMENT: Administration.

**PROGRAMMATIC AGREEMENT
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CONCURRING PARTY

ENTITY NAME: Emmonak Corporation

By: _____

DATE: 03/31/2026_____

**REPRESENTATIVE NAME: Jason Wagner
TITLE: President & Chief Executive Officer
DEPARTMENT: Lands & Planning**

**PROGRAMMATIC AGREEMENT
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REGARDING
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CONCURRING PARTY

ENTITY NAME: Igiugig Village Council

By: *AlexAnna Salmon*

DATE: March 29, 2026

REPRESENTATIVE NAME: AlexAnna Salmon

TITLE: President

DEPARTMENT: Igiugig Village Council

**PROGRAMMATIC AGREEMENT
BETWEEN THE
NATIONAL TELECOMMUNICATION AND INFORMATION ADMINISTRATION AND
THE ALASKA STATE HISTORIC PRESERVATION OFFICE
REGARDING
THE NOME TO HOMER EXPRESS AND HOOPER BAY BROADBAND PROJECTS**

CONCURRING PARTY

ENTITY NAME: NVHPB

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DATE: 3-9-26

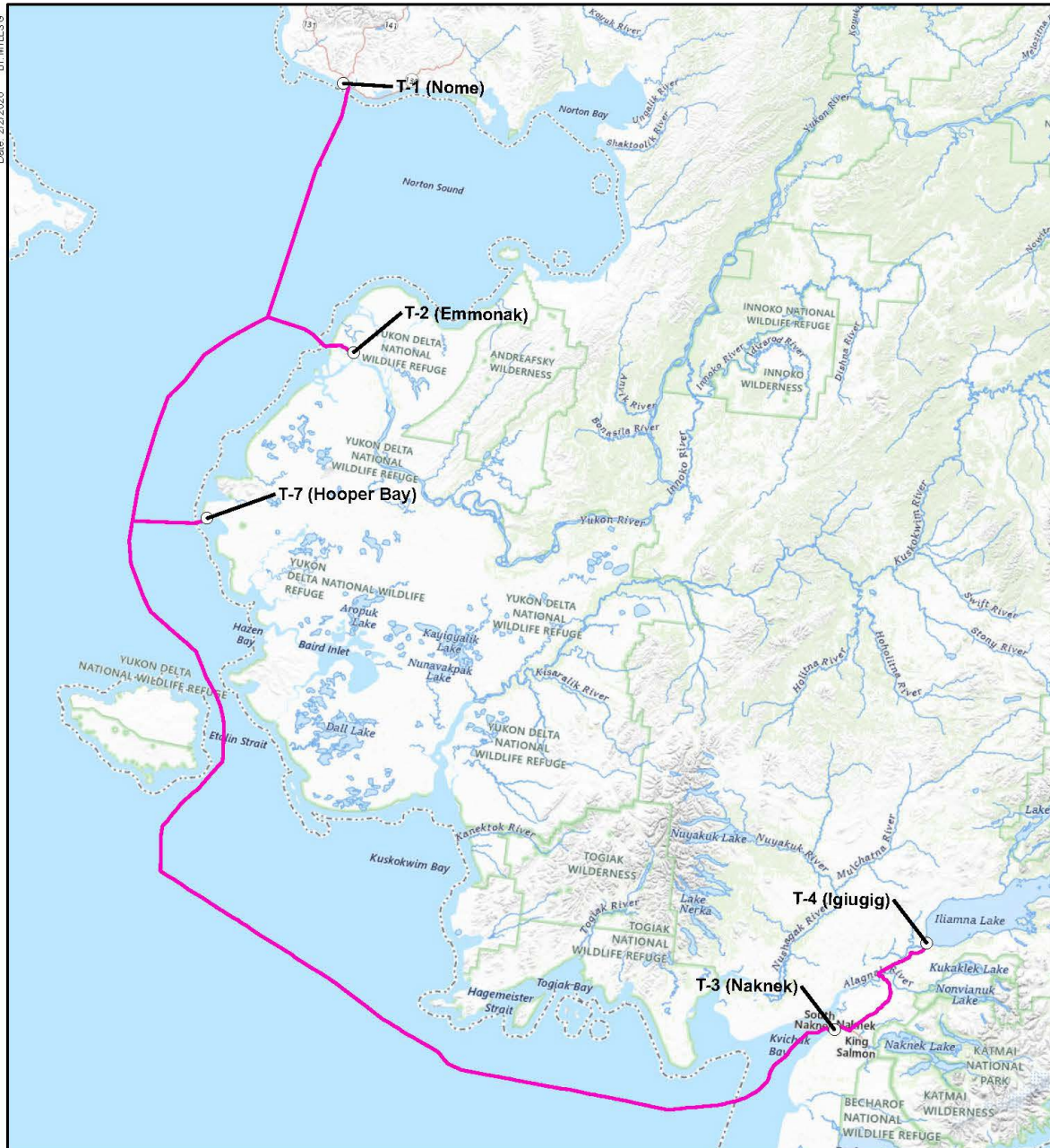
REPRESENTATIVE NAME:

TITLE: Tribal chief

DEPARTMENT:

ATTACHMENT A
PROJECT LOCATION MAP

Date: 2/21/2026 BY: MILES G

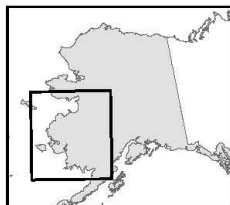


LEGEND

- Populated Places
- Fiber Optic Cable

QUINTILLION SUBSEA OPERATIONS
NOME-TO-HOMER EXPRESS

Project Overview



NORTHERN LAND USE
RESEARCH ALASKA, LLC

Attachment A: The Nome to Homer Express and Hooper Bay Broadband Projects

ATTACHMENT B
PROJECT DESCRIPTION



**Nome to Homer Express Middle Mile Network
Project with Joint Agency Collaboration on the Hooper
Bay Broadband Project**

Project Description

Quintillion
3601 C Street, Suite 1000B
Anchorage, AK 99503

August 09, 2025

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ACRONYMS AND ABBREVIATIONS

AK	Alaska
ANCSA	Alaska Native Claims Settlement Act
BMH	Beach Manhole
CAI	Community Anchor Institutions
CLS	Cable Landing Station
DA	Double Armor
DGPS	Differential geographic positioning system
DNR	Alaska Department of Natural Resources
DOT-PF	Alaska Department of Transportation and Public Facilities
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FOC	Fiber Optic Cable
FONSI	Finding of No Significant Impact
FTTP	Fiber-to-the-Premises
GCI	GCI Communication Corp.
HDD	Horizontal Directional Drilling
HDPE	High-density polyethylene
LW	Lightweight
LWA	Lightweight-Armored
m	Meter
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	NOAA National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fisheries Management Council
NPS	United States National Park Service
NTHE	Nome to Homer Express
NTIA	National Telecommunications and Information Administration

OSP	Outside plant
PFE	power feed equipment
Project	Nome to Homer Express submarine fiber optic cable system
ROV	Remotely operated vehicle
ROW	Right-of-way
SA	Single Armor
SHPO	State Historic Preservation Office
US	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish & Wildlife Service

Project Name: Nome to Homer Express Middle Mile Network Project with Joint Agency Collaboration on the Hooper Bay Broadband Project
Applicant: QSH Parent Holdco LLC

Total Estimated Project Cost:
\$160,564,315.94 – Nome to Homer Express (NTHE)
\$24,957,845 – Hooper Bay Project

1. PROJECT DESCRIPTION

1.1 INTRODUCTION

Quintillion is deploying its *Nome to Homer Express (NTHE)* submarine and terrestrial fiber optic cable system across western Alaska, a transformative infrastructure initiative that will interconnect existing fiber telecommunications networks in Nome, AK, with competitive fiber infrastructure in Homer, AK. This new middle-mile route—underpinned by a National Telecommunications and Information Administration (NTIA) Middle Mile Grant—will extend Quintillion’s existing subsea and terrestrial network south from Nome to Emmonak, follow the Yukon-Kuskokwim (YK) Delta coastline to Naknek, and traverse overland to Igiugig. From Igiugig, the system interconnects with existing dark fiber pairs stretching across Iliamna Lake to Pile Bay and Williamsport, culminating in a final submarine segment across Cook Inlet to Homer. At Homer, NTHE will tie into multiple regional carriers, enabling resilient, low-latency, competitive broadband access and interconnection to national and global networks, including cloud services (**Figure 1**).

NTHE is composed of both submerged marine segments and terrestrial alignments, crossing various land jurisdictions and remote terrain. Quintillion is committed to full compliance with the National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), Endangered Species Act (ESA), and all relevant federal, state, tribal, and local environmental permitting requirements. The project is structured to enhance statewide broadband capacity and enable service delivery to previously unserved or underserved Alaskan communities.

Quintillion currently owns and operates a subsea fiber optic cable system serving Alaska’s Northwest and North Slope Arctic regions, utilizing terrestrial infrastructure to reach its internet gateway in Seattle, WA. Building on this backbone, the NTHE project serves as the critical expansion of Quintillion’s open access middle mile network, driving redundancy, resiliency, and regional accessibility across Alaska.

One of the key leveraging initiatives within the NTHE ecosystem is the Hooper Bay Broadband Project. This initiative will utilize a planned branching unit off the NTHE subsea route to construct a dedicated subsea middle mile extension reaching the Native Village of Hooper Bay under a US Department of Agriculture (USDA) Rural Utilities Service (RUS) Reconnect Grant (**Figure 2**).

As part of its integrated network strategy, Quintillion will design, construct, own, operate, and maintain the Hooper Bay subsea and terrestrial fiber optic infrastructure. Quintillion will act as the Internet Service Provider (ISP), offering enterprise and residential broadband through advanced Operational Support Systems and Business Support Systems (OSS/BSS), including dedicated technical support and customer service teams. Moreover, consistent with its open access model, Quintillion will operate the new Hooper Bay middle mile infrastructure as part of its broader NTIA Middle Mile Grant-backed network, providing equitable backhaul access to other broadband and advanced service providers serving the region.

The integration of the Hooper Bay project within the broader NTHE framework represents a scalable and sustainable approach to broadband expansion, utilizing shared infrastructure to maximize public investment, extend middle-mile reach, and ensure service delivery in alignment with NTIA objectives and community needs.

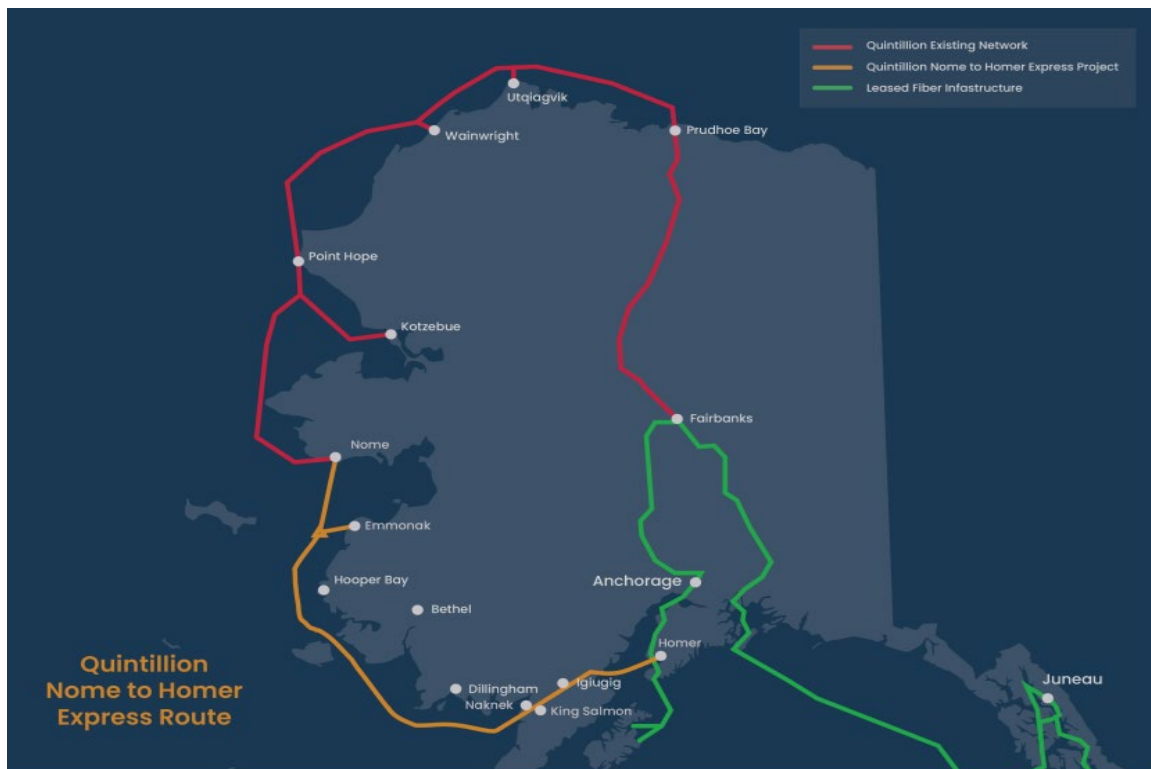


Figure 1: Proposed NTHE Network relative to Quintillion's entire network

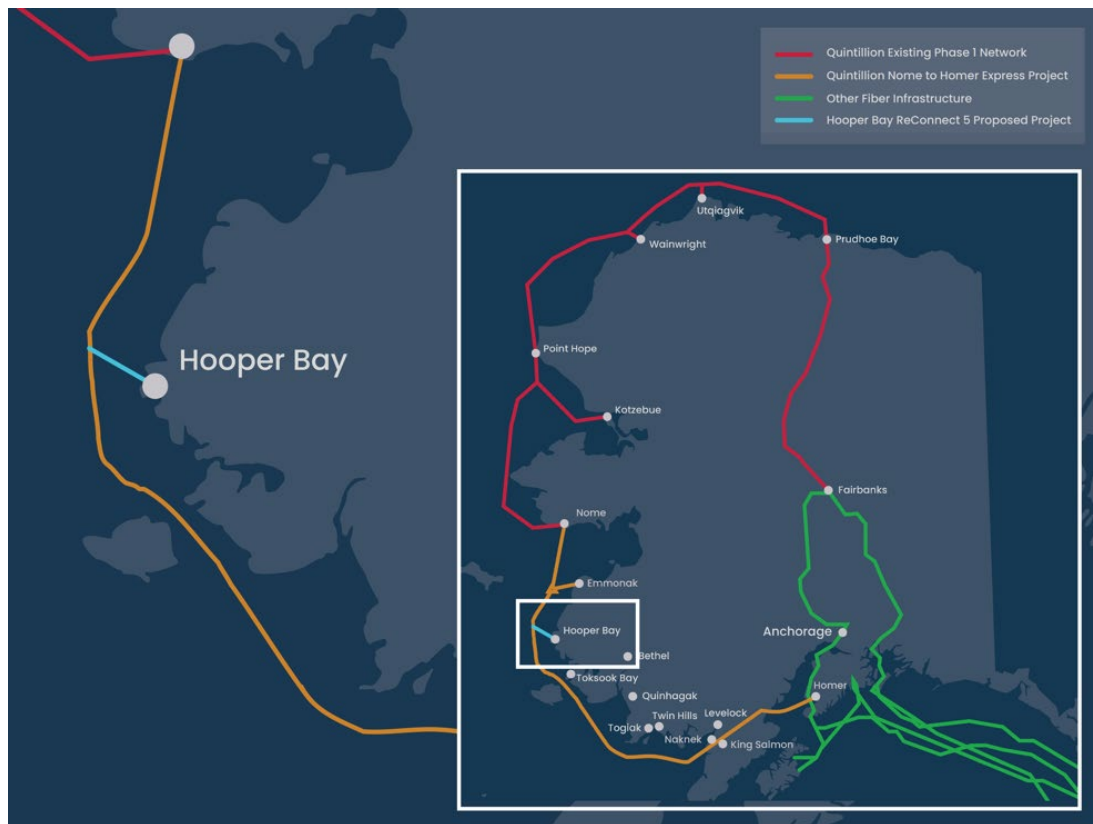


Figure 2: Hooper Bay branch relative to Quintillion’s entire network

1.2 PROJECT PURPOSE AND BENEFITS

The NTHE system will provide direct fiber access and communications facilities for the communities of Emmonak (population 858), Naknek (464), and Igiugig (61), and access and facilities to Hooper Bay (1,193) with Fiber-to-the-Premises (FTTP). The Community Anchor Institutions (CAI) for these communities have been identified and will be considered in the construction plan, providing access points to the fiber optic cable (FOC), ensuring ease of access for last-mile providers and key CAIs. Additional and future prospective projects include expanding on the Nome to Homer Express network to serve the communities of Homer (5,491), Toksook Bay (682), Quinhagak (713), Eek (356), Oscarville (74), Napaskiak (434), Bethel (6,179), Goodnews Bay (277), Togiak (858), Dillingham (2,226), King Salmon (307), and Levelock (60). The NTHE project would help strengthen long-term economic and community stability in rural Alaska, where legacy industries such as timber and mining have been in decline and where residents have ever-increasing needs for broadband to support telemedicine, distance learning, remote working, civic engagement, e-commerce, marketing, and sharing cultural resources and knowledge. Additionally, the project will bring new resilient middle-mile capacity to the vicinity of military bases including Fort Wainwright, Fort Greely, and Eielson AFB, several Alaska Army National Guard bases, and Alaska Coast Guard stations. The project is funded primarily (61%) by a Middle Mile Grant from NTIA with an RUS Reconnect Grant for the branching unit to Hooper

Bay with FTTP. The project provides broadband service to tribally- and ANCSA-owned land and facilities, and helps to support economic development, community sustainability, and self-determination objectives. A key feature of this project will be to complete a transformative, foundational, and resilient fiber ring that connects Anchorage, Fairbanks, and Prudhoe Bay to the Northwest Arctic, down to Bristol Bay, and across the Alaska Peninsula to Homer and back to Anchorage.

1.3 PROPOSED CONSTRUCTION ACTIVITIES

Quintillion’s Nome to Homer Express (NTHE) project proposes to construct approximately 894.34 miles of middle-mile fiber optic cable (FOC) infrastructure comprising both submarine and terrestrial segments from Nome to Igiugig. This new route will interconnect with Quintillion’s existing Phase I subsea system at the Cable Landing Station (CLS) in Nome and extend to leased dark fiber pairs on GCI’s network from Igiugig to Homer (204 miles). At Homer, the system will interconnect with multiple regional providers to establish a diverse, resilient, low-latency, and competitive broadband pathway to the continental United States and global cloud services. By closing the loop on Quintillion’s statewide fiber infrastructure, the NTHE project will create a redundant fiber ring, improving broadband resiliency for carriers and end users statewide and significantly enhancing Alaska’s digital connectivity to the world (illustrated in **Figure 1**).

The NTHE project includes the construction of new subsea and terrestrial cable infrastructure that will:

- Deploy a new submarine fiber optic cable from the existing CLS in Nome to a new CLS in Naknek, Alaska.
- Install a Branching Unit (BU) and lateral spur connecting to a new CLS in Emmonak, located within the Yukon River Delta.
- Extend a terrestrial fiber optic route from Naknek to Igiugig, where the system will transition to subsea infrastructure again, interconnecting with existing dark fiber pairs.
- Utilize these dark fiber segments to carry service from Igiugig across Lake Iliamna to Pile Bay, then overland to Williamsport, and across Cook Inlet to Homer, where the system will terminate at Quintillion’s co-located CLS facility. This location serves as a critical network aggregation point, supporting interconnection with multiple terrestrial and subsea carriers.

2. HOOPER BAY INTEGRATION – LEVERAGING THE NTHE BACKBONE

As a key leveraging initiative, Quintillion’s Hooper Bay Broadband Project, which is approximately 38.45 mi., is fully integrated into the NTHE architecture via a planned Branching Unit off the NTHE subsea main line. This branch will:

- Extend a dedicated subsea middle mile spur from the BU to a new Beach Manhole (BMH) in Hooper Bay, Alaska

- Establish a new Cable Landing Station (CLS)—also referred to as a Communications Shelter—within Hooper Bay to terminate the subsea segment.
- Support the deployment of a fiber-to-the-premises (FTTP) last-mile network, delivering 10 Gbps symmetrical XGS-PON service to every Broadband Serviceable Location (BSL) within the Hooper Bay service area.

This integrated last-mile architecture will ensure comprehensive connectivity for this Unserved community, advancing the NTIA’s digital equity goals and Alaska’s broadband access objectives.

Quintillion will design, construct, own, operate, and maintain the Hooper Bay subsea and terrestrial FOC infrastructure as part of its open-access network. As with the broader NTHE system, the Hooper Bay middle mile segment will be operated on an open-access basis, ensuring fair and non-discriminatory access to other service providers and enabling third-party ISPs to extend services to Hooper Bay using Quintillion’s backhaul.

Quintillion will serve as the Internet Service Provider (ISP) for the FTTP segment, with full-service delivery supported by its Operational Support Systems (OSS) and Business Support Systems (BSS), as well as its internal technical support and customer service teams.

This integrated deployment approach—leveraging the NTHE backbone to deliver high-capacity middle mile to remote community endpoints—demonstrates Quintillion’s commitment to scalable, equitable broadband deployment in alignment with NTIA’s Middle Mile Grant (MMG) program.

3. FIBER OPTIC CABLE SYSTEM

3.0 CABLE AND CONSTRUCTION TYPES

The NTHE project is a hybrid system consisting of submarine and terrestrial cables, components, and facilities. The diagram presented in **Figure 3** provides an overview of the components that constitute this hybrid submarine cable system. It serves as a reference for identifying and describing the various components. This includes the transition point from submarine FOC to terrestrial FOC, while identifying the various components from the Beach Manhole (BMH) to the CLS, and beyond the CLS for access to the system. **Figure 4** shows the complete route, including segment IDs for easy reference. **Table 1** lists the distances for each segment, including submarine and terrestrial.

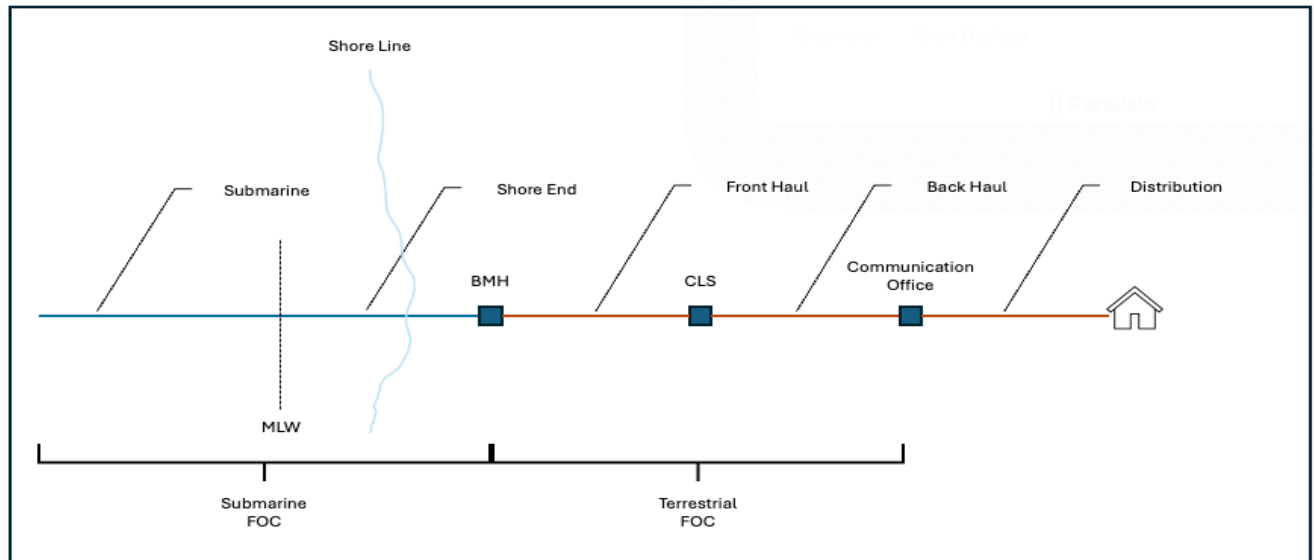


Figure 3: Hybrid Submarine Cable System diagram with associated components

Submarine FOC: This construction involves the installation of a submarine FOC within the marine environments from BMH to BMH. These segments are either plowed or laid on the seafloor (surface-lay). The submarine FOC components include BUs, which allows the extension of the submarine FOC branches from the main trunk to the BMH, at which point the Submarine FOC transitions to a Terrestrial FOC. From the BMH the terrestrial FOC will be constructed to the CLS (referred to as Front Haul) and will extend beyond the CLS to provide access points for CAIs in the region. Landing points for the submarine FOC will include shore-end construction from the MLW to the BMH, where the construction method and timing are different from the main trunk construction.

Terrestrial FOC: This construction involves the installation of a terrestrial fiber optic cable (FOC) across a variety of Alaskan landscapes, including wetlands, inland lakes, and stream crossings. Terrestrial FOC segments will terminate at Beach Manholes (BMHs), underground vaults, and Cable Landing Stations (CLSs). The scope of construction also includes front haul segments (Table 2) extending from the BMH to the CLS for Nome, Emmonak, and Naknek.

Additionally, the Hooper Bay Broadband Project will mirror this approach, with a subsea branch from the Nome to Homer Express (NTHE) mainline landing at a newly constructed BMH in Hooper Bay. From this BMH, a front haul segment will be constructed to a new CLS (Communications Shelter) located within the community. This terrestrial link will support the transition from the subsea middle mile to the local fiber-to-the-premises (FTTP) network, enabling last-mile connectivity to every Broadband Serviceable Location (BSL) in Hooper Bay.

The NTHE project will require a comprehensive set of Federal, State, and Local permits, with a particular focus on historical, environmental, and cultural resource risks, as well as the development of mitigation plans where necessary. Quintillion, with technical support from

Environmental Science Associates (ESA), has identified the construction path to guide these permitting and compliance efforts, as outlined below and in **Figure 4**.

Construction Paths:

Submarine FOC: 410 ft. on each side of route centerline, with total width of 820 ft.

Terrestrial FOC: 25 ft. on each side of route centerline, with total width of 50 ft.

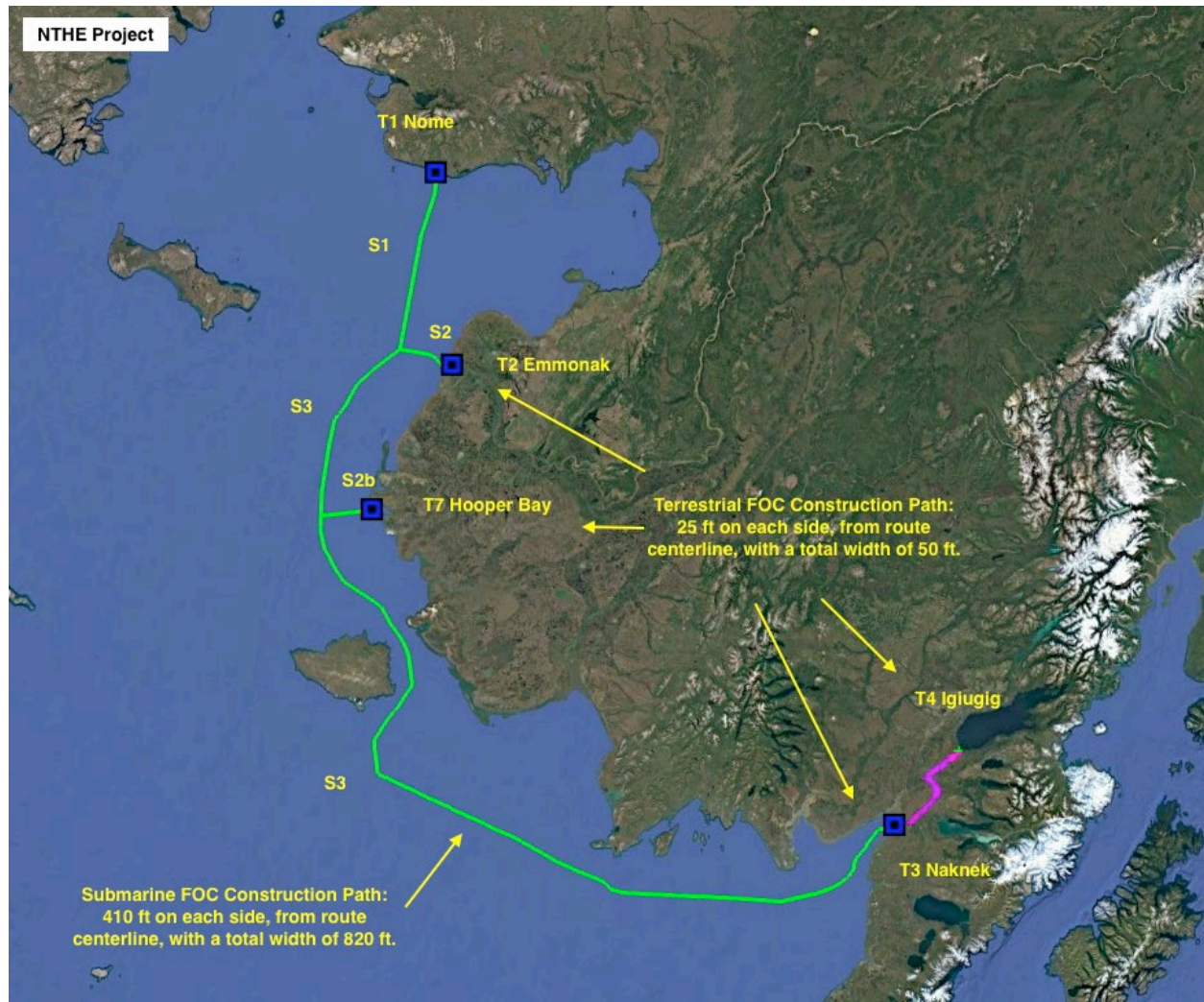


Figure 4: Submarine Routes and Identification Numbers (Segment IDs)

In parallel, the Hooper Bay Broadband Project, which leverages a planned branching unit off the NTHE mainline, will also undergo site-specific permitting and regulatory review, including the establishment of a construction path. This construction path will address both the subsea spur route to Hooper Bay and the terrestrial infrastructure extending from the Beach Manhole (BMH) to the new Cable Landing Station (CLS). The Hooper Bay construction path will specifically evaluate potential impacts to cultural resources, subsistence use areas, coastal habitats, and

wetlands, ensuring alignment with National Environmental Policy Act (NEPA), National Historic Preservation Act (NHPA), and other applicable permitting frameworks. Mitigation strategies will be developed accordingly, consistent with those applied across the NTHE system.

Segment Type	Project Area	Seg ID	from	to	Length (mi.)	Associated Facilities
Terrestrial FOC	Nome	T1	Nome CLS	Nome BMH	0	Existing CLS, BMH, New CLS
Submarine FOC	Bering Sea	S1	Nome BMH	Emmonak BU	113.53	Existing BMH and CLS, and new BU
Submarine FOC	Bering Sea	S2	Emmonak BU	Emmonak BMH	35.65	New BMH and CLS
Terrestrial FOC	Emmonak	T2	Emmonak BMH	Emmonak	9.46	New BMH and CLS
Submarine FOC	Bering Sea	S3	Emmonak BU	Naknek BMH	656.48	New Bu
Terrestrial FOC	Naknek - King Salmon	T3	Naknek BMH	King Salmon	10.33	New BMH and CLS
Terrestrial FOC	King Salmon - Igiugig	T4	King Salmon	Igiugig BMH	68.89	New BMH
Submarine FOC	Bering Sea	S2b	Hooper Bay BU	Hooper Bay BMH	32.33	New BU
Terrestrial FOC	Hooper Bay	T7	Hooper Bay BMH	Hooper Bay CLS	6.12	New BMH and CLS
				Total	932.79	

Table 1: Submarine and Terrestrial segments

System Component	Landing Points	Front Haul	Length (mi.)
Shore-ends	Nome	Existing BMH and CLS	0.0
Shore-ends	Emmonak	New BMH and CLS	9.11
Shore-ends	Naknek	New BMH and CLS	3.20
Shore-ends	Hooper Bay	New BMH and CLS	1.95

Table 2: Front Haul segments from BMH to CLS

3.1 SUBMARINE FOC

3.1 TRUNK AND BRANCH INSTALLATION

The primary marine route includes submarine FOC segments from Nome to Naknek, including a branch to Emmonak and Hooper Bay. The path chosen for the marine routes was identified through desktop studies and a marine route survey, conducted in 2023 and 2024. These engineering and field studies assist in selecting routes that provide considerations for environmental and anthropogenic forms of disturbance on the cable system that may lead to cable faults. The International Cable Protection Committee (ICPC) has identified fishing activities as the primary cause for submarine cable faults and repairs (ICPC 2021). As such, the proposed route identified in the desktop and marine route surveys avoids high-impact fishing grounds where possible. Where ground fishing areas cannot be avoided, the cable would be buried. Shore-end segments of the marine route were identified by avoiding developed shorelines and high energy landfalls that are subject to erosion and defined vessel anchorages. Geophysical reviews were also conducted for the route, and considerations were made to avoid areas prone to sediment slumping, fast currents, and other geological hazards.

The marine route would rely on two or more vessels for construction operations. The vessel used for cable installation operations would be dependent upon water depth, location, and installation method. A cable ship (**Figure 5**) would be used for cable-laying and plowing operations within areas of the marine route with water depths exceeding 49 feet (ft) and would rely on dynamic positioning. Proposed construction in waters shallower than 49 ft would be conducted using a contracted Alaska Vessel of Opportunity (VOO), which is a tug and barge, a small landing craft stored on the cable ship, or any small vessel capable of operating in shallow waters. Additionally, shore-end locations would be assisted by a landing craft. These vessels would have a shallow draft, making shallow waters and landings more accessible.



Figure 5: Main lay cable vessel depiction

The submarine FOC will consist of lightweight submarine cable, while all other marine portions of the route would use either a single or double armor submarine cable. The submarine cable, measuring approximately 1 inch in diameter, is constructed from benign materials (**Figure 6**).



Figure 6: Submarine Cable Profile

Prior to trenching operations on the seabed, a pre-lay grapnel run (PLGR) would be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation would be to identify and clear any seabed debris (e.g., wires, hawsers, fishing gear) deposited along the route. PLGR is conducted by pulling a grapnel (**Figure 7**) along the route over the seabed. Any debris recovered by the grapnel would be discharged ashore upon completion of the operations and disposed of in accordance with local regulations. If debris cannot be recovered, then a local re-route would be planned to avoid the debris. The PLGR operation would be conducted to industry standards for employing towed grapnels, and the type of grapnel would be determined by the nature of the seabed.



Figure 7: Grapnel on the deck of main lay cable vessel

3.2 CONSTRUCTION METHODOLOGY

3.2.1 SURFACE LAY

Submarine FOC components would either be laid on top of the seafloor or buried by plowing. The Cable would be laid on the seafloor within areas identified as low risk to cable disturbance or where traversing seafloor substrates that do not allow for plowing (e.g., steep grades, bedrock). When placing cable on the seafloor, bathymetric conditions would be analyzed so the vessel can lay the cable with the engineered slack necessary to allow the cable to conform to the seafloor. If the substrate allows, plowing would be used where there is significant risk of outside disturbance to the cable. In high-risk areas where the substrate does not allow for plowing, cable armoring would be implemented.

3.2.2 BURIAL

Burial within waters deeper than 40 ft would be conducted using a cable plow (**Figure 8**). Burial within deep sea segments would protect the submarine FOC against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow would be pulled along the seafloor by a tow wire connected to the cable ship. The cable would be fed through the plow's share blade, penetrating seafloor sediments under the plow up to 5 ft deep while excavating a path 1 ft wide. The cable would exit the lower aft end of the share blade, and the sediments would immediately collapse on top of the cable behind the plow.



Figure 8: Submarine Cable Plow

In waters shallower than 40 ft, trenching would occur within areas where cable protection from additional environmental conditions such as surf action and ice scour are needed. At these depths, trenching would be conducted by a jet sled, which is a self-propelled cable trenching system that uses water pressure to destabilize the seafloor and bury the cable. The water used for jetting is supplied from the surface by high pressure hoses. This system would allow for jetting pressure and flow rates to be manipulated based on local conditions. The pressurized water would be focused on the seafloor, liquifying the substrate by turning it into a slurry. The cable would then sink within the trench. The jet sled would be accompanied by divers who would monitor trenching performance and assist in operations. **Figure 9** shows a typical jet sled



Figure 9: Typical jet sled

Upon completing the cable-laying operations, a post-lay inspection and burial will be conducted using a remotely operated vehicle (ROV) equipped for cable trenching. This inspection aims to review sections of the cable ship route where laying operations might have encountered challenges. These challenges include plow failure, unexpected cable repairs, uncontrolled cable payout, branching unit or joint placement, or other unforeseen events. If burial corrections are necessary, the ROV will perform jet burial, similar to the method used by a jet sled, to trench the cable. The ROV will be remotely operated from the cable-laying ship, generating pulsed sounds and utilizing cameras for precise positioning and orientation.

3.2.3 SUBMARINE TRUNK AND BRANCH ROUTES (S1 – S3)

This section describes the primary segments of the proposed submarine cable routes for the trunk and branches, as illustrated in Figure 10. The main trunk route will terminate at an existing Cable Landing Station (CLS) in Nome and a new CLS in Naknek, with a branching unit extending service to a new CLS in Emmonak. The trunk route includes three submarine cable landings—Nome, Emmonak, and Naknek—and features one major river crossing of the Alagnak River along

the T4 terrestrial segment from King Salmon to Igiugig, which includes buried and/or surface-laid terrestrial cable connecting Naknek to Igiugig, as well as community buildouts (aerial and buried) in Emmonak, Naknek, and Igiugig.

Additionally, a dedicated branch line from the NTHE subsea trunk will extend service to Hooper Bay, terminating at a new CLS constructed within the Native Village of Hooper Bay. This submarine spur will include a new Beach Manhole (BMH) at the landing site and a short terrestrial segment connecting to the CLS. This buildout will enable the delivery of middle mile fiber capacity directly to Hooper Bay, supporting a FTTP last-mile deployment throughout the community.

The approximate cable segment distances and design specifications are outlined in Table 3 and are based on Quintillion's current engineering plan. These details remain subject to refinement following completion of the marine survey, environmental review, and permitting phases. Recommendations and conditions identified during these stages may result in modifications to the final route alignment or construction methodology as described in this report.

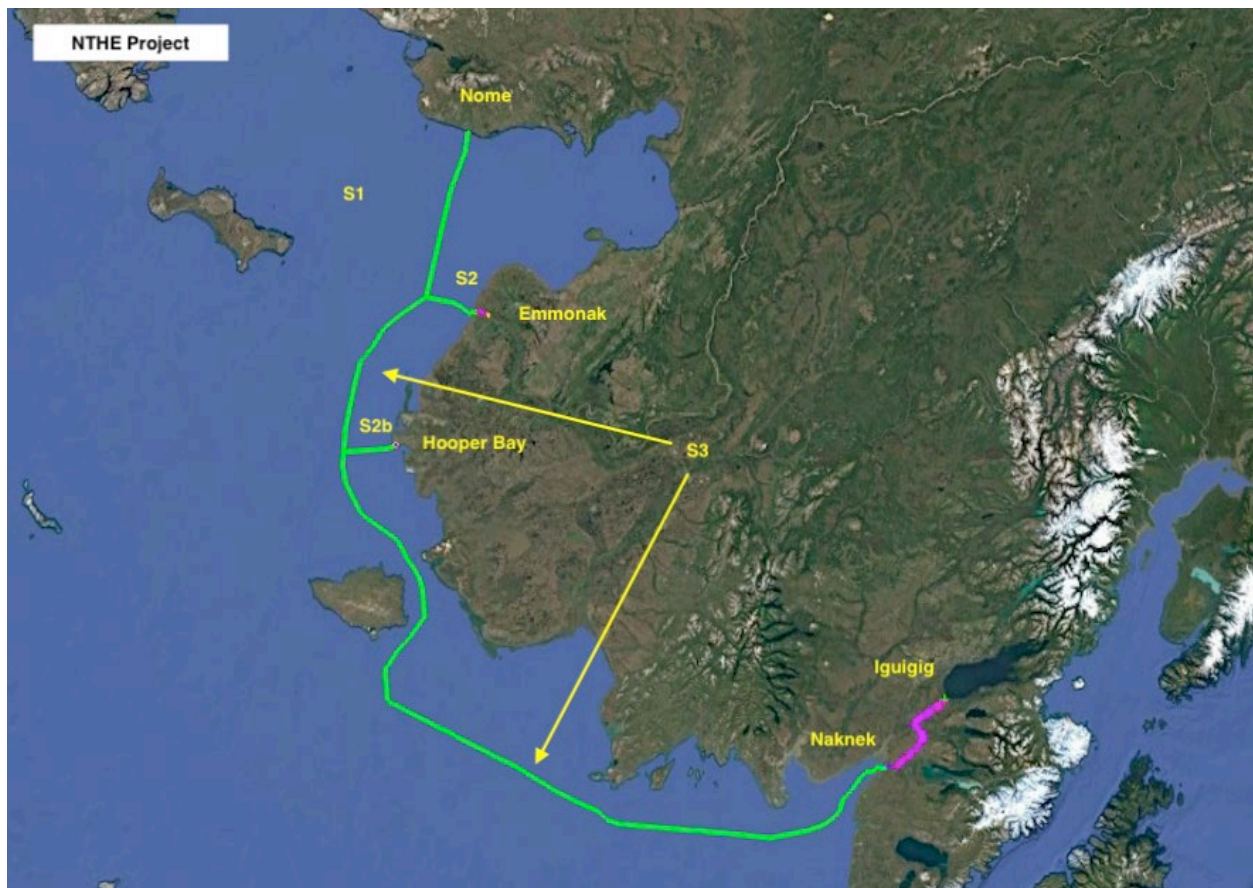


Figure 10: Submarine FOC segments

System Component	Project Area	Seg. ID	From	To	Length (mi.)
Submarine FOC	Bering Sea	S1	Nome BMH	Emmonak BU	113.53
Submarine FOC	Bering Sea	S2	Emmonak BU	Emmonak BMH	35.65
Submarine FOC	Bering Sea	S3	Emmonak BU	Naknek BMH	656.48
Submarine FOC	Bering Sea	S2b	Hooper Bay BU	Hooper Bay BMH	32.33
				Total	837.99

Table 3: Submarine cable segments

3.2.4 SHORE-END INSTALLATION (MLW TO BMH)

Shore-end construction includes segments of the cable route between MLW and a BMH at each landing point. Shore-end construction would occur concurrently with marine construction, at each shore-end, the cable would be trenched within the shoreline between MLW and the BMH. A BMH is an enclosed underground structure that houses the splice between the incoming submarine cable and outgoing terrestrial cable that would connect to the CLS. BMHs are positioned above the high tide line (HTL) and typically measure 3 ft by 4 ft by 4 ft for unpowered cable segments and 4 ft by 6 ft by 6 ft for powered landings (Nome and Naknek). Shore-end trenching would be conducted with either a rock saw or backhoe. When deemed necessary, additional protection may be provided to the cable at landing point locations with split pipe articulated armor (**Figure 11**). Two 4-inch conduits would be buried at no deeper than 36 inches and extend from the BMH to the beach area above MLW, allowing the bank to be disturbed only once. Conduit installation would be conducted in a controlled manner using best management practices prior to the arrival of the cable ship.

**Figure 11:** Articulated Pipe being installed

While conducting shore-end construction, care would be taken to protect shorelines from future erosion. Additionally, best practices would be employed to address stormwater runoff concerns. For all intertidal work (MLW to HTL), construction operations would occur only during low tide. When constructing on shorelines without firm sediments such as large boulders, heavy equipment would be placed on mats to protect the substrate from slumping and erosion. Alterations to shorelines would be temporary. Best management practices to minimize the impact of landfall construction on the environment will be provided in the Environmental Assessment report.

3.2.5 HORIZONTAL DIRECTIONAL DRILLING (HDD)

In locations where Submarine FOC may be disturbed by human activities and/or at risk of damage, burial may be required. The burial depth is determined based upon local conditions (e.g., soil type, anticipated activities in the area, environmental conditions, and operational needs).

Burial is achieved by a variety of means, and includes Horizontal Directional Drilling (HDD), which is typically employed when the submarine cable is landed at the BMH. Specifically, where there are areas of environmental sensitivity and/or risk to the submarine FOC. HDD is accomplished using a large-tracked bore machine (**Figure 12**) to bore a steel conduit underground for the cable.



Figure 12: Bore Machine

When conducting HDD operations, it's common to utilize excavators (**Figure 12**) with an approximately 2–3-foot bucket to excavate bore entry, move equipment and material around the operations site.

3.2.6 BMH LOCATIONS

Beach landing facilities, including the BMH and seaward conduit, would be constructed on public and state tidelands and submerged tidelands using a “mini-sized” tracked excavator. Where conditions preclude the seaward duct from being buried by an excavator at low tide, the seaward duct may be pinned to the seabed or otherwise anchored to a submerged concrete bulkhead to provide seaward stability and prevent the duct from floating off the seabed.

The total time to place a pre-cast concrete BMH vault and construct a seaward conduit is estimated at 4-5 days at each landing, except where HDD will be utilized at Nome (HDD operations may take 3-4 weeks). Staging of equipment and materials would occur on-site and would be compliant with local construction permit requirements obtained at each location. **Table 4** lists the BMH locations/coordinates, and the following sections describe the BMH construction plan and location.

Beach Manholes	Location Coordinates
Nome	64.486583 -165.3207
Emmonak	62.80051 -164.78216
Naknek	58.72439 -157.05553
Hooper Bay	61.51135, - 166.13467

Table 4: BMH locations and coordinates

3.2.7 NOME

A new BMH would be constructed at the Nome landing point (**Figure 13**) to support the new submarine cable landing, as well as a power feed equipment (PFE) communication shelter with standby generator and fuel storage. In addition, HDD seaward conduit may be required to further protect the submarine FOC. An HDD bore machine will be used to cross the Nome-Counsel highway and beach/intertidal area. The existing gravel pad will be expanded to allow construction of a new communication shelter. An excavator would be used for setting BMH, other vaults, installing duct, and fiber. Construction would be completed in Spring/Summer (pending environmental approval).



Figure 13: Nome Landing Point - BMH Location

3.2.8 EMMONAK

A new CLS is proposed in both Emmonak and Naknek. Quintillion, or a contracted field crew, would install fiber along main corridors near anchor institutions and last-mile communication companies within the local communities of Emmonak and Naknek. The installation crew would consist of personnel supported by light duty vehicles (i.e., crew and service trucks), one or two bucket trucks (**Figure 14**), tools, equipment, and possibly traffic control devices and signage.



Figure 14: Bucket Truck

The front haul route for Emmonak, which is the portion of the route extending from the BMH to the CLS in Emmonak (**Figure 15**), is planned to be surface laid across land managed by Emmonak Corporation. The cable would be installed where existing poles exist (from Alaska Village Electric Cooperative) in Emmonak to reach the proposed CLS. Quintillion would communicate proactively with property owners in the area to inform them of its installation schedule, and coordinate work as necessary.

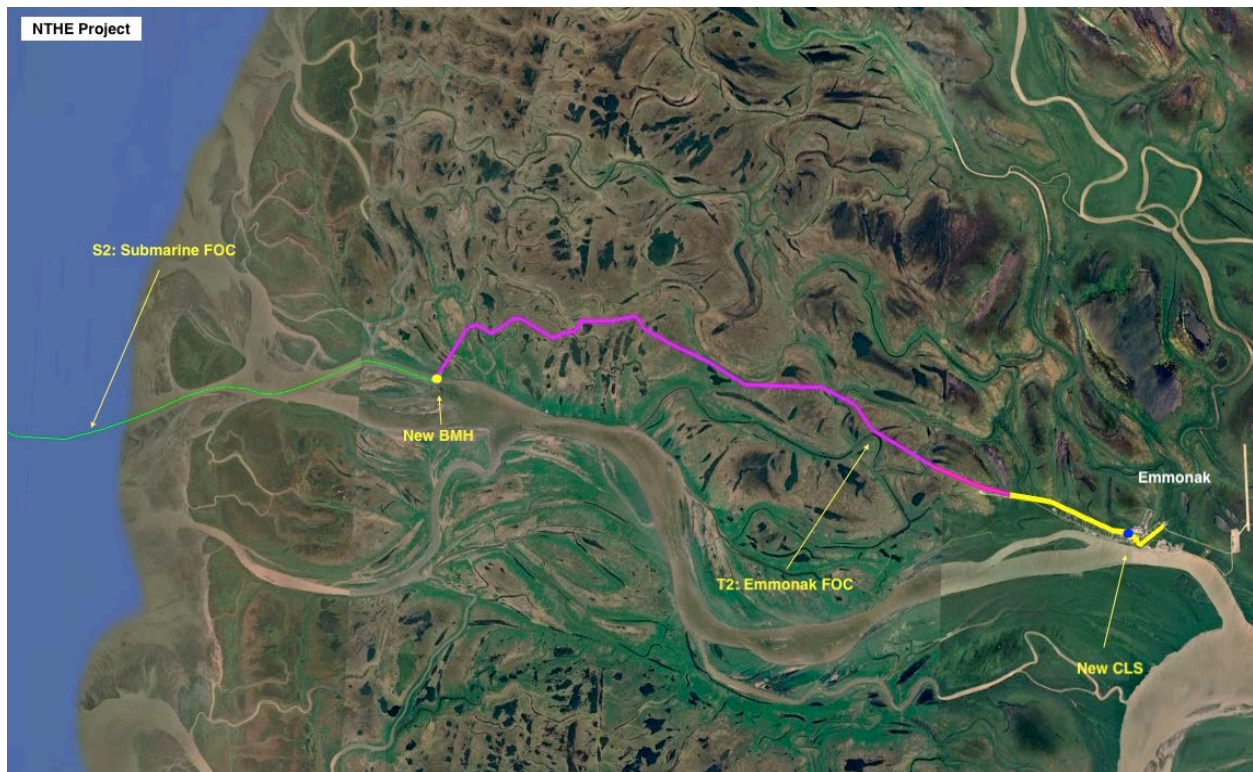


Figure 15: Emmonak Landing Point – BMH location

3.2.9 NAKNEK

The Naknek landing (**Figure 16**) is planned to be located near the existing wastewater treatment plant at Cape Suwarof. This location avoids other tidal users and leverages existing access infrastructure. A new BMH and HDD conduit from the BMH to a concrete headwall would be placed near the base of the bluff. HDD is preferred to avoid erosion of the bluff. The cable would be buried from the headwall seaward with mini excavator. A new CLS facility will be constructed in Naknek to house submarine line terminal and power feed equipment. Cabling between the BMH and CLS would be installed via conventional burial within existing utility ROW to the extent feasible. Buried ground anodes would be placed nearby the BMH to serve as a system ground for the submarine cable.



Figure 16: Naknek Landing Point – BMH location

3.2.10 HOOPER BAY

The Hooper Bay landing (**Figure 17**) is planned to be located south of the airport. This location avoids other tidal users and a wide gravel shoreline below HTL. This spur will come ashore at a new BMH, extend inland to a newly constructed CLS, and support the deployment of a full FTTP last-mile network. A new CLS facility will be constructed in Hooper Bay to house submarine line terminal and power feed equipment.

The new BMH would be placed above HTL. Buried ground anodes would be placed nearby the BMH to serve as a system ground for the submarine cable. HDD conduit would be trenched from the BMH across DOT&PF airport property and then surface laid to the airport road. The cable would be trenched along the airport road for approximately 0.66 mile to a power pole with a mini excavator. From this power pole, the FOC would be aerial to the CLS and throughout the community.



Figure 17: Hooper Bay Landing Point – BMH location

3.3 TERRESTRIAL FOC

As described in **Figure 3** in section 3.1, the terrestrial route starts at the BMH and extends to the CLS, in most cases, and can in some cases extend beyond the CLS to allow last-mile providers easier access to the Submarine cable system. The terrestrial FOC components include the front haul, CLS and some back haul. The following sections describe the proposed terrestrial FOC construction activities.

3.3.1 FRONT HAUL SEGMENTS

The proposed submarine cable would include the construction of several front haul segments to include Nome, Emmonak, Naknek, Homer, and Hooper Bay. The term “front haul” is used in the submarine cable system industry to describe the segment of cable from the BMH to the CLS. The BMH is the point where the submarine cable is spliced or transitions to terrestrial cable, which is constructed from the BMH to the CLS, where the FOC is terminated. **Table 5** lists the fronthaul segments and associated facilities.

System Component	Project Area	Segment ID	Distance (mi.)	Associated Facilities
Fronthaul	Nome	T1	0.00	Existing BMH and CLS, and new BU
Fronthaul	Emmonak	T2	9.11	New BMH and New CLS
Fronthaul	Naknek	T3	3.20	New BMH and New CLS
Fronthaul	Hooper Bay	T7	1.95	New MBH and New CLS

Table 5: Fronthaul segments (BMH to CLS)

3.3.2 CABLE LANDING STATION & COMMUNICATION SHELTER LOCATIONS

The CLS is a building that provides the enclosure for the submarine line terminal equipment, terrestrial transmission equipment, any required power feed equipment, network monitoring equipment, and building management equipment. The terrestrial FOC from the BMH terminates in the CLS and connects to the submarine line terminal equipment. The NTHE project would utilize an existing CLS at Nome and Homer. A new CLS building is proposed at Emmonak, Naknek, and Hooper Bay, as well as a small communication building in the Igiugig area. Table 6 lists the CLS locations/coordinates, while **Figure 18** illustrates a typical CLS building.

CLS	Existing or New	Location Coordinates
Nome	Existing CLS	64.486538 -165.320710
Emmonak	New CLS	62.778093 -164.534843
Naknek	New CLS	58.731087 -157.993489
Igiugig	New Communication Shelter	59.307638 -155.911942
Homer	Existing CLS	59.641613 -151.545950
Hooper Bay	New CLS	61.526920, -166.110252

Table 6: CLS location/coordinates

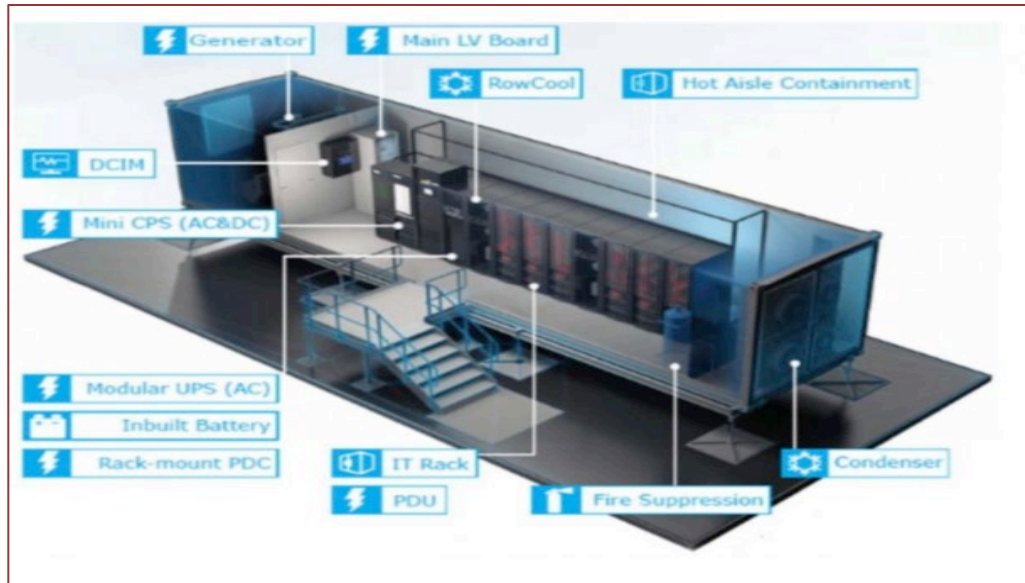


Figure 18: Typical CLS internal configuration

3.3.3 CONSTRUCTION METHODOLOGY

Terrestrial route segments crossing extensive wetlands would be installed during winter months, when the substrate is frozen, to minimize ground disturbances. Wetland segments would use a lightweight submarine cable provided in drums or containers that are towed by light tracked vehicles. Lightweight submarine cables would be coated in high-density polyethylene and measure approximately 0.5 inch in diameter. A splice joint case approximately 10 inches in diameter would be located along the route, approximately every 6.81 miles along the route, to join cable segments. Additional slack would be provided when laying the cable to allow it to settle on the vegetation and conform to changing surface features and environmental conditions. When crossing overland sections, the cable would either be laid across the ground surface or trenched. Placing the cable directly on the ground surface significantly reduces wetland impacts and is the preferred installation method. The cable would be buried where the route is close to trails, crosses streambanks and riverbanks, or is in other locations where the cable may be susceptible to damage. Additionally, unless the cable is being routed on riser poles, it would be trenched within 0.6 mi of each community. If permafrost is present during trenching with any method, the trenching would only occur within the vegetative mat above the permafrost, and the permafrost would be left intact.

The process of laying cable within wetlands would begin by removing deep snow from the cable route. Buried cable segments over wetlands would then be excavated and the cable laid directly within the trench. Trench depth would be targeted at a minimum of 12 inches and would vary with the terrain, with maximum depth of 48". Submarine cable would be used to cross streams and rivers. The cable would be spliced with the terrestrial FOC and buried into each stream bank below the ordinary high-water level. Split pipe articulated armor and driven cable anchors may be deployed in stream crossings for extra stabilization and protection.

Natural sediment transport would passively bury the cable. Additionally, the cable would be equipped with an outer plastic covering to avoid frazil (loose, randomly oriented) ice buildup. Care would be taken to position the crossings on stable banks to provide erosion protection. When constructing on soft and unstable sediments, heavy equipment would be placed on mats (**Figure 19**). The position of the laid cable would be recorded with a survey-quality Global Positioning System (GPS). Post-lay inspection for terrestrial components would be conducted following snow and ice melt. Any cable left suspended after the snow melt would be repositioned so as not to be hazardous for humans or animals. Cable repositioning would be done manually by moving the installed slack cable accordingly. If needed, the cable would be pinned to the ground using small duckbill anchors that would be installed using a hammer and drive pin. Cable left on the vegetation would sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Helicopter and walking inspections would be conducted on an annual basis to monitor erosion and bank failure.



Figure 19: Drill mat “road”

In general, equipment used across overland routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Small bulldozer or other tracked machine to remove snow
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Rock saw

- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Small utility boat for larger rivers
- Splicing equipment, small genset, and splicing tent

The method of construction is determined by considering environmental impact, cost, logistical feasibility, and weather conditions. An effective method to mitigate environmental impacts is to conduct construction during specific weather windows, summer vs winter, which are in some cases dictated by permitting agencies. The NTHE project has two project areas that have weather windows as represented in the **Figure 20** for T2 Emmonak, and **Figure 21** for T4 King Salmon to Igiugig.



Figure 20: Construction weather window for T2 Emmonak

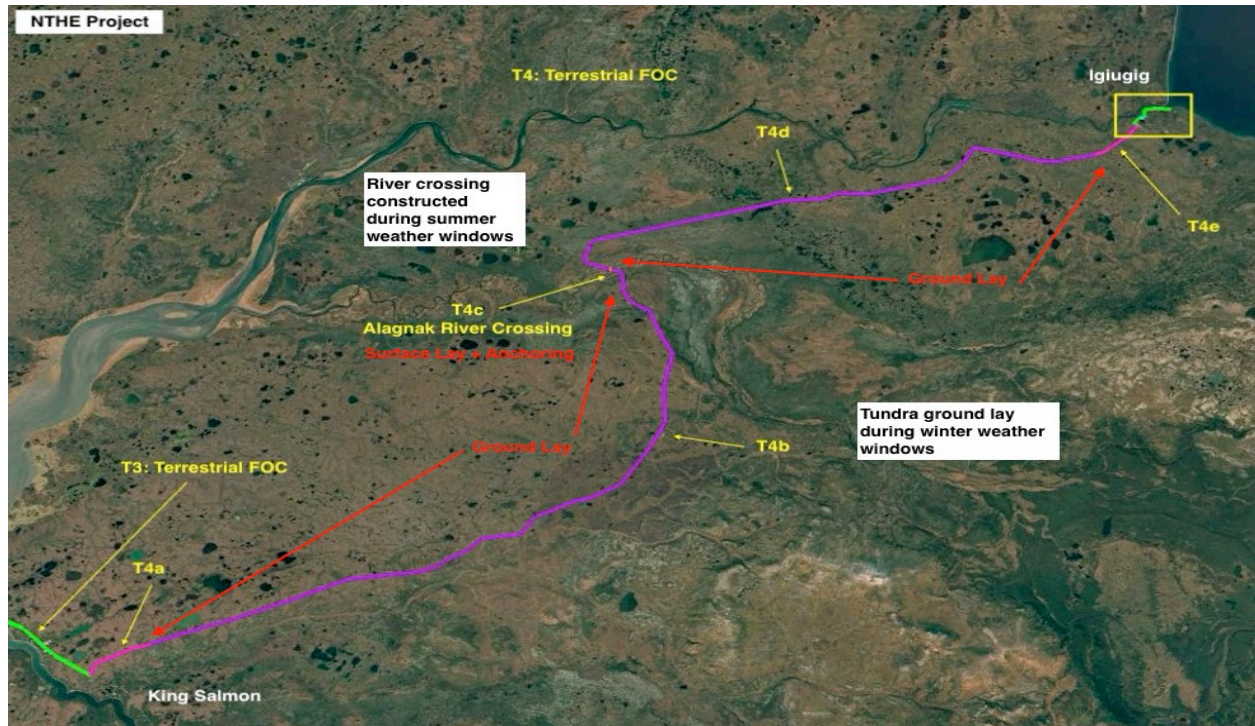


Figure 21: Construction weather window for T4 King Salmon to Igiugig

3.3.4 SURFACE LAY

In previously undisturbed areas along the cable route, Quintillion aims to limit disturbances and impacts to the environment by laying the cable on the surface where feasible, anchoring where needed. Due to the remote nature of some of the cable route's segments, surface-laid cable would not be at risk of damage from other users or their activities.

The terrestrial segment between greater Naknek and Igiugig is currently an undisturbed area. Due to its remote location and the difficulty of bringing heavy equipment on-site, Quintillion proposes to surface-lay the cable in the winter months, when the substrate is frozen, to minimize ground disturbance. The risk of damage to the cable is low in this area with few other ongoing activities. The frozen ground helps protect vegetation while also being stable enough to support heavy equipment. Surface lay overland segments will use a lightweight submarine cable provided in large spools that are towed by light tracked vehicles. Over the course of several freeze and thaw cycles, it is anticipated that the cable will become embedded into the surface layer or achieve a shallow self-bury.

In areas where land managers or other stakeholders prefer burial, Quintillion proposes to shallow-bury the cable by trenching within the upper 12-18 inches of the surface, with a minimum depth of approximately 12 inches depth (if achievable). This method would require much less excavation and lighter equipment than a typical buried cable, minimizing impacts to the environment, while remaining feasible to mobilize such equipment on-site at these locations. The cable will also be shallow buried when the route is near trails, crosses streambanks and riverbanks, or is in other places where the cable may be susceptible to damage. Additionally, unless the cable is being routed on poles, it will be buried within 0.6 mi of each receiving community. Trenching activities will be conducted with a backhoe along streams and riverbanks. All other winter trenching activities will be completed with a rock saw.

3.3.5 BURIAL

Burial is achieved by a variety of means, most commonly, telecommunications cables are buried by plowing, trenching, and horizontal directional drilling, and include the installation of conduits in some scenarios. For newly buried construction along existing rights-of-way (ROW), Quintillion would follow storm water pollution prevention plans (SWPPP), and other requirements associated with this installation effort. Burial will include conduits where appropriate, and following conduit installation, fiber optic cable would be pulled or “blown” into place. Hand holes would be placed along the route as necessary to provide future access points to the fiber system and splice cable segments together. The location and spacing of the hand holes will be subject to final design.

Due to the anticipated landscape conditions of the NTHE project (i.e., tundra), conventional trenching is likely not feasible. In undisturbed tundra conditions, a shallower trench would be excavated using a rock saw or chain trencher to cut a narrow slot, with the cable buried to a minimum of approximately 12 inches below grade. Performing this trenching during winter conditions allows the local environment to better withstand impacts from the heavy machinery in the area, such as tracked chain trenchers or rock saw for installation. Inspections would be conducted in summer to verify trench cover and would then be backfilled by hand as required.

3.3.6 TRENCHING

Trenching techniques will vary, depending on local conditions and the presence of other utilities near the NTHE cable route. A trenched burial is typically to a depth of 12-48 inches (minimum 12 inches if achievable), depending on the conditions. Due to the anticipated landscape conditions of the NTHE project (i.e., tundra), conventional trenching is likely not feasible. In undisturbed tundra conditions, a shallower trench would be excavated using micro-trenching, with the cable buried to a minimum of approximately 12 inches below grade. Performing this trenching during winter conditions allows the local environment to better withstand impacts from the heavy machinery in the area, such as tracked chain trenchers or rock saw (**Figure 22**) for installation. Inspections would be conducted in summer to verify trench cover and backfill as required.



Figure 22: Rock saw trencher

In areas accessible for summer construction, backhoes and excavators would be utilized to excavate and backfill a trench for placement of conduit. Non-mechanical trenching would be employed as necessary to install buried cable near other utilities. Excavators (**Figure 23**) with an approximately 2–3-foot bucket are utilized to trench an opening for laying the conduit, installing CVs, and moving materials around the construction site.



Figure 23: Excavator

Associated with burial are handholes and cable vaults, which are used to house extra cable, splice points and access points for further distribution of the FOC. **Figure 24** is a typical hand hole, while **Figure 25** illustrates a typical cable vault.



Figure 24: Handhole with FOC and splice case



Figure 25: Cable Vault with extra FOC cable

3.3.7 HORIZONTAL DIRECTIONAL DRILLING (HDD)

HDD is commonly utilized where there are congested areas with other utilities, and to reduce environmental impact. HDD is accomplished using a small-tracked bore machine (**Figure 26**) to bore a conduit underground for the cable. While HDD is a good construction method to reduce environmental impact, it must be noted that in the remote tundra areas of Alaska, utilization of this method is limited due to logistics and the harsh environmental conditions that may prohibit the use.



Figure 26: HDD rig utilized in terrestrial boring

In general, equipment used at each landfall location may include:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Chain trencher or cable plow (optional)
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Winch or turning sheave
- Small utility boat to run the pull line to the beach
- Splicing equipment, small genset, and splicing tent

3.3.8 AERIAL INSTALLATION

Aerial installation involves mounting the cable between poles. Where there is pre-existing pole infrastructure, Quintillion will seek to utilize it to the greatest extent feasible to minimize additional disturbances and construction activity. Additionally, aerial installation will be considered for areas where burial or surface-laid cable cannot be achieved. Quintillion's crews would use a highway-based boom truck (flatbed truck with a boom crane) and bucket truck (**Figure 27**), a cable trailer, traffic control lighting, and light vehicles for crew and tools, where necessary, for any aerial installations.



Figure 27: Aerial Pole Construction

When crossing anadromous waterbodies, the cable installation would include shallow burial across shallow channels and vegetated areas in winter, and armored cable laid on the riverbed's main channel after opening of the ice. The FOC will be surface laid and anchored by driven stakes to secure the cable in the river flow. The crossing methodology will be determined by the final design, accounting for feedback from land managers and other stakeholders.

3.3.9 TERRESTRIAL FOC ROUTES

Terrestrial segments are located at Nome (T1), Emmonak (T2), Naknek to King Salmon (T3), King Salmon to Igiugig (T4), and Hooper Bay (T7) as listed in **Table 7**. In Nome the construction plan expands the existing BMH and landing point site to include PFE shelter and larger BMH. The Emmonak segment includes front haul from the BMH to the CLS but also extends the cable beyond the CLS to provide access to the FOC for ACIs. At Naknek the terrestrial FOC segment includes fronthaul but also extends the system beyond Naknek to Igiugig to a point just short of King Salmon, where the cable turns north to Igiugig. The King Salmon to Igiugig segment begins at the turning point at King Salmon and includes the Alagnak river crossing, extending the system to Igiugig, where the Terrestrial FOC will interconnect with the leased fiber pairs at the GCI CLS. The Hooper Bay segment includes front haul from the BMH to the CLS but also extends the cable beyond the CLS to provide FOTP for the community through aerial installation.

The following table summarizes the terrestrial routes:

Segment Type	Project Area	Seg ID	from	to	Length (mi.)
Terrestrial FOC	Nome	T1	BMH	Power Hut	0
Terrestrial FOC	Emmonak	T2	Emmonak BMH	End of Route	9.46
Terrestrial FOC	Naknek – King Salmon	T3	Naknek BMH	King Salmon	10.33
Terrestrial FOC	King Salmon – Igiugig	T4	King Salmon	End of Route	68.89
Terrestrial FOC	Hooper Bay	T7	Hooper Bay BMH	FTTP	6.12
				Total Length	94.80

Table 7: Terrestrial segment distances

3.3.10 NOME

As described in previous sections, there will be a new BMH, PFE shelter, and HDD pipe installed at the landing point. However, there is no need to construct a terrestrial FOC from the BMH to the existing CLS.

The CLS in Nome is an existing structure in operation currently. New equipment may be placed in the CLS. No physical alterations to the building are planned. The existing gravel pad will be expanded, and a new facility will be constructed at the existing BMH site to house PFE for the cable extending between Nome and Naknek.

3.3.11 EMMONAK (T2)

In Emmonak, a terrestrial fiber optic cable will extend from the BMH to a new CLS to be constructed in Emmonak, as shown in **Figure 28**. This fiber optic route will consist of a surface laid submarine type cable across undisturbed tundra from the BMH to a point near the Emmonak waste disposal area, where a CV would be placed prior to transitioning to conventional aerial attachment on existing utility poles for the remainder of the route to the CLS (**Table 8**).

The FOC route in Emmonak will also extend past the CLS, providing strategically placed access points to serve anchor institutions, passing less than 1000ft from three Anchor Institutions. The Emmonak Community Center, Emmonak Clinic, and Emmonak School. Quintillion will work with landowners and tribal communities to identify future anchor institutions, and consider these needs, if any additional needs are identified.

Segment	ID	Distance (mi.)	Construction Method
T2	A	0.64	TGL – Tundra Ground Lay
T2	B	0.13	Anchored Water Crossing
T2	C	0.33	TGL – Tundra Ground Lay

T2	D	0.07	Anchored Water Crossing
T2	E	4.18	TGL – Tundra Ground Lay
T2	F	0.18	Anchored Water Crossing
T2	G	0.97	TGL – Tundra Ground Lay
T2	H	0.28	Anchored Water Crossing
T2	I	0.93	SBT – Shallow Bury Trench
T2	J	1.34	Aerial Pole Line
T2	K	0.01	Aerial Pole Line
T2	L	0.34	Aerial Pole Line

Table 8: Segment T2 Construction Method by segment ID**Figure 28:** Terrestrial Segments Emmonak

Regarding the CLS in Emmonak, an existing building will be modified into the CLS or replace an existing structure with a communications shelter. FOC will be buried along the main road and will have buried vaults that allow us to branch off to Community Anchor Institutions. One of these vaults will be near the chosen CLS location, with the connecting fiber to be buried and inside conduit where it connects to the building.



Figure 29: Communications Shelter

3.3.12 NAKNEK TO KING SALMON (T3)

In Naknek, a telecommunications shelter will be placed along the fiber route and install equipment to serve as the CLS. FOC will be buried along the main road and will have buried vaults that allow us to branch off to CAIs. One of these vaults will be near the chosen CLS location, with the connecting fiber to be buried and inside conduit where it connects to the building. See **Figure 29** above for a sample shelter.

The terrestrial segment would travel east out of Naknek, beyond the CLS to a turning point near King Salmon before turning north to Igiugig across an undeveloped tundra environment (**Figure 30**). In Naknek, the cable would be installed via conventional burial, and directional boring (**Table 9**), leveraging existing utility ROW to the extent possible. Beyond the developed area of Naknek, the cable is planned as a half-inch armored type, surface-laid directly on the tundra or shallow-buried during winter. Installation methodology is subject to final design, determined in part by feedback from the land managers and other stakeholders.

Segment	ID	Distance (mi.)	Construction Method
T3	A	0.96	Standard Burial
T3	B	0.84	Standard Burial
T3	C	0.04	DB -Directional Bore
T3	D	0.02	Standard Burial
T3	E	0.06	DB -Directional Bore
T3	F	0.12	Standard Burial
T3	G	0.57	DB -Directional Bore
T3	H	0.04	Standard Burial
T3	I	0.51	DB -Directional Bore
T3	J	0.003	Standard Burial
T3	K	0.27	DB -Directional Bore
T3	L	0.37	Standard Burial
T3	M	0.13	DB -Directional Bore
T3	N	0.19	Standard Burial

T3	O	0.06	DB -Directional Bore
T3	P	0.66	Standard Burial
T3	Q	0.10	DB -Directional Bore
T3	R	0.03	Standard Burial
T3	S	0.13	DB -Directional Bore
T3	T	0.06	Aerial Pole Line
T3	U	0.41	DB -Directional Bore
T3	V	1.86	Standard Burial
T3	W	0.06	DB -Directional Bore
T3	X	0.36	Standard Burial
T3	Y	0.05	DB -Directional Bore
T3	Z	2.06	Standard Burial

Table 9: Segment T3 Naknek Construction Method by segment ID



Figure 30: Terrestrial Segments from Naknek to King Salmon

3.3.13 KING SALMON TO IGIUGIG (T4)

At a point near King Salmon, the FOC route turns north to Igiugig across an undeveloped tundra environment (**Figure 31**). Beyond the developed area at this turning point, the cable is planned as a half-inch armored type, surface-laid directly on the tundra or shallow-buried during winter (**Table 10**). Installation methodology is subject to final design, determined in part by feedback from the land managers and other stakeholders.

This route would cross the Alagnak River on lands managed by the U.S. Bureau of Land Management (BLM). The proposed installation would include shallow burial across shallow channels and vegetated areas in winter, and armored cable laid on the riverbed's main channel after opening of the ice. The FOC will be laid on the surface and anchored by driven stakes to secure the cable in the river flow.

A small communications shelter is planned for Igiugig to house the required amplifier equipment due to the distances from Igiugig to Homer. This equipment will amplify the signal at this intermediate point between these locations. In addition, a terrestrial FOC (1 mi.) will be installed from the communications shelter to the GCI CSL, and another distribution cable from the communication shelter to a vault just short of Iliamna Lake for future access to community CAIs. This distribution FOC provides fiber access points are strategically planned along the route for future services to CAIs and local service providers. The planned FOC route will be roughly 1500ft from the Camai Community Health Center and the Bristol Bay School District building and roughly 1200ft from the Naknek Health Clinic. In Igiugig, the FOC will pass the airport and will be about 25ft from the school.

Segment	ID	Distance (mi.)	Construction Method
T4	A	0.88	SBT – Shallow Bury Trench
T4	B	0.06	Anchored Water Crossing
T4	C	0.30	SBT – Shallow Bury Trench
T4	D	0.03	Anchored Water Crossing
T4	E	0.90	SBT – Shallow Bury Trench
T4	F	2.32	TGL – Tundra Ground Lay
T4	G	0.05	Anchored Water Crossing
T4	H	1.11	TGL – Tundra Ground Lay
T4	I	0.09	Anchored Water Crossing
T4	J	00.89	TGL – Tundra Ground Lay
T4	K	0.04	Anchored Water Crossing
T4	L	2.31	TGL – Tundra Ground Lay
T4	M	0.05	Anchored Water Crossing
T4	N	0.89	TGL – Tundra Ground Lay
T4	O	0.07	Anchored Water Crossing
T4	P	0.30	TGL – Tundra Ground Lay
T4	Q	0.05	Anchored Water Crossing
T4	R	0.90	TGL – Tundra Ground Lay
T4	S	0.10	Anchored Water Crossing
T4	T	0.52	TGL – Tundra Ground Lay
T4	U	0.10	Anchored Water Crossing
T4	V	6.69	TGL – Tundra Ground Lay
T4	W	0.12	Anchored Water Crossing
T4	X	1.39	TGL – Tundra Ground Lay

T4	Y	0.06	Anchored Water Crossing
T4	Z	3.61	TGL – Tundra Ground Lay
T4	Aa	0.03	Anchored Water Crossing
T4	Ab	2.77	TGL – Tundra Ground Lay
T4	Ac	0.06	Anchored Water Crossing
T4	Ad	5.18	TGL – Tundra Ground Lay
T4	Ae	0.11	Anchored Water Crossing
T4	Af	2.31	TGL – Tundra Ground Lay
T4	Ag	0.02	Anchored Water Crossing
T4	Ah	2.32	TGL – Tundra Ground Lay
T4	Ai	0.02	Anchored Water Crossing
T4	Aj	1.37	TGL – Tundra Ground Lay
T4	Ak	0.17	Anchored Water Crossing
T4	Al	0.16	TGL – Tundra Ground Lay
T4	Am	0.07	Anchored Water Crossing
T4	An	1.14	TGL – Tundra Ground Lay
T4	Ao	0.06	Anchored Water Crossing
T4	Ap	0.32	TGL – Tundra Ground Lay
T4	Aq	0.08	Anchored Water Crossing
T4	Ar	9.69	TGL – Tundra Ground Lay
T4	As	0.09	Anchored Water Crossing
T4	At	0.54	TGL – Tundra Ground Lay
T4	Au	0.06	Anchored Water Crossing
T4	Av	1.92	TGL – Tundra Ground Lay
T4	Aw	0.03	Anchored Water Crossing
T4	Ax	2.95	TGL – Tundra Ground Lay
T4	Ay	0.09	Anchored Water Crossing
T4	Az	1.50	TGL – Tundra Ground Lay
T4	Ba	0.07	Anchored Water Crossing
T4	Bb	0.58	TGL – Tundra Ground Lay
T4	Bc	0.12	Anchored Water Crossing
T4	Bd	2.19	TGL – Tundra Ground Lay
T4	Be	2.08	SBT – Shallow Bury Trench
T4	Bf	0.03	Anchored Water Crossing
T4	Bg	1.67	TGL – Tundra Ground Lay
T4	Bh	1.34	SBT – Shallow Bury Trench
T4	Bi	0.06	Anchored Water Crossing
T4	Bj	1.23	SBT – Shallow Bury Trench
T4	Bk	0.09	Standard Burial
T4	Bl	0.01	DB -Directional Bore
T4	Bm	0.00	Standard Burial
T4	Bn	0.14	Standard Burial
T4	Bo	0.01	DB -Directional Bore

T4	Bp	0.29	Standard Burial
T4	Bq	0.01	DB -Directional Bore
T4	Br	0.20	Standard Burial
T4	Bs	0.24	DB -Directional Bore
T4	Bt	1.29	Standard Burial

Table 10: Segment T4 King Salmon to Igiugig Construction Method by segment ID

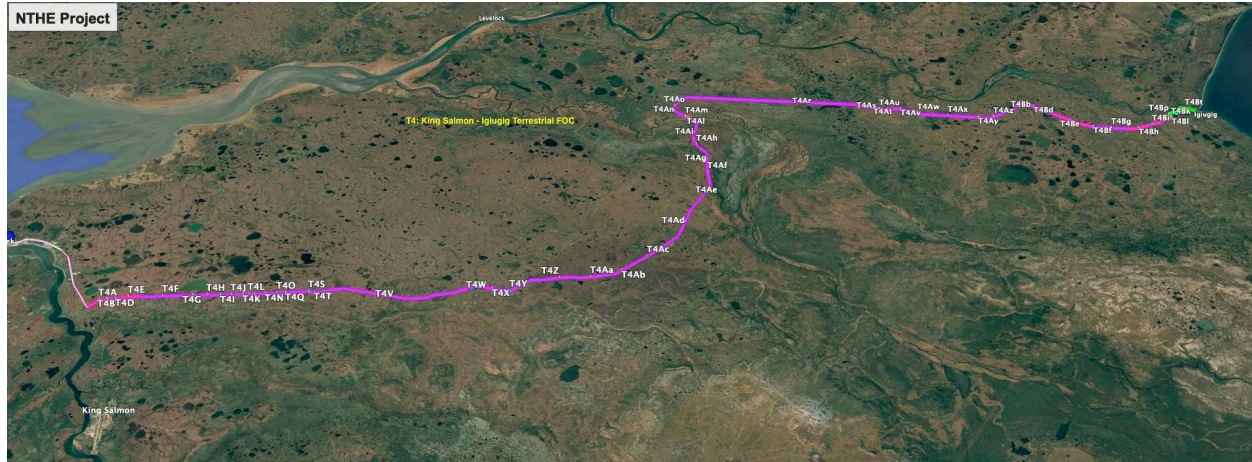


Figure 31: Terrestrial Segments from King Salmon to Igiugig

3.3.14 HOOPER BAY (T7)

In Hooper Bay, a terrestrial fiber optic cable will extend from the BMH to a new CLS to be constructed in Hooper Bay, as shown in **Figure 32**, as well as **distribution segments beyond the CLS**. This fiber optic route will consist of a trenched cable from the BMH across DOT&PF airport property and then a surface laid submarine type cable across undisturbed tundra from the BMH to a point along the airport road where the FOC would be trenched 0.66 mile to a power pole. At the transition power pole, a CV would be placed prior to transitioning to conventional aerial attachment on existing utility poles for the remainder of the route to the CLS (**Table 9**). The FOC route in Hooper Bay will also extend past the CLS, providing FTTP.

Segment	ID	Distance (mi.)	Construction Method
T7	A	0.93	TGL – Tundra Ground Lay
T7	B	0.18	Standard Burial
T7	C	0.18	Standard Burial
T7	D	0.67	Aerial – Existing Pole Line
T7	E	1.06	Aerial – Existing Pole Line
T7	F	0.10	Aerial – Existing Pole Line
T7	G	0.44	Aerial – Existing Pole Line
T7	H	1.39	Aerial – Existing Pole Line
T7	I	0.30	Aerial – Existing Pole Line

Prior to finalizing the submarine cable routes, a geophysical and geotechnical survey of the entire proposed submerged segments will be conducted. Survey work would include beach topographic, and offshore geophysical, and geotechnical surveys. The topographic survey would be to determine the precise cable landing points, BMH locations, shore tide line, and all other necessary topography features. The marine geophysical and geotechnical survey of the planned marine cable segments is required to identify suitable cable routes for these segments along the seabed. Data to be collected include geophysical (multibeam echo sounder, side scan sonar, sub bottom profiler) and geotechnical (cone penetration tests (CPTs), gravity cores and grab samples) data to identify seabed bathymetry and bathymetric features, surface and subsurface geology, and any seafloor and substrate obstructions or limitations. This data is needed to identify the best and most environmentally sensible cable routes. The data will also be evaluated to locate feasible burial conditions to better protect the cable based on site specific conditions. This survey data will assist with the review under the National Environmental Policy Act (NEPA) and supporting documents.

Bottom samples would be taken using a combination of cone penetration tests (CPTs), gravity core or similar, and/or grab sampler. Samples would be taken either every 3.1 or 6.2 miles, based on data collected during the geophysical portion of the survey. These samples would provide an understanding of the nature of the sediment type of the seafloor. Samples would be discarded over the side of the ship after analysis is completed. Findings from this offshore survey would be used to develop a suitable route for the submarine section of the NTHE network. The submarine cable segments are planned to be 100% buried at a minimum depth of approximately 3 feet. In the event there are other submarine cables in the vicinity, the marine survey contractor will collect magnetometer survey data and side scan sonar data to identify the existing cable systems, and crossing agreements with in-service cable owners will be created per industry standards for cable crossings.

Terrestrial surveys may also occur in the form of in-field investigations where cultural resources and/or any critical habitats are identified. No construction activities would be conducted during any survey efforts.

4. STAKEHOLDER AND TRIBAL ENGAGEMENT

Quintillion has commenced government, public, and industry engagement activities regarding the project and intends to continue ongoing engagement as the project progresses.

4.1 APPLICATION PERIOD OUTREACH

Quintillion conducted community outreach and engagement during the grant application preparation period. This included coordinating with local stakeholders to gain feedback. This effort consisted of postings on the Quintillion website, emails to key Stakeholders, meetings and attendance of community council meetings. The Stakeholders included various community entities, such as tribal councils, corporations and landowners. The program sought stakeholder feedback and specifically any concerns with that project that needed to be addressed. The communities support the project and are interested in the benefits that this system will bring to the area. In addition, Quintillion is also continuing the outreach, as the project progresses through environmental assessment and permitting process, seeking stakeholder acceptance of the plan. Quintillion will contact community leaders in Hooper Bay to post flyers in the community center with information about the project and signing up for service.

4.2 TRIBAL/ALASKA NATIVE CLAIMS SETTLEMENT ACT STAKEHOLDER SUPPORT

Quintillion continues ongoing coordination with tribal members to define positive impacts to tribally- and Alaska Native Claims Settlement Act (ANCSA)-owned facilities and land, and the sociocultural benefits of broadband availability.

4.3 CONTINUED STAKEHOLDER ENGAGEMENT

Quintillion intends to continue sharing key project milestones as the project (**Figure 33**) progresses. This would occur through bilateral communication with tribes and local government, as well as press releases and announcements.

Following environmental and regulatory approvals, Quintillion would announce an update to its project schedule, which is dependent upon the timing of the NEPA and environmental approval processes. Prior to terrestrial construction, Quintillion would notify communities of upcoming construction activities and would coordinate with property owners on the build-out of local community fiber networks.

5. NATIONAL ENVIRONMENTAL POLICY ACT

The projects are funded by grants awarded by NTIA and the RUS, and is therefore subject to evaluation under NEPA. NTIA will serve as the lead federal agency for NEPA compliance, with RUS and the Bureau of Land Management (BLM) participating as cooperating agencies. NTIA will coordinate the environmental review process, including the determination of whether the project qualifies for a categorical exclusion, requires an Environmental Assessment (EA), or necessitates a more comprehensive Environmental Impact Statement. At this time, preparation of an EA is anticipated.

Documentation submitted for NEPA evaluation would address the project's purpose and need, a reasonable range of alternatives, environmental impacts of the proposed action and alternatives, consultations with stakeholders, and ultimately determines whether the action has the potential to cause significant effects on the environment. This process would include consultations with National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) on protected species and habitat (i.e., Endangered Species Act [ESA], Essential Fish Habitat [EFH]), as well as consultations with the Alaska Department of Archaeology and Historic Preservation (i.e., the State Historic Preservation Office [SHPO]) on cultural resources. If the agencies determine that the action would not have significant impacts on environmental and cultural resources, NTIA will issue a FONSI. However, if the environmental review determines that the environmental impacts of a proposed Federal action would be significant, a Notice of Intent to prepare an EIS would be issued.

Although submarine cable systems are considered low-impact projects and environmentally benign, the permitting process will involve coordination with multiple federal, state, and local agencies. A summary of anticipated permits and approvals is provided in Table 11, with the final list to be confirmed in consultation with the relevant regulatory authorities.

Land status is a key consideration in permitting. The marine segments of the project will involve coordination with agencies such as the U.S. Army Corps of Engineers (USACE), U.S. Fish & Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Bureau of Land Management (BLM) and the Alaska Department of Natural Resources (ADNR). Terrestrial cable segments will be located within existing rights-of-way (ROW) managed by the Alaska Department of Transportation and Public Facilities (DOT-PF), BLM, and ADNR. Fiber will be installed utilizing various construction methods, including ground lay, shallow burial, standard burial, and directional boring, as well as some aerial on existing utility poles to minimize disturbance and remain within the existing ROW to the greatest extent possible.

Responsible Agency	Permit or Approval	Regulated Activity
USACE	Nationwide permit (NWP) #6 Survey Activities NWP #57 Utility Line Activities	Geophysical sediment sampling. Construction of utility lines and associated facilities provided the activity does not result in the loss of greater than ½-acre of waters of the U.S. for the complete project.
	Federal Section 10 Permit <i>River and Harbors Act of 1899</i>	Construction of artificial islands, installations, and other devices on the seabed, to the seaward limit of the outer continental shelf, pursuant to Section 4(f) of the CWA, as amended (see 33 CFR 320.2(b).)

	Section 404 Permit <i>Clean Water Act (CWA)</i>	Discharge of dredged or fill materials in navigable waters of the U.S., including marine waters.
NMFS	ESA Consultation / EFH Assessment	Potential to cause harm to ESA-listed species, EFH species, and/or affect their respective habitat.
USFWS	ESA Consultation	Potential to cause harm to threatened and endangered species.
U.S. Coast Guard	Local Notice to Mariners	Notification of activity during surveying and cable laying.
DNR	Public Utility Easement	Required for placing a cable on state-owned tide and submerged lands over the long term.
	State Lands Lease	Required for the construction of permanent structures on State lands.
Alaska Dept. of Environmental Conservation	Section 401 of CWA – Water Quality Certificate (WQC)	Regulatory authority to review federal actions in or affecting the quality of waters of the State. Required before USACE can issue Section 404/Section 10 permits. If USACE issues an NWP, a separate 401 WQC is not needed.
	Section 402 of CWA – APDES General Construction Permit	Required for construction sites that disturb 1 or more acres and discharge into waters of the U.S.
DNR Office of History and Archaeology (OHA)	Section 106 of National Historic Preservation Act of 1966 (NHPA)	NHPA requires federal and state agencies to consider the effects of their undertakings on historic and cultural resources and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings.
	Alaska Historic Preservation Act (AHPA)	AHPA requires a review of State public construction projects to determine if historic, prehistoric, or archaeological sites may be adversely affected.
Alaska Dept. of Fish & Game (ADFG)	Fish Habitat Permit	Work within or across a specified anadromous waterbody.

	Special Area Permit	Work that would use land or water within a Special Area in the state
DOT-PF	Utility Permit	Utility construction activities in DOT-PF right-of-way
Alaska Dept. of Public Safety, Fire, and Safety	State Fire Marshal's office review	Required for construction of any building/structure
Borough	Building Permit	Required for construction of a CLS
	Land Lease	Required for placing cable/construction on Borough-owned land over the long term

Table 12: Anticipated Permits, Consultations, and Approvals to Install the NTHE Cable System

ATTACHMENT C
CULTURAL RESOURCES MANAGEMENT PLAN

Attachment C Redacted, per Section 304 of the National Historic Preservation Act

ATTACHMENT D
ENGAGEMENT & CONSULTATION EFFORTS

Section 106 Consultation and Programmatic Agreement Stakeholder Engagement Summary

Date: February 12, 2026

The National Telecommunications and Information Administration (NTIA) has undertaken targeted engagement with key stakeholders as part of the outreach efforts to secure participation in the National Historic Preservation Act (NHPA) consultation and Programmatic Agreement (PA) process. This document captures the timeline of engagement activities conducted by NTIA, including initial invitations, follow-ups by Quintillion, the grant applicant, follow-ups Quintillion's tribal engagement consultant Deerstone Consulting, and outcomes of those interactions. The objective is to document our transparent and inclusive efforts to coordinate with Tribal Governments, Native Corporations, and other stakeholders to inform and invite participation in NHPA consultation and the PA process aligned with Quintillion's broadband infrastructure deployment.

The following sections provide entity-specific outreach summaries organized by initial communication, consultant follow-up, phone engagement, and status of participation as of this report date.

Advisory Council on Historic Preservation (ACHP)

Entity Type: Federal Agency

Project Area: All

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 3/7/2025, sending an ACHP e106 submittal. The submittal included an E106 form, Project Description, Supplemental Project Information, Cultural Desktop Study, Community Outreach Summary, Stakeholder Invitation Letter, and Stakeholder Invitation Acceptances.

ACHP Request for Additional Information:

On 3/18/2025, ACHP responded that in order to respond to NTIA's invitation to participate in the Section 106 process, ACHP would need to be provided "copies or summaries of any views provided by consulting parties, to include federally recognized Indian tribes or Native Hawaiian organizations as appropriate, the public, and the Alaska State Historic Preservation Officer."

NTIA Response to ACHP Request for Additional Information:

On 5/28/2025, NTIA provided a version of this document to address ACHP's request for additional information.

ACHP Response to Invitation to Participate:

On 6/2/2025, ACHP responded, "we have concluded that *Appendix A, Criteria for Council Involvement in Reviewing Individual Section 106 Cases*, of our regulations, "Protection of Historic Properties" (36 CFR Part 800) implementing Section 106 of the National Historic Preservation Act, does not apply to this undertaking. Accordingly, we do not believe our participation in the consultation to resolve adverse effects is needed."

Participation Status:

The current participation status for this entity is: Declined.

Alaska State Historic Preservation Office (SHPO)

Entity Type: State Agency

Project Area: All

NTIA Initial Communication:

On 10/15/2025, NTIA and the Quintillion team introduced the project to SHPO via teleconference and has updated SHPO on progress through regularly cadenced (bi-weekly) meetings.

NTIA Invitation to Stakeholders:

NTIA officially initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

SHPO Acceptance of Invitation to Participate:

On 2/24/2025, SHPO officially accepted NTIA's invitation to participate in the Section 106 process.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

SHPO Response with Edits/Comments to the Preliminary Draft PA:

On 12/5/2025, SHPO responded to NTIA with edits/comments to the preliminary Draft PA. Several additional emails between these two parties were exchanged to organically understand, discuss, and address comments and, ultimately, confirm concurrence with NTIA's response to comments.

Meeting to Discuss PA Survey Methodology with SHPO and BLM:

On December 11, 2025, NTIA conducted a meeting with Quintillion, SHPO, and BLM concerning some comments from SHPO and BLM regarding survey methodology as part of the Cultural Resources Management Plan (CRMP; Attachment C of the PA). The discussion resulted in some changes to the CRMP and survey methods used for certain discreet areas of construction impacts.

Meeting to Discuss PA Survey Methodology with SHPO and BLM:

On January 14, 2026, NTIA conducted a meeting with Quintillion, SHPO, BLM, and Quintillion's cultural resource consultant concerning SHPO's comments regarding survey methodology as part of the CRMP. The discussion resulted in some changes to the CRMP and survey methods used for certain discreet areas of construction impacts.

Meeting to Discuss PA Survey Methodology with SHPO and BLM:

On January 16, 2026, NTIA conducted a meeting with SHPO, BLM, and Quintillion's cultural resource consultant concerning their comments regarding survey methodology as part of the CRMP. The discussion resulted in final changes to the CRMP and survey methods for final review by stakeholders.

Meeting to Discuss PA Survey Methodology with SHPO:

On February 3, 2026, NTIA conducted a meeting with SHPO and Quintillion's cultural resource consultant concerning Quintillion's desire to adjust survey methodology for Beach Manholes as part of the CRMP. The discussion resulted in some changes to the CRMP and survey methods used for certain discreet areas of construction impacts.

Rural Utilities Service (RUS)

Entity Type: Federal Agency

Project Area: All

NTIA Initial Communication:

On 7/7/2025, NTIA and the Quintillion team introduced the project to RUS via teleconference and has updated BLM on progress through regularly cadenced (weekly) meetings.

NTIA Invitation to Stakeholders:

NTIA officially initiated engagement on 8/18/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

RUS Acceptance of Invitation to Participate:

On 8/26/2025, RUS officially accepted NTIA's invitation to participate in the Section 106 process.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

RUS Response with Edits/Comments to the Preliminary Draft PA:

On 11/20/2025 and 11/26/2025, SHPO responded to NTIA with edits/comments to the preliminary Draft PA. Several additional emails between these two parties were exchanged to organically understand, discuss, and address comments and, ultimately, confirm concurrence with NTIA's response to comments.

Bureau of Land Management

Entity Type: Federal Agency

Project Area: T4 - KS - Igiugig

NTIA Initial Communication:

On 10/15/2024, NTIA and the Quintillion team introduced the project to BLM via teleconference and has updated BLM on progress through regularly cadenced (monthly) meetings.

NTIA Invitation to Stakeholders:

NTIA officially initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

BLM Acceptance of Invitation to Participate:

On 2/10/2025, BLM officially accepted NTIA's invitation to participate in the Section 106 process.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

BLM Response with Edits/Comments to the Preliminary Draft PA:

On 9/26/2025 and 10/14/2025, BLM responded to NTIA with edits/comments to the preliminary Draft PA. Several additional emails between these two parties were exchanged

to organically understand, discuss, and address comments and, ultimately, confirm concurrence with NTIA's response to comments.

Meeting to Discuss PA Survey Methodology with SHPO and BLM:

On December 11, 2025, NTIA conducted a meeting with Quintillion, SHPO, and BLM concerning some comments from SHPO and BLM regarding survey methodology as part of the Cultural Resources Management Plan (Attachment C of the PA). The discussion resulted in some changes to the CRMP and survey methods used for certain discreet areas of construction impacts.

U.S. Army Corps of Engineers (USACE)

Entity Type: Federal Agency

Project Area: All

NTIA Initial Communication:

On 2/1/2024, NTIA and the Quintillion team introduced the project to USACE via teleconference and has updated USACE on progress through ad hoc meetings.

NTIA Invitation to Stakeholders:

NTIA officially initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

USACE Acceptance of Invitation to Participate:

On 2/19/2025, USACE officially accepted NTIA's invitation to participate in the Section 106 process.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

USACE Response with Edits/Comments to the Preliminary Draft PA:

On 10/29/2025, USACE responded to NTIA with edits/comments to the preliminary Draft PA. Several additional emails between these two parties were exchanged to organically understand, discuss, and address comments and, ultimately, confirm concurrence with NTIA's response to comments.

Alaska Department of Natural Resources (DNR)

Entity Type: State Agency

Project Area: All

NTIA Initial Communication/Invitation to Stakeholders:

NTIA officially initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

DNR Response to Invitation to Participate:

On 2/28/2025, DNR agreed that DNR does not have any obligations under Section 106 of the NHPA and, therefore, there is no expectation for DNR to have any obligations under the PA. DNR is not interested in being a concurring party to the PA.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

Participation Status:

The current participation status for this entity is: Declined.

Alaska Department of Transportation (DOT)

Entity Type: State Agency

Project Area: All

NTIA Initial Communication/Invitation to Stakeholders:

NTIA officially initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

DOT Response to Invitation to Participate:

On 3/5/2025, DOT stated, "since we are not doing the work on lands we manage, it is their [NTIA] responsibility to contact OHA/SHPO regarding cultural resource compliance. Any permits we issue, access etc., should state plainly that compliance with any state or federal regulations or statutes are the applicant's responsibility. ... So we are not interested in being a concurring party."

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

Participation Status:

The current participation status for this entity is: Declined.

Alaska Village Council Presidents (AVCP)

Entity Type: Tribal Entity

Project Area: T2 - Emmonak

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: 3/12/2025: left voice mail at 907-543-7304 executive secretary. No response has been received.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. AVCP attended the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Pending

Bristol Bay Borough (BBB)

Entity Type: Local Government

Project Area: T3 - Naknek - KS

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: Left voice mail 3/11 with Sherrie at the BBB, left message for Phill on 3/12; Phill returned the call and a secondary email. A follow up call and email sent April 30 and May 5, no response has been received.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. BBB did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Pending.

Bristol Bay Native Corporation (BBNC)

Entity Type: Tribal Corporation

Project Area: T3 - Naknek - KS

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: Voicemail

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. BBNC attended the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Yes.

Calista Corporation

Entity Type: Tribal Corporation

Project Area: T2 - Emmonak

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: left voice mail for Tisha 3/12

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Calista Corporation attended the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

On 9/15/2025 and 10/15/2025, Calista responded with some suggested grammatical edits and a letter of support for the project and the PA effort.

Participation Status:

The current participation status for this entity is: Yes.

Chuloonawick Native Village

Entity Type: Tribal Entity

Project Area: T2

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: left voice mail 3/12 and sent email.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Chuloonawick Native Village did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Pending.

City of Emmonak

Entity Type: Local Government

Project Area: T2 - Emmonak

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: left Dave a voicemail 3/11, called 3/12/2025

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. City of Emmonak did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Pending.

Emmonak Corporation

Entity Type: Tribal Corporation

Project Area: T2 - Emmonak

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: 3/12/2025: James is not in left a message with Martha. 5/5/2025- said call Achua; Achua requested an email.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Emmonak Corporation did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Pending.

Emmonak Tribe/Tribal Council

Entity Type: Tribal Corporation

Project Area: T2

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: 3/12/25: spoke with Janice, was going to check email on this.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Emmonak Tribe/Tribal Council did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Yes.

Igiugig Native Corporation

Entity Type: Tribal Corporation

Project Area: T4 - KS - Igiugig

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: emailed 3/11 to Christina, Alexanna and Karl for a response. AlexAnna came back with a yes.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Igiugig Native Corporation did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Yes.

Igiugig Village Council

Entity Type: Tribal Entity

Project Area: T4 - KS - Igiugig

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: emailed 3/11 to Christina, AlexAnna and Karl for a response. AlexAnna came back with a yes.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Igiugig Village Council attended the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Yes.

King Salmon Tribe

Entity Type: Tribal Corporation

Project Area: T4

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/11/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: 3/11/2025: RuthAnn, at King Salmon, Joni will reach out to Bucko 5/5, Bucko declined via a phone call, citing capacity issues.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. King Salmon Tribe did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

Participation Status:

The current participation status for this entity is: Declined.

Lake & Peninsula Borough

Entity Type: City Agency

Project Area: T4 - KS - Igiugig

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: 3/11/25 phone call with Kate: she forwarded to Nathan. Waiting on response from Nathan, but Kate stated that this type of engagement is not really in the Lake & Peninsula Borough purview and because they are not a permitting agency.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Lake & Peninsula Borough did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

Participation Status:

The current participation status for this entity is: Declined.

Levelock Native Corporation

Entity Type: Tribal Corporation

Project Area: T4 - KS - Igiugig

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: Email was sent April 1, 2025, a second email was sent 4/15/2025, Kyle responded with a yes.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Levelock Native Corporation attended the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Yes.

Naknek Native Village Council (NNVC)

Entity Type: Tribal Entity

Project Area: T3 - Naknek - KS

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: Voicemail, phone call returned with a verbal confirmation to participate.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. NNVC attended the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Yes.

Nome Eskimo Community

Entity Type: Tribal Corporation

Project Area: T1

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: 3/12 Teressa answered and transferred, Rena spoke and emailed. A reminder email was sent 5/5/2025.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Nome Eskimo Community did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Pending.

Paug-Vik Incorporated Limited

Entity Type: Tribal Corporation

Project Area: T3 - Naknek - KS

NTIA Initial Communication/Invitation to Stakeholders:

NTIA initiated engagement on 1/24/2025, sending a formal email invitation to participate in NHPA consultation and PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Quintillion Follow-Up:

Quintillion followed-up on or around 3/12/2025, sending a follow-up email invitation to participate in the PA process. The invitation included background information on the project and outlined the purpose and structure of the PA.

Deerstone Consulting Follow-Up:

As a designated tribal engagement consultant for Quintillion, Deerstone Consulting followed up with personalized emails to reinforce the invitation, offer further explanation of the PA process, and extend an opportunity to meet or respond with questions.

Phone Contact Summary:

The following engagement was recorded: Phone discussion; 3/12/2025: Kristina called Bill and they are looking at having someone sit on the Concurring Party but don't generally support the project, will bring up later this month. They meet on the 25th. I will attend to help field questions. Follow up call made 5/5/2025 Bill Hill confirmed request to address concerns.

NTIA NHPA Consultation and Project PA Meeting:

On 3/17/2025, NTIA setup and invited all stakeholders to participate in a NHPA consultation and Project PA Meeting that was held on 3/25/2025. Paug-Vik Incorporated Limited did not attend the meeting.

Quintillion NHPA Consultation and Project PA Meeting Follow-Up:

On 3/31/2025, Quintillion sent a follow-up email for the meeting to all stakeholders, along with meeting notes.

National Environmental Policy Act (NEPA) Scoping Period:

A public notification of the project and development of the environmental analysis was initiated by Bureau of Land Management (BLM) on 8/18/2025 and posted on the BLM NEPA Register website. The scoping period was 15 days. Quintillion sent follow-up emails to stakeholders notifying them of the availability and opportunity to comment on the project, at large.

NTIA Submittal of Preliminary Draft for Review:

On 9/15/2025, NTIA submitted a copy of the preliminary Draft PA and associated attachments to stakeholders for review and discussion. NTIA also invited the opportunity to hold a conference call to discuss the preliminary draft PA. No stakeholders suggested the need for a group meeting.

NTIA Follow-up:

On 9/29/2025, NTIA followed-up with stakeholders letting them know that the preliminary Draft PA comment period was approximately halfway complete.

Response to the Preliminary Draft PA:

At the time of the finalization of this document, NTIA has not received any response.

Participation Status:

The current participation status for this entity is: Pending.

ATTACHMENT E
PROGRAMMATIC AGREEMENT DISTRIBUTION LIST

Attachment E: Programmatic Agreement Distribution List and Proposed Signing Status

State and Federal Agencies (5)	
National Telecommunications and Information Administration (NTIA)	Signatory
Alaska State Historic Preservation Office (SHPO)	Signatory
Rural Utilities Service (RUS)	Invited Signatory
Bureau of Land Management (BLM)	Invited Signatory
U.S. Army Corps of Engineers (USACE)	Invited Signatory
Federally Recognized Tribes and Tribal Entities (10)	
Chuloonawick Native Village	Concurring Party
Emmonak Village Council	Concurring Party
Igiugig Village Council	Concurring Party
King Salmon Tribe	Concurring Party
Levelock Village Council	Concurring Party
Naknek Native Village Council	Concurring Party
Native Village of Hooper Bay	Concurring Party
Nome Eskimo Community	Concurring Party
Chickaloon Village Traditional Council	Concurring Party
Association of Village Council Presidents	Concurring Party
ANCSA Regional and Village Corporations (7)	
Bristol Bay Native Corporation	Concurring Party
Calista Corporation	Concurring Party
Emmonak Corporation	Concurring Party
Igiugig Native Corporation	Concurring Party
Levelock Natives Limited	Concurring Party
Paug-Vik Incorporated Limited	Concurring Party
Sea Lion Corporation	Concurring Party
City and Borough Governments (6)	
Bristol Bay Borough	Concurring Party
City of Emmonak	Concurring Party
City of Hooper Bay	Concurring Party
City of Nome	Concurring Party
Kusilvak Borough	Concurring Party
Lake and Peninsula Borough	Concurring Party
Other (1)	
QSH Parent Holdco LLC (Quintillion)	Invited Signatory

ATTACHMENT F
SIGNATORY CONTACT LIST

Attachment F: Signatory Contact List

Entity: QSH Parent Holdco LLC (Quintillion) Entity Type: Project Proponent Name: Art Paul Title: Grants Program Director Email: apaul@quintillionglobal.com Phone: 907-529-7808	Entity: National Telecommunications and Information Administration (NTIA) Entity Type: Lead Federal Agency Name: Andrew Bielakowski Title: Environmental Program Officer Email: andrew.bielakowski@ firstnet.gov Phone: 202-657-7982
Entity: Rural Utilities Service (RUS) Entity Type: Federal Agency Name: Phoebe Gilbert Title: Archaeologist Email: phoebe.gilbert@usda.gov Phone: 907-409-0203	Entity: Alaska State Historic Preservation Office (SHPO) Entity Type: State Agency Name: McKenzie Herring Title: Archaeologist Email: mckenzie.herring@alaska.gov Phone: 907-269-8726
Entity: Bureau of Land Management (BLM) Entity Type: Federal Agency Name: Jenny Blanchard Title: Regional Archaeologist Email: jblanchard@blm.gov Phone: 907-267-1210	Entity: U.S. Army Corps of Engineers (USACE) Entity Type: Federal Agency Name: John Sargent Title: Regulatory Specialist Email: john.c.sargent@usace.army.mil Phone: 907-347-1801
Entity: U.S. Army Corps of Engineers (USACE) Entity Type: Federal Agency Name: Chris Parrish Title: Tribal Liaison/Archaeologist Email: christopher.m.parrish@ usace.army.mil Phone: 505-231-3586	Entity: Bristol Bay Native Corporation Entity Type: Regional Corporation Name: Daniel Cheyette Title: SVP, Land and External Affairs Email: dcheyette@bbnc.net Phone: 907-265-7855
Entity: Calista Corporation Entity Type: Regional Corporation Name: Tisha Kuhns Title: VP, Land and Natural Resources Email: tkuhns@calistacorp.com Phone: 907-275-2800	Entity: City of Emmonak Entity Type: Local Government Name: Dave Roland Title: Emmonak City Manager Email: droland@gci.net Phone: 907-545-2611
Entity: City of Hooper Bay Entity Type: Local Government	Entity: Emmonak Corporation Entity Type: Village Corporation

Name: Roy Joseph Title: City Administrator Email: cityhpb@gmail.com Phone: 907-758-4311	Name: Jason Wagner Title: President & CEO Email: jason@emmonak.com Phone: 907-949-4114
Entity: Igiugig Village Council Entity Type: Tribal Entity Name: Karl Hill Title: Director of Maintenance Email: karl.hill@igiugig.gov Phone: 907-533-3211	Entity: Native Village of Hooper Bay Entity Type: Tribal Entity Name: Edgar Tall, Sr. Title: Tribal Chief Email: talledgar2@gmail.com Phone: 907-758-4915

ATTACHMENT G
BLM'S PLAN OF ACTION FOR THE NATIVE AMERICAN HUMAN REMAINS
OR CULTURAL ITEMS DISCOVERED OR EXCAVATED ON
FEDERAL OR TRIBAL LANDS

**Plan of Action for
Native American Human Remains or Cultural Items
Discovered or Excavated on Federal or Tribal Lands**

BLM Anchorage Field Office, Quintillion Nome to Homer Express Project

This plan of action was developed in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA; 25 U.S.C. 3001 et seq) and its implementing regulations (43 CFR part 10).

Appropriate official

To ensure compliance with NAGPRA, the BLM Anchorage Field Office has designated the following appropriate officials to carry out the requirements in 43 CFR Subpart B-Protection of Human Remains or Cultural Items on Federal or Tribal Lands.

Jacob Vialpando
Field Manager
BLM Anchorage Field Office
4700 BLM Road
Anchorage, AK 99507
jvialpando@blm.gov
(907) 621-4640

Description

Quintillion LLC has proposed to install a fiber optic network connecting four communities (Emmonak, Hooper Bay, Naknek, and Igiugig) within Quintillion's regional network to provide internet infrastructure to rural communities, as part of its Nome to Homer Express Project. As a part of this project, Quintillion has applied for a federal right-of-way (ROW) grant and associated permits from the BLM Anchorage Field Office, for lands BLM manages between Naknek and Igiugig, and crossing the Alagnak River. The project will mostly involve laying the fiber optic cable directly on the ground surface, with extremely low potential for disturbing subsurface cultural resources, including ancestral remains and associated funerary objects. However, some areas of the project may involve horizontal directional drilling, or burying the fiber optic cable, which could potentially disturb ancestral remains. This potential means that BLM is required to develop a NAGPRA Plan of Action before approving the project.

The National Telecommunications and Information Administration (NTIA) is acting as the lead federal agency for the purposes of compliance with Section 106 of the National Historic Preservation Act (NHPA), and is proposing to develop a project specific Programmatic Agreement (PA). The PA allows for a phased approach to complying with Section 106, pursuant to the implementing regulations found at 36 CFR § 800. Further, the PA establishes a collaborative process for the future identification, evaluation, mitigation, monitoring, and recovery of historic properties, consistent with Advisory Council on Historic Preservation (ACHP) regulations pursuant to Section 110(a)(2)(E) of the NHPA. In accordance with Section 106 of the NHPA, NTIA has initiated consultation with agencies, Tribes, and other interested parties that have an interest or concern about any cultural resources, historic properties, or traditional cultural sites.

The literature review shows that there are no known cultural resources located on the BLM land within the project area. The PA will provide a process for additional survey and identification efforts within the Area of Potential Effect (APE), so additional cultural resources may be documented in the future.

Consultation

This plan of action was developed in consultation with Igiugig Village, King Salmon Tribe, Levelock Village, Naknek Native Village, and South Naknek Village. A list of consulting parties who responded and participated is in the attached record of consultation. Consultation is not final; additional consultation may result in an update to this plan. Additionally, if ancestral remains and/or associated cultural items are found during project activities, the BLM is committed to continuing consultation with Tribes to the maximum extent needed.

Plan of Action

In the event that ancestral remains and associated cultural items are found, Quintillion's contract archaeologists will stop work immediately within 300 feet of the discovery. The NTIA, SHPO, BLM, and Alaska State Troopers will be contacted within 24 hours. They would record GPS coordinates of the discovery and create a drawing and sketch map of the ancestor's location. They would photograph them only if desired by the Tribes. They would then consult with the Quintillion engineers to confirm that construction and ground disturbance can be relocated at least 100 feet away from the ancestral remains, or more, depending on the nature of the discovery and the potential extent of the site. The contract archaeologists would then fill the excavated area back in with the same soil that was removed, covering with the vegetation mat that was removed and set aside.

In the unlikely event that the project activities cannot be relocated, NTIA and BLM will consult with Tribes to determine disposition of ancestral remains and associated funerary objects. Ancestors would be excavated carefully and with respect, and would only be photographed if desired by the Tribes. Archaeologists would transport the ancestral remains to the BLM Anchorage Field Office, or to the Alaska State Medical Examiner, if required, until consultation determined which Tribe(s) would assume custody.

We anticipate neither the removal of, nor access or research related to, any ancestors discovered as a part of this project. We anticipate ceasing work in that area and stabilizing and reburying in place any ancestor's remains found, and moving ground disturbing activity elsewhere. Any removal, storage, treatment, or handling of ancestors or associated cultural items would only be done with the free, prior, and informed consent of the Tribes consulted.

In the case of a discovery, we would inform the consulting parties within 48 hours. Tribes would be informed by email and/or telephone, based on their preference. The BLM will work with the Tribes to provide them with all relevant information and to set up a consultation meeting (virtual or in-person). Based upon the results of that meeting, the BLM will then work with Quintillion and NTIA and develop a plan to move forward with construction while incorporating the Tribe's preferences. The BLM will send the proposed plan to the Tribe for their review and additional comments. When a final plan is agreed upon, the BLM will provide Quintillion with a notice to proceed, and provide the Tribe, Quintillion, and relevant agencies with a record documenting consultation and the final plan.

Signed,

 Digitally signed by
JACOB VIALPANDO
Date: 2026.02.17
08:50:07 -09'00'

Jacob “Jake” Vialpando

Field Manager

Anchorage Field Office

Enclosure: Record of consultation

Record of consultation between BLM Anchorage Field Office and Tribes

Initiation of consultation.

Copies of each invitation to consult are on file.

The following tribes were invited to consult on the NAGPRA POA. Letters were mailed 11/20/2025.

Federally Recognized Tribes

Igiugig Village
President AlexAnna Salmon
PO Box 4008
Igiugig, AK 99613

King Salmon Tribe
President Ralph Angasan, Sr.
PO Box 68
King Salmon, AK 99613

Levelock Village
President Alexander Tallekpalek
PO Box 70
Levelock, AK 99625

Naknek Native Village
President Judy Matson
PO Box 210
Naknek, AK 99633

South Naknek Village
President Fred Angasan, Sr.
PO Box 70029
South Naknek, AK 99670

Response to invitation to consult

<i>Consulting party</i>	<i>Letter sent Date</i>	<i>Follow up call/email date(s)</i>	<i>Comments</i>
Igiugig Village	11/20/25	1/22/2026 2/12/2026	BLM follow up email sent on 1/7/2026 Written comments received 1/10/2026. BLM response to comments emailed 1/14/2026.

			BLM follow up call and email re: BLM responses to comments 1/22/2026 BLM follow up call re: BLM responses to comments 2/12/2026
King Salmon Tribe	11/20/25	BLM follow up email sent on 1/7/2026	
Levelock Village	11/20/25	BLM follow up email sent on 1/7/2026	
Naknek Native Village	11/20/25	BLM follow up email sent on 1/7/2026	
South Naknek Village	11/20/25	BLM follow up email sent on 1/7/2026	

ATTACHMENT H
AMENDMENT AND ADDENDUM LOG

Attachment H: Amendment and Addendum Log

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Appendix G – Letters of Concurrence

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802-1668

September 29, 2025

Andrew Bielakowski
Environmental Program Officer
Office of Internet Connectivity and Growth
1401 Constitution Avenue, NW
Washington, D.C. 20230

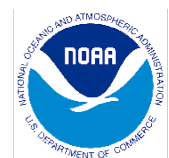
Re: Nome to Homer Express Middle Mile Network Fiber Optic Cable; NMFS ECO Reference
No. AKRO-2025-02726

Dear Mr. Bielakowski:

The National Marine Fisheries Service has reviewed the essential fish habitat (EFH) assessment provided on September 16, 2025, regarding the above referenced project. The purpose of this project is to install approximately 894 miles of fiber optic cable. The proposed scope of work includes installation of fiber optic cable using aerial transmission, shallow burial, and horizontal directional drilling.

Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and the Fish and Wildlife Coordination Act require Federal agencies to consult with us on all actions that may adversely affect EFH and other aquatic resources. The EFH consultation process is guided by the regulation at 50 CFR 600 Subpart K, which mandates the preparation of EFH assessments and outlines each agency's obligations. In support of this consultation process, you provided a notice of the proposed action and your agency's conclusion regarding impacts on EFH. We offer the following comments on this project.

Your agency has concluded that the proposed project activity may adversely affect EFH for Pacific salmon and Bering Sea groundfish in the project area. You also concluded those effects would be minimal and temporary in nature. Federal regulations define an adverse effect as "any impact which reduces the quality and/or quantity of EFH" (50 CFR 600.810(a)). Based on our review of the project plans and the information provided, we agree with your conclusion of effects. Potential adverse effects to EFH can be mitigated if your identified mitigation measures and best management practices are implemented. Therefore, we have no conservation recommendations for the proposed action and additional EFH consultation is not necessary.



Significant changes to the project may require reinitiating a consultation. Additional information regarding the EFH consultation process can be found in our [EFH Fact Sheet](#) and our [Regional website](#), where you can find FAQs. Lucas Byker (lucas.byker@noaa.gov) is available to answer questions or discuss further actions.

Sincerely,

A handwritten signature in black ink, appearing to read "S. M. J." followed by a stylized flourish or initials.

Assistant Regional Administrator
Habitat Conservation



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802-1668

April 8, 2025

Andrew Bielakowski
National Telecommunications & Information Administration (NTIA)
1401 Constitution Avenue, N.W.
Washington, D.C. 20230

Re: NTIA Nome to Homer Fiber Optic Cable Project, Letter of Concurrence, AKRO-2024-01522

Dear Andrew Bielakowski:

The National Marine Fisheries Service (NMFS) has completed informal consultation under section 7(a)(2) of the Endangered Species Act (ESA) regarding the proposed Quintillion Fiber Optic Cable (FOC) laying project connecting Nome to Homer, Alaska. The National Telecommunications & Information Administration (NTIA) requested written concurrence that the proposed action may affect, but is not likely to adversely affect North Pacific right whale (*Eubalaena japonica*), Mexico Distinct Population Segment (DPS) or Western North Pacific DPS humpback whale (*Megaptera novaeangliae*), fin whale (*Balaneoptera physalus*), sperm whale (*Physeter macrocephalus*), Arctic subspecies of ringed seal (*Phoca hispida hispida*), Beringia DPS bearded Seal (*Erignathus barbatus nauticus*), or Western DPS Steller sea lion (*Eumetopias jubatus*) and its critical habitat.

There is no humpback whale or North Pacific right whale critical habitat in or near the project area. The cable-laying ship will pass offshore of Cape Newenham, approximately 72 kilometers (km) (35 nautical miles[nm]) east of North Pacific right whale critical habitat, and approximately 320 km (173 nm) north of the humpback critical habitat north of the Aleutian Islands. Therefore, critical habitat for these two species will not be discussed further in this concurrence.

Based on our analysis of the information you provided to us, and additional literature cited below, NMFS concurs with your determinations.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 FR 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to NMFS' existing practice in implementing section 7(a)(2) of the ESA (84 FR at 45015; 89 FR at 24268). We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this letter of concurrence would not have been any different under the 2019 regulations or pre-2019 regulations.



This letter underwent pre-dissemination review in compliance with applicable Data Quality Act guidelines. A complete administrative record of this consultation is on file in this office.

Consultation History

- NMFS received your request for consultation and your correspondence identifying 48 North as your non-Federal representative for this project on June 26, 2024.
- NMFS requested more information about the project via email on July 22, and the applicant responded on November 4, 2024.
- On November 13, the US Fish and Wildlife Service (USFWS) emailed NMFS to coordinate on the project.
- On December 11, NMFS sent follow up questions related to the potential effects to sunflower sea stars and a meeting was held on December 18, 2024, to discuss the project and the possibility of completing a formal conference for the sea star.
- On December 20, 2024, 48 North informed NMFS that NTIA was considering some changes to the project and that they would submit a revised project description once the details were finalized.
- On January 28, 2025, NTIA submitted a revised project description.
- On January 30, 2025, NMFS submitted clarification questions on the new approach to crossing Cook Inlet using existing FOC infrastructure.
- On February 23, 2025, 48 North provided a revised species list and new figures and details on the Cook Inlet portion of the project.
- NMFS initiated consultation on February 25, 2025.
- 48 North provided additional details on the vessels and cable laying schedule on March 18, 2025.

Description of the Proposed Action

“Action” means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas (50 CFR 402.02).

NTIA intends to provide funding under the Enabling Middle Mile Broadband Infrastructure (MM) Program to Quintillion to complete its Nome to Homer Express (NTHE) submarine and terrestrial FOC system. The NTHE will be located in western Alaska and will connect existing fiber telecommunication networks in Nome, Alaska, with existing fiber networks in Homer, Alaska (Figure 1). This would extend Quintillion’s existing subsea and terrestrial network south from Nome to Emmonak, continuing along the Yukon-Kuskokwim Delta coast to Naknek, and crossing terrestrially to Igiugig, at which point the system will connect to existing FOC infrastructure from Igiugig to Homer. The existing FOC infrastructure crosses Iliamna Lake to Pile Bay and Williamsport, before ending in a subsea segment across Cook Inlet into Homer (Figure 1). At Homer, NTHE will interconnect with existing tie-in points.

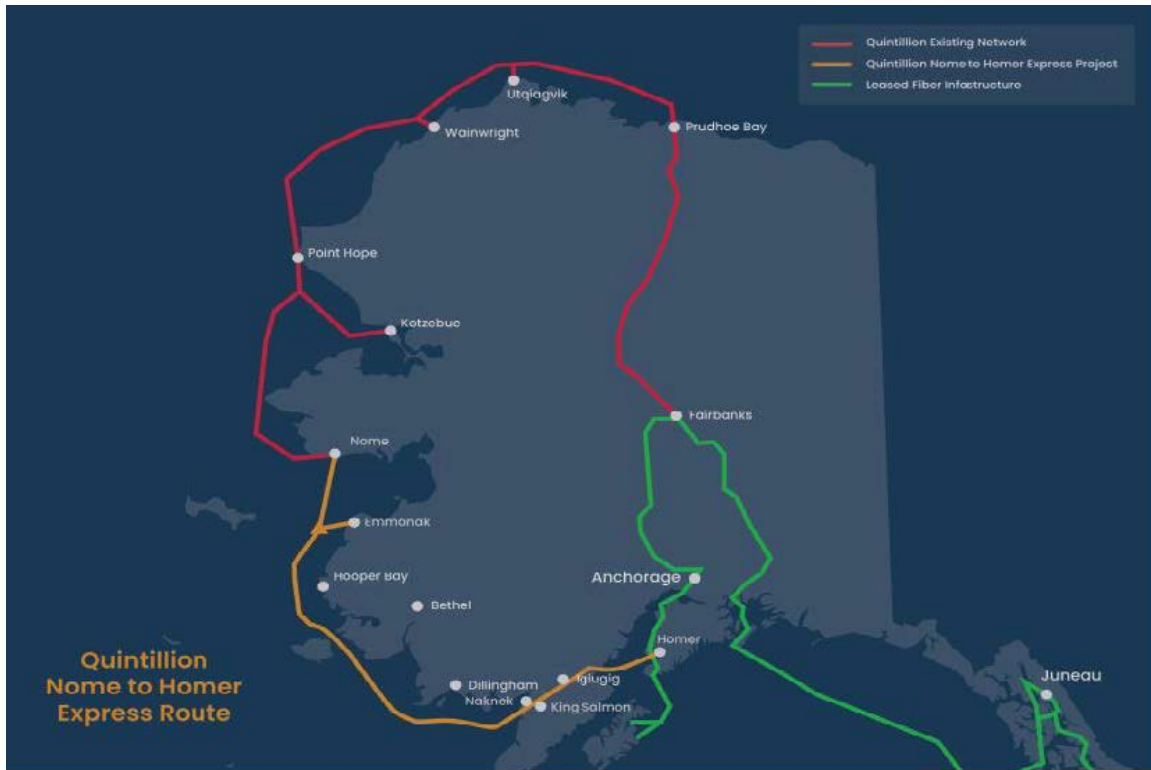


Figure 1. Proposed NTHE Network relative to Quintillion’s entire network (48 North 2025)

Quintillion’s NTHE project proposes to construct 891.79 miles of middle-mile FOC (Submarine/Terrestrial) from Nome to Igiugig, interconnecting Quintillion’s submarine cable system Phase I in northwestern Alaska at Nome, and to GCI’s existing network from Igiugig to Homer (204 miles) where the system will interconnect with multiple regional providers using existing FOC infrastructure. The submarine and terrestrial portions of the proposed NTHE project are shown in Figure 2.

Submarine FOC Construction

Construction involves the installation of a submarine FOC within the marine environments from beach manhole (BMH) to BMH. These segments are either plowed or laid on the seafloor (surface-lay). The submarine FOC components include branching units (BUs), which allows the extension of the submarine FOC branches from the main trunk to the BMH, at which point the submarine FOC transitions to a terrestrial FOC. From the BMH, the terrestrial FOC will be constructed to the cable landing station and will extend beyond this connection to provide access points for community anchor institutions in the region. Landing points for the submarine FOC will include shore-end construction from the mean low water (MLW) to the BMH, where the construction method and timing are different from the main trunk construction.

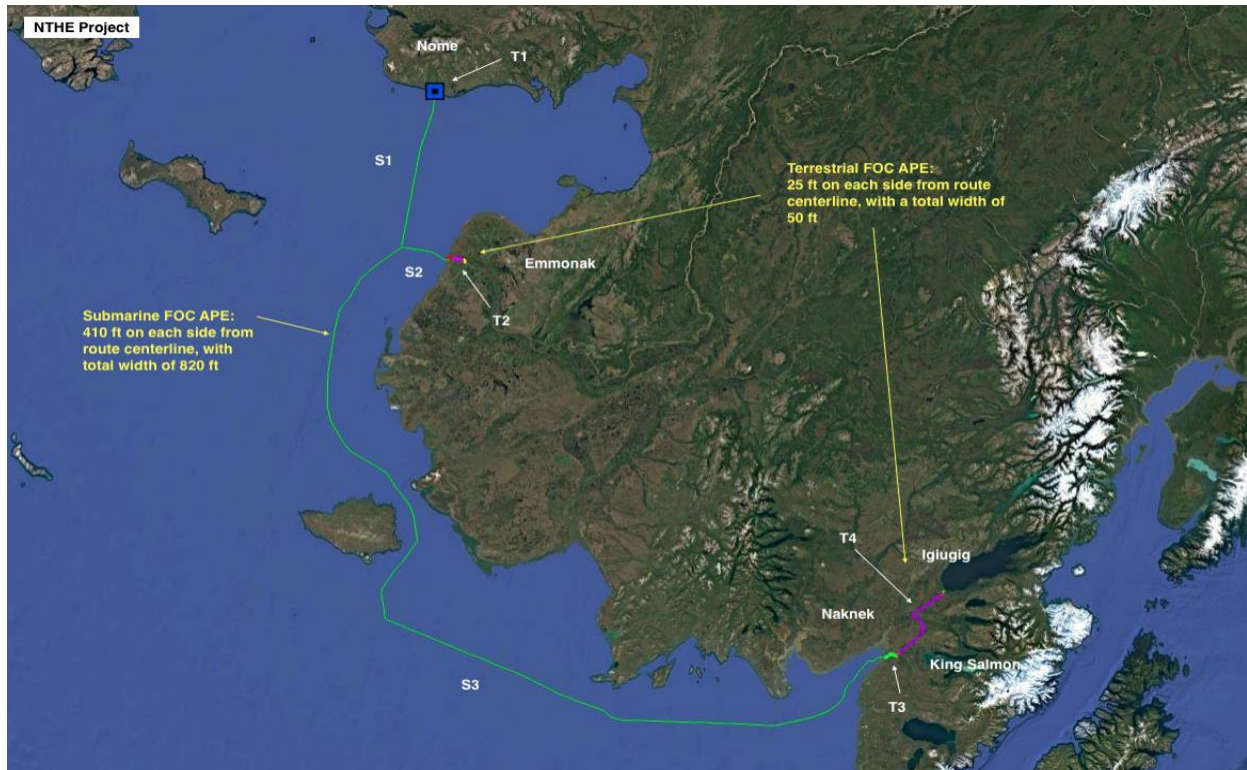


Figure 2. Submarine and terrestrial routes for the Nome to Homer FOC project and estimated area of potential effect (APE) widths (48 North 2025).

The FOC route was determined using guidance from the International Cable Protection Committee (ICPC), which has identified fishing activities as the primary cause for submarine cable faults and repairs (ICPC 2021). As such, the proposed route identified in the desktop and 2024 marine route surveys avoids high-impact fishing grounds where possible. In shallow areas where ground fishing areas cannot be avoided, the cable would be buried. The submarine FOC will consist of lightweight submarine cable measuring approximately 2.5 cm (one inch) in diameter, while all other marine portions of the route would use either a single or double armor submarine cable. All marine cables at depths greater than 12 m (40 ft) will be buried.

Table 1. Submarine cable segments for the Nome to Homer FOC project.

Segment ID	Start	End	Length (mi)	Length (km)
S1	Nome BMH	Emmonak Branching Unit (BU)	113.53	182.71
S2	Emmonak BU	Emmonak BMH	35.65	57.37
S3	Emmonak BU	Naknek	656.48	1,056.50
		Total	805.66	1,296.58

Prior to trenching or cable-burying operations on the seabed, a pre-lay grapnel run (PLGR) would be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation would be to identify and clear any seabed debris (e.g., wires, hawsers, fishing gear) deposited along the route. PLGR is conducted by pulling a grapnel (Figure 3) along the route over the seabed. Any debris recovered by the grapnel would be discharged ashore upon completion of the operations and disposed of in accordance with local regulations. If debris cannot be recovered, then a local re-route would be planned to avoid the debris. The PLGR operation would be conducted to industry standards for employing towed grapnels, and the type of grapnel would be determined by the nature of the seabed. The applicant expects to use the *IT Integrity*, a 72 m (236 ft) ship for the grapnel tow.



Figure 3. Example marine grapnel on the deck of a cable vessel (48 North 2025)

Burial within waters deeper than 12 m (40 ft) would be conducted using a cable plow (Figure 4). The applicant expects to use the KDDI Cable *Infinity*, a 113 m (370 ft) ship to plow and bury the cable. Burial within deep sea segments would protect the submarine FOC against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow would be pulled along the seafloor by a tow wire connected to the cable ship. The cable would be fed through the plow's share blade, penetrating seafloor sediments under the plow up to 1.5 m (five ft) deep while excavating a path 0.3 m (one ft) wide. The cable would exit the lower aft end of the share blade, and the sediments would immediately collapse on top of the cable behind the plow.



Figure 4. Sample fiber optic cable undersea plow (TE Services 2025).

In waters shallower than 12 m, trenching will occur where cable protection from additional environmental conditions such as surf action and ice scour are needed. Trenching will be conducted by a jet sled, which is a self-propelled cable trenching system that uses water pressure to destabilize the seafloor and bury the cable. The jet sled will be accompanied by divers who will monitor trenching performance and assist in operations.

Upon completing the cable-laying operations, but during the same cruise, a post-lay inspection and burial will be conducted using a remotely operated vehicle (ROV) equipped for cable trenching. This inspection aims to review sections of the cable ship route where laying operations might have encountered challenges. These challenges include plow failure, unexpected cable repairs, uncontrolled cable payout, branching unit or joint placement, or other unforeseen events. If burial corrections are necessary, the ROV will perform jet burial, similar to the method used by a jet sled, to trench the cable. The ROV will be remotely operated from the cable-laying ship, generating pulsed sounds and utilizing cameras for precise positioning and orientation.

Shore-end construction includes segments of the cable route between MLW and a BMH positioned above the high tide line (HTL) at each landing point. Shore-end construction would occur concurrently with marine construction, at each shore-end, the cable would be trenched within the shoreline between MLW and the BMH. Cables may be encased in articulated pipe for these segments depending on the shoreline characteristics. All shoreline construction will take place at low tide.

Front Haul Segments

The proposed submarine cable would include the construction of several front haul segments to include Nome, Emmonak, and Naknek. The term “front haul” is used in the submarine cable system industry to describe the segment of cable from the BMH to the CLS. The BMH is the point where the submarine cable is spliced or transitions to terrestrial cable, which is constructed from the BMH to the CLS, where the FOC is terminated.

Terrestrial FOC Construction

Terrestrial FOC construction involves installation along terrestrial landscapes, including wetlands, inland lakes, and stream crossings. Terrestrial FOC segments will terminate in BMH/Vault, and cable landing stations. This construction includes segments from the BMH to the cable landing stations at the Nome, Emmonak, and Naknek sites (Figure 1).

Beach landing facilities, including the BMH and seaward conduit, would be constructed on public and state tidelands and submerged tidelands using a “mini-sized” tracked excavator. Where conditions preclude the seaward duct from being buried by an excavator at low tide, the seaward duct may be pinned to the seabed or otherwise anchored to a submerged concrete bulkhead to provide seaward stability and prevent the duct from floating off the seabed. All shoreline construction will take place at low tide.

Nome

A new BMH will be constructed at the Nome landing point to support the new submarine cable landing, as well as a power feed equipment (PFE) communication shelter with standby generator and fuel storage. In addition, a horizontally directional drilled (HDD) seaward conduit may be required to further protect the submarine FOC to connect it to the front haul route and CLS. An HDD bore machine will be used to cross the Nome-Counsel highway and beach/intertidal area to reach the BMH site offshore. Using HDD will reduce the need for trenching in sensitive shoreline and intertidal areas.

Emmonak

The BMH at Emmonak will be sited several miles upstream into the Yukon River delta. The FOC cable will be buried in the sediment using the jet sled from the intertidal area up to the BMH.

Naknek

A new BMH and HDD conduit from the BMH to a concrete headwall would be placed near the base of a bluff near the wastewater treatment plant at Naknek at the mouth of the Naknek River.

Project-Related Vessels

The marine route will rely on two or more vessels for construction operations. The vessel used for cable installation operations will be dependent upon water depth, location, and installation method. A cable ship will be used for cable-laying and plowing operations within areas of the

marine route with water depths exceeding 12 meters (40 feet (ft)) and will rely on dynamic positioning. Cable laying will require two vessels beginning in Naknek, heading west and then north along the alignment, with the *IT Integrity* completing the grapnel pre-lay work closely followed by the *Infinity*. The *Infinity* is the primary cable-laying vessel and will tow the plow which lays and buries the cable. The two vessels will work northward to Emmonak. There will be a 22-day break to resupply the ships which will then travel north to Nome and begin laying cable heading south back to Emmonak. Therefore, there will be two vessels active along the alignment throughout the project.

Proposed construction in waters shallower than 15 meters will be conducted using a contracted Alaska Vessel of Opportunity (VOO), which is a tug and barge, a small landing craft stored on the cable ship, or any small vessel capable of operating in shallow waters. Additionally, shore-end locations will be assisted by a landing craft. These vessels will have a shallow draft, making shallow waters and landings more accessible.

Project Schedule

Work at terrestrial and offshore sites will take advantage of site conditions to reduce potential impacts. The BMH site and HDD work will be completed for Nome in the spring/ summer of 2025. The BMH sites at Emmonak and Naknek will be completed in the spring/summer of 2026, and all three sites are expected to be completed by July 2026.

The cable-laying is somewhat subject to vessel availability, but the applicant expects that the FOC cable will be installed between April 2026 and mid-October 2026. This will include connecting the submarine FOC to the terrestrial sites at the BMHs.

Project Community Outreach

Quintillion conducted community outreach and engagement during the grant application preparation period. This effort consisted of postings on the Quintillion website, emails to key stakeholders, meetings and attendance of community council meetings. The stakeholders included various community entities, such as tribal councils, corporations and landowners. The program sought stakeholder feedback and specifically any concerns with that project that needed to be addressed. The communities support the project and are interested in the benefits that this system will bring to the area. In addition, Quintillion is also continuing the outreach, as the project moves through environmental assessment and permitting process.

Action Area

The action area is defined in the ESA regulations (50 CFR 402.02) all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The action area is distinct from and larger than the project footprint because some elements of the project may affect listed species some distance from the project footprint. The action area, therefore, extends out to a point where no measurable effects from the project are expected to occur.

NMFS defines the action area for this project as the area within which project-related noise levels are ≥ 120 dB_{rms} re 1 μ Pa or approaching ambient noise levels (i.e., the point where project-

related sound attenuates to levels below non-anthropogenic sound).¹ Received sound levels associated with the cable-laying ship (source) are expected to decline to 120 dB_{rms} re 1μPa 2,000 m on either side of the source. To define the action area, we considered the size and type of vessels being used, the speed and equipment being used to lay the cable, characteristics of the marine environment such as depth and bottom compositions, and empirical measurements of noise from similar projects (Illingworth and Rodkin 2016). NMFS defines the action area for this project to include the vessel cable-laying routes (Figure 1), bounded by a buffer of 2.0 km (1.25 mi) on each side of the route for areas in which the cable-laying ship will be used based on the area of increased noise from vessel operations.

The action area also includes the area that will be disturbed by alignment clearing, cable laying, cable burying, and offshore construction activities. This includes the areas disturbed by the grapnel, plow, jetting sled, and ROV.

The total action area encompasses approximately 5,186.34 square kilometers (km²) (2,014.15 square miles [mi²]) as summarized in Table 2.

Table 2. Action Area Dimensions and Total Area for the Cable-laying Operations and Transit between Sites for the Aleutian II Project

Description	Length of Route (km/mi)	Width of Route including Buffer (km/mi)	Total Area (km²)	Total Area (mi²)
Cable-laying ship operations	1,296.58/805.66	4.0 /2.5	5,186.34 ^a	2,014.15 ^a
Plow area ^b	1,296.58/805.66	0.016/0.01	20.75	8.06
Totals			5,207.08	2,022.21

^a The area presented is the total sum of ensonified areas along all segment routes. The maximum area ensonified to the 120-dB acoustic threshold at any given time would be approximately 10.18 km² (3.93 mi²).

^b The area disturbed by the plow is wider and will encompass the areas disturbed by the grapnel to clear the seafloor. Therefore, we have not calculated separate disturbance areas for these two processes.

¹ We express noise as the sound force per unit micropascals (μPa), where 1 pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of one square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1 μPa, and the units for underwater sound pressure levels are decibels (dB) expressed in root mean square (rms), which is the square root of the arithmetic average of the squared instantaneous pressure values.

Mitigation Measures

The NTIA via its non-federal designee 48 North informed NMFS via an email on February 26, 2025, that the proposed action will incorporate the following mitigation measures:

For all reporting that results from implementation of these mitigation measures, NMFS will be contacted using the contact information specified in (Table 4). In all cases, notification will reference the NMFS consultation tracking number (e.g., AKRO-2024-01522).

General Mitigation Measures

1. The project proponent will inform NMFS of impending in-water activities a minimum of one week prior to the onset of those activities (email information to akr.prd.records@noaa.gov).
2. If construction activities will occur outside of the time window specified in this letter, the applicant will notify NMFS of the situation at least 60 days prior to the end of the specified time window to allow for reinitiation of consultation.
3. In-water work will be conducted at the lowest points of the tidal cycle when feasible.
4. Consistent with AS 46.06.080, trash will be disposed of in accordance with state law. The project proponent will ensure that all closed loops (e.g., packing straps, rings, bands, etc.) will be cut prior to disposal. In addition, the project proponent will secure all ropes, nets, and other marine mammal entanglement hazards so they cannot enter marine waters.

PSO Requirements

5. At least one PSO will have either prior experience as a PSO in Alaska, or will have taken a NMFS-approved PSO or marine mammal observer training course.
6. PSO training will include:
 - a. field identification of marine mammals and marine mammal behavior;
 - b. ecological information on marine mammals and specifics on the ecology and management concerns of those marine mammals;
 - c. ESA and Marine Mammal Protection Act (MMPA) regulations;
 - d. proper equipment use;
 - e. methodologies in marine mammal observation and data recording and property reporting protocols; and
 - f. an overview of PSO roles and responsibilities.
7. PSOs will be individuals independent from the project proponent and must have no other assigned tasks during monitoring periods.

8. The action agency or its designated non-federal representative will provide resumes or qualifications of PSO candidates to consultation biologist and akr.prd.records@noaa.gov approval at least one week prior to in-water work. NMFS will provide a brief explanation of lack of approval in instances where an individual is not approved.
9. PSOs will:
 - a. collectively be able to effectively observe the entirety of the monitoring zone;
 - b. be able to identify marine mammals and accurately record the date, time, and species, of all observed marine mammals in accordance with project protocols;
 - c. be able to identify listed marine mammals that may occur in the action area, at a distance equal to the outer edge of the applicable monitoring zone and determine marine mammal's location and distance from sound source;
 - d. have the ability to effectively communicate orally, by radio or in person with project personnel to provide real-time information on listed marine mammals;
 - e. possess a copy of mitigation measures; and
 - f. possess data forms.
10. PSOs will not scan for marine mammals for more than four hours without at least a one hour break from monitoring duties between shifts. PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.

PSO Procedures

11. PSOs will have the ability, authority, and obligation to order appropriate mitigation response, including monitoring, to avoid takes of listed marine mammals.
12. Two PSOs will perform PSO duties onsite throughout the authorized activity.
13. Where a team of three or more PSOs are required, a lead observer or monitoring coordinator will be designated.
14. During cable laying operations, it is unfeasible and unsafe to stop activities, so there are no shut down procedures for this project. However, two PSOs will continuously monitor marine waters within 2,000-meters of the vessel during all daylight hours, and report sightings to NMFS via monthly reports (cable-laying activities will take place 24 hours/day).
15. For each in-water activity, PSOs will monitor all marine waters within the indicated monitoring zone radius for that activity (Table 3).

Table 3. Monitoring Zones for Each Activity

Activity	Zone Radius (m)
Cable laying	2,000 meters
Grapnel clearing	2,000 meters

16. PSOs will be positioned such that they will collectively be able to monitor the entirety of each activity's monitoring zone.
17. Prior to commencing any activity listed in Table 3, PSOs will scan waters within the appropriate monitoring zone and confirm no listed marine mammals are within the monitoring zone for at least 30 minutes immediately prior to initiation of the in-water activity. If one or more listed marine mammals are observed within the monitoring zone, the in-water activity will not begin until the listed marine mammals exit the monitoring zone of their own accord, or the monitoring zone has remained clear of listed marine mammals for 30 minutes immediately prior to the commencement of the activities listed in Table 3.
18. The on-duty PSOs will continuously monitor the monitoring zone and adjacent waters during any of the activities listed in Table 3 for the presence of listed marine mammals.
19. Activities listed in Table 3 will only take place:
 - a. between sunrise and sunset;
 - b. during conditions with a Beaufort Sea State of 4 or less; and
 - c. when the entire monitoring zone and adjacent waters are visible (e.g., monitoring effectiveness is not reduced due to rain, fog, snow, haze, or other environmental/atmospheric conditions).
20. If visibility degrades such that PSOs can no longer ensure that the monitoring zone remains devoid of listed marine mammals during any of the activities listed in Table 3, the crew will stop activities until the entire monitoring zone is visible and the PSOs has indicated that the zone remained devoid of listed marine mammals for 30 minutes.
21. The PSOs will order ongoing activities listed in Table 3 to immediately cease if one or more listed marine mammals has entered, or appears likely to enter, the monitoring zone.
22. If any of the activities listed in Table 3 are shut down for less than 30 minutes due to the presence of listed marine mammals in the monitoring zone, the activities may commence when the PSOs provides assurance that listed marine mammals were observed exiting the monitoring zone. Otherwise, the activities may only commence after the PSO provides assurance that listed marine mammals have not been seen in the monitoring zone for 30 minutes (for cetaceans) or 15 minutes (for pinnipeds).
23. If a listed marine mammal is observed within a monitoring zone or is otherwise harassed, harmed, injured, or disturbed, the PSO will immediately report that occurrence to NMFS

using the contact information specified in Table 4.

24. Prior to commencing any activity listed in Table 3, or at changes in watch, PSOs will establish a point of contact with the construction crew. The PSO will brief the point of contact as to the monitoring procedures if the PSO observes that listed marine mammals are likely to enter or enter the monitoring zone. If the point of contact goes “off shift” and delegates their duties, the point of contact must inform the PSO and brief the new point of contact.

Grapnel/Underwater Excavating (Plow and Jet) Activities

25. All vessels involved in grapnel clearing and underwater excavating operations, including survey vessels, will transit at velocities ≤ 10 knots.
26. Grapnel and underwater excavating activities will slow the vessel whenever a listed marine mammal enters, or appears likely to enter the applicable monitoring zone (see Table 3).
27. Following a lapse of grapnel and underwater excavating activities of more than 30 minutes, the PSO will authorize resumption of the activity only after the PSO provides assurance that listed marine mammals have not been present within the monitoring zone for at least 30 minutes immediately prior to resumption of operations.

Project-Dedicated Vessels (vessel and crew safety should never be compromised)

28. Vessel operators will:
 - a. maintain a watch for marine mammals at all times while underway;
 - b. stay at least 91 meters (100 yards) away from listed marine mammals, except that they will remain at least 460 meters (500 yards) away from endangered North Pacific right whales;
 - c. travel at less than 5 knots when within 274 meters (300 yards) of a whale;
 - d. avoid changes in direction and speed within 274 meters (300 yards) of a whale, unless doing so is necessary for maritime safety;
 - e. not position vessel(s) in the path of a whale, and will not cut in front of a whale in a way or at a distance that causes the whale to change direction of travel or behavior (including breathing/surfacing pattern);
 - f. reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 kilometers (1 mile) or less; and
 - g. adhere to the Alaska Humpback Whale Approach Regulations when vessels are transiting to and from the project site: (see 50 CFR 216.18, 223.214, and 224.103(b); these regulations apply to all humpback whales). Specifically, pilot

and crew will not:

- i. approach, by any means, including by interception (i.e., placing a vessel in the path of an oncoming humpback whale), within 100 yards of any humpback whale;
 - ii. cause a vessel or other object to approach within 100 yards of any humpback whale; or
 - iii. disrupt the normal behavior or prior activity of a humpback whale by any other act or omission.
29. If a whale's course and speed are such that it will likely cross in front of a vessel that is underway, or approach within 91 meters (100 yards) of the vessel, and if maritime conditions safely allow, the engine will be put in neutral and the whale will be allowed to pass beyond the vessel, except that vessels will remain 460 meters (500 yards) from North Pacific right whales.
30. Vessels will not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear.
31. Project-specific barges will travel at 12 knots or less.

Vessel Transit, Western DPS Steller Sea Lions, and their Designated Critical Habitat

32. Vessels will not approach within 5.5 kilometers (3 nautical miles) of rookery sites listed in 50 CFR 224.103(d); and
33. Vessels will not approach within 914 meters (3,000 feet) of any Steller sea lion haulout or rookery.

Data Collection

PSOs have the following responsibilities for data collection:

34. PSOs will record observations on data forms or into electronic data sheets.
35. The project proponent will ensure that PSO data will be submitted electronically in a format that can be queried such as a spreadsheet or database (i.e., digital images of data sheets are not sufficient).
36. PSOs will record the following:
- a. Project name, date, shift start time, shift stop time, and PSO identifier;
 - b. date and time of each reportable event (e.g., a listed marine mammal observation, operation modification, reason for operation change (e.g. speed reduction, path change), change in weather conditions);

- c. weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state where the Beaufort Wind Force Scale will be used to determine sea state (<https://www.weather.gov/mfl/beaufort>);
- d. species, numbers, and, if possible, sex and age class of observed listed marine mammal;
- e. the predominant anthropogenic sound-producing activities occurring during each listed marine mammal observation;
- f. observations of listed marine mammal behaviors and reactions to anthropogenic sounds and presence;
- g. geographic coordinates of initial, closest, and last location of listed species, including distance from observer to the listed species, and minimum distance from the predominant sound-producing activity to listed species; and
- h. whether the presence of a listed species necessitated the implementation of mitigation measures to avoid acoustic impact (i.e., speed reduction, avoidance measures), and the duration of time that normal operations were affected by the presence of listed species.

Reporting

Unauthorized Take

37. If a listed marine mammal is determined by the PSO to have been disturbed, harassed, harmed, injured, or killed (e.g., a listed marine mammal is observed entering a monitoring zone before operations can be shut down, or is injured or killed as a direct or indirect result of the action), the PSO will report the incident to NMFS within one business day, with information submitted to akr.prd.records@noaa.gov. These PSO records will include:

- a. digital, queryable documents containing PSO observations and records, and digital, queryable reports;
- b. the date, time, and location of each event (provide geographic coordinates);
- c. description of the event;
- d. number of individuals of each listed marine mammal species affected;
- e. the time the animal(s) was first observed or entered the monitoring zone, and, if known, the time the animal was last seen or exited the zone, and the fate of the animal;
- f. mitigation measures implemented prior to and after the animal was taken;

- g. if a vessel struck a listed marine mammal, the contact information for the PSO on duty on the vessel or the contact information for the individual piloting the vessel; and
- h. photographs or video footage of the animal(s), if available.

Stranded, Injured, Sick or Dead Listed Species (not associated with the project)

- 38. If the PSO observes an injured, sick, or dead marine mammals (i.e., stranded), they will notify the Alaska Marine Mammal Stranding Hotline at 877-925-7773. The PSOs will submit photos and available data to aid NMFS in determining how to respond to the stranded animal. If possible, data submitted to NMFS in response to stranded marine mammals will include date/time, location of stranded marine mammal, species and number of stranded individuals, description of the stranded marine mammal's condition, event type (e.g., entanglement, dead, floating), and behavior of live-stranded marine mammals.

Illegal Activities

- 39. If the PSO observes listed marine mammals or other marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS Alaska Region Office of Law Enforcement; 1-800-853-1964).
- 40. Data submitted to NMFS will include date/time, location, description of the event, and any photos or videos taken.

North Pacific Right Whales

- 41. All observations of North Pacific right whales will be reported to NMFS within 24 hours. Photographs and/or video should be taken if possible to aid in Photo ID of individual animals. Reports will include all applicable information that will be included in a final report.

Extralimital Sightings

- 42. All observations of ESA-listed marine mammal species not considered in this consultation will be reported to NMFS within 24 hours. Photographs and/or video should be taken if possible to aid in Photo ID of individual animals. Reports will include all applicable information that would be included in a final report.

Final Report

- 43. A final report will be submitted to NMFS within 90 calendar days of the completion of the project summarizing the data recorded by emailing it to akr.prd.records@noaa.gov. The report will summarize all in-water activities associated with the proposed action, and results of PSO monitoring conducted during the in-water activities.

44. The final report for projects will include:

- a. summaries of monitoring efforts, including dates and times of construction, dates and times of monitoring, dates and times and duration of operation modifications due to listed marine mammal presence;
- b. dates and times of listed marine mammal observations, geographic coordinates of listed marine mammals at their closest approach to the project site, including date, water depth, species, age/size/gender (if determinable), and group sizes;
- c. number of listed marine mammals observed (by species) during periods with and without project activities (and other variables that could affect detectability);
- d. observed listed marine mammal behaviors and movement types versus project activity at the time of observation;
- e. numbers of marine mammal observations/individuals seen versus project activity at time of observation;
- f. any photos or videos taken of marine mammals; and
- g. digital, queryable documents containing PSO observations and records, and digital, queryable reports.

Table 4. Summary of Agency Contact Information

Reason for Contact	Contact Information
Consultation Questions & Unauthorized Take	akr.prd.section7@noaa.gov
Reports & Data Submittal	akr.prd.records@noaa.gov
Stranded, Injured, or Dead Marine Mammals	Stranding Hotline (24/7 coverage) 1-877-925-7773
Oil Spill & Hazardous Materials Response	U.S. Coast Guard National Response Center: 1-800-424-8802 and AKRNMFSspoilResponse@noaa.gov
Illegal Activities (<i>not related to project activities; e.g., feeding, unauthorized harassment, or disturbance to marine mammals</i>)	NMFS Office of Law Enforcement (AK Hotline): 1-800-853-1964

Reason for Contact	Contact Information
In the event that this contact information becomes obsolete	NMFS Anchorage Main Office: 907-271-5006 or NMFS Juneau Main Office: 907-586-7236

Listed Species and Critical Habitat

North Pacific Right Whale

The right whale (*Eubalaena* spp.) was listed as an endangered species under the ESCA in 1970 (35 FR 8491, June 2, 1970 (baleen whales listing); 35 FR 18319, December 2, 1970 (right whales listing)), and continued to be listed as endangered following passage of the ESA. NMFS later divided northern right whales into two separate endangered species: North Pacific right whales (*E. japonica*) and North Atlantic right whales (*E. glacialis*; 73 FR 12024, March 6, 2008). There are likely fewer than 500 North Pacific right whales remaining with less than 50 individuals estimated to remain of the eastern population found in Alaskan waters (Muto et al. 2022). The larger western population, on the coast of Russia and Japan, is outside of United States jurisdiction, so will not be considered further in this consultation.

The eastern North Pacific right whale is distributed from the Bering Sea to Baja California and has been sighted as far west as the Hawaiian islands (Kennedy et al. 2012). Sightings are rare, with the highest number seen in a single year was 17 distinct individuals, sighted over multiple ship surveys in the Southeastern Bering Sea (Wade et al. 2006). North Pacific right whales are primarily found in coastal or shelf waters but sometimes travel into deeper waters. From spring to fall, their distribution is dictated by the distribution of their prey. It is currently unknown if North Pacific right whales migrate to warmer habitats during winter as no migratory route or breeding and calving grounds have been identified and right whales have been sighted and detected acoustically in Alaskan waters in winter months (Wright et al. 2018a; NMFS 2022).

The North Pacific right whale is the first right whale species documented to produce song and it is hypothesized that these songs are reproductive displays (Crance et al. 2019). The singers whose sex could be determined were all males and it is unknown if females also sing. Four distinct song types were recorded at five distinct locations in the southeastern Bering Sea from 2009-2017. A study of right whale ear anatomy suggests a total possible hearing range of 10 Hz to 22 kHz (Parks et al. 2007). NMFS categorizes right whales in the low-frequency cetacean functional hearing group, with an applied frequency range between 7 Hz and 35 kHz (NMFS 2018).

Bering Sea

Passive acoustic recorders located in the Bering Sea and Unimak Pass in the Aleutian Islands have detected right whales in the Bering Sea in most months of the year, with a peak in occurrence in known foraging habitats during summer (Wright 2016; Wright et al. 2018b; Crance et al. 2019). Detections were made at Unimak Pass during most months of the year, supporting the idea that right whales may use this area as more than just a corridor to enter and

leave the Bering Sea (Wright et al. 2018b). In February 2022, there was an opportunistic sighting of two North Pacific right whales feeding north of Unimak Pass in the Aleutian Islands (NMFS 2022). This sighting is of particular interest as it is the first time right whales have been visually sighted in the area during that time of year (previous detections have been through acoustic moorings (Wright et al. 2018b)). Video footage confirmed that the whales were feeding, an activity not expected during the winter months when their prey is not as plentiful.

Numerous right whale detections have occurred in the critical habitat area of the southeastern Bering Sea, consistent with satellite tagging results and sightings (Zerbini et al. 2015; Crance et al. 2017; Crance et al. 2019). Detections and sightings have also occurred in the northern Bering Sea, including in the vicinity of St. Lawrence Island (Wright et al. 2019; Matsuoka et al. 2022), and acoustic detections have been increasing in frequency in recent years in this area (Wright et al. 2019).

North Pacific Right Whales in the Action Area

Overlap of North Pacific right whale individuals with project activities could occur during the transit route for the cable-laying ship as it moves from Nome to Naknek. It is possible that the vessel would pass through areas occupied by North Pacific right whales. The rarity of the whales and the plan for a single project-specific round-trip with the ships traveling close to one another make the likelihood of encounters extremely rare. Information on biology and habitat of the North Pacific right whale is available at:

[North Pacific Right Whale Species Description](#)

[Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales](#)

[North Pacific Right Whale Critical Habitat](#)

Humpback Whale

The humpback whale (*Megaptera novaeangliae*) was listed as endangered under the ESCA in 1970 (35 FR 8491, June 2, 1970 (baleen whales listing); 35 FR 18319, December 2, 1970 (humpback whale listing)). Congress replaced the ESCA with the ESA in 1973, and humpback whales continued to be listed as endangered. NMFS conducted a global status review that led to changing the status of humpback whales under the ESA and dividing the species into 14 distinct population segments (DPS) (81 FR 62259, September 8, 2016). Of these 14 DPSs, NMFS listed four as endangered, one as threatened, and delisted the remaining nine. Three DPSs occur in waters of Alaska. The Western North Pacific DPS is listed as endangered; the Mexico DPS is listed as threatened; and the Hawaii DPS is not listed (81 FR 62259, September 8, 2016).

The Hawaii DPS population is estimated to be 11,540 animals (CV=0.04) with an annual growth rate between 5.5 and 6.0 percent. The Mexico DPS is comprised of approximately 2,913 animals (CV=0.7; Wade 2021) with an unknown, but likely declining, population trend (81 FR 62259; September 8, 2016). Approximately 1,084 animals (CV=0.09) comprise the Western North Pacific DPS (Wade 2021). Humpback whales in the Western North Pacific remain rare in some

parts of their former range, such as the coastal waters of Korea, and have shown little sign of recovery in those locations.

Whales from these three DPSs overlap on feeding grounds off Alaska, and are visually indistinguishable unless individuals have been photo-identified on breeding grounds and again on feeding grounds. All waters off the coast of Alaska may contain ESA-listed humpbacks.

Humpback whales produce a variety of vocalizations ranging from 20 Hz to 10 kHz (Silber 1986; Richardson et al. 1995; Au 2000; Erbe 2002; Au et al. 2006; Vu et al. 2012). NMFS categorizes humpback whales in the low-frequency cetacean functional hearing group, with an applied frequency range between 7 Hz and 35 kHz (NMFS 2018).

Bering Sea/Aleutian Islands/Chukchi and Beaufort Seas

The abundance estimate for humpback whales in the Bering Sea and Aleutian Islands is estimated to be 7,758 (CV= 0.2) animals, which includes whales from the unlisted Hawaii DPS (91 percent), threatened Mexico DPS (7 percent), and endangered Western North Pacific DPS (2 percent; NMFS 2021; Wade 2021)(Table 5). These same DPS proportions apply for the Chukchi and Beaufort seas. Humpback whales have increasingly been recorded during surveys in the eastern Chukchi Sea (67°–72°N, 157°–169°W) from July to October primarily over the continental shelf (Brower et al. 2018). During similar aerial surveys in 1982–1991, there was a complete lack of sightings of these whales (Brower et al. 2018). It is unknown if this is an indicator of population recovery, climate change, or increased survey effort (Brower et al. 2018).

In Aleutian and Bering Sea feeding areas, humpback whales forage mainly on krill but documented prey items for some locations also include Atka mackerel, juvenile pollock, capelin, sand lance, and cod. In summer 2020, around Unimak Pass, north of which a major Pacific herring concentration occurs in summer (Tojo et al. 2007), humpback whales were mainly observed feeding on krill but were also observed feeding on Pacific herring (NMFS 2020).

The area around the Aleutian Islands from Unimak Island northeastward along the Alaska Peninsula has been identified as a Biologically Important Area for humpback whales (Brower et al. 2022). Telemetry data from Kennedy et al. (2014) supported findings of historical data showing that humpback whales congregate in the shallow, highly productive coastal waters north of the eastern Aleutian Islands, between Unimak and Samalga Passes. The extremely high proportion of foraging within the narrow band 200 km east and west of Unalaska Bay further emphasizes the importance of the waters off the eastern Aleutian Islands for humpback whales (Kennedy et al. 2014). Annual vessel-based, photo-identification surveys in the Shumagin Islands from 1999 to 2015 identified 654 unique individual humpback whales between June and September (Witteveen and Wynne 2017).

Table 5. Percent probability of encountering humpback whales from each DPS in the North Pacific Ocean (columns) in various feeding areas (on left; Wade 2021).

Summer Feeding Areas	North Pacific Distinct Population Segments (DPS) (percent)			
	Western North Pacific (endangered)	Hawaii (not listed)	Mexico (threatened)	Central America (endangered)
Kamchatka	91	9	0	0
Aleutian I / Bering / Chukchi Seas	2	91	7	0
Gulf of Alaska	1	89	11	0
Southeast Alaska / Northern BC	0	98	2	0
Southern BC / WA	0	69	25	6
OR/CA	0	0	58	42
Note that in the past iteration of this guidance, upper confidence intervals were used for endangered DPSs. However, the revised estimates do not have associated coefficients of variation to cite. Therefore, the point estimate is being used for each probability of occurrence.				

Additional information on humpback whale biology and natural history is available at:

[Humpback Whale Species Description](#)

[Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales](#)

[Humpback Whale Critical Habitat](#)

[Occurrence of Listed Humpback Whales off Alaska](#)

Humpback whales in the action area

Because of their size and preference for deeper waters, it is unlikely that humpback whales would overlap with effects from the nearshore cable-laying activities. However, the cable-laying ship could pass through waters occupied by humpback whales along the bulk of the alignment from Nome to Naknek. The cable-laying ship is expected to be in the area in the spring and summer months when humpbacks are more likely to be in the area. However, the route is outside of the BIAs along the Aleutian Islands.

Fin Whale

The fin whale (*Balaenoptera physalus*) was decimated by commercial whaling in the 1800s and early 1900s. It was listed as an endangered species under the ESCA in 1970 (35 FR 8491, June 2,

1970 (baleen whales listing); 35 FR 18319, December 2, 1970 (fin whale listing), and continues to be listed as endangered following passage of the ESA. Critical habitat has not been designated for fin whales. There are no reliable estimates of current and historical abundances for fin whales, and there continue to be uncertainties in their population structure (Muto et al. 2022). Based on dedicated line-transect surveys of the offshore waters of the Gulf of Alaska conducted by Rone et al. (2017b), the best provisional abundance estimate in the northeast Pacific is 3,168 fin whales. However, this is an underestimate because these surveys covered only a small portion of fin whale range, and no correction factors were computed for this data (Muto et al. 2022).

Fin whales occur throughout the North Pacific, from the northeastern Chuckchi Sea to the Tropic of Cancer. They occur mostly offshore but frequently enter exposed coastal areas. It has been presumed that fin whales undergo regular long-range migrations between high latitude summer feeding grounds and lower-latitude winter calving grounds like other baleen whales. However, there is evidence that fin whales exhibit more complex and varied movement patterns, and do not perform concerted seasonal long-term migrations (Mizroch et al. 2009). Their winter distribution and location of primary calving areas (if any) are not well understood (Young et al. 2023). In any one season, fin whales can occur at many different latitudes, possibly depending on their age or reproductive state; movements can be inshore/offshore or north/south (NMFS 2010a). Fin whales also exhibit residency patterns in some parts of their range (i.e., the Gulf of California and East China Sea) (Mizroch et al. 2009). Fin whales remain in Alaskan waters through the winter (Moore et al. 2006; Mizroch et al. 2009; Rice et al. 2021), and there is recent evidence for both feeding and reproductive behavior in high latitudes during winter (Koot 2015). However, it is not clear whether the fin whales that occur in northern latitudes in the winter represent year-round resident individuals, or if staggered migration patterns occur that result in at least some whales being present at all times.

Fin whale distribution is primarily driven by prey availability, which includes schooling fish, euphausiids, and copepods. Fin whale concentrations in the northern North Pacific and Bering Sea generally form along frontal boundaries, which are highly productive mixing zones between coastal and oceanic waters. These nutrient rich waters can sustain high biomasses of phytoplankton and zooplankton and correspond roughly to the continental shelf edge (NMFS 2010a). Fin whales in the Gulf of Alaska are found consistently along the shelf break; passive acoustic monitoring studies recorded fin whales at more sites on or near the continental shelf compared to seamount sites in deeper water (Rice et al. 2021). Historical whaling data provide further evidence that fin whales are strongly associated with the shelf edge; habitat models based on catch data identified the continental slope as essential habitat for fin whales (Gregar and Trites 2001).

Fin whales produce a variety of low-frequency sounds, with their primary call types centered around 20 Hz and 40 Hz. These are highly stereotyped, frequency down-swept, loud (as high as 189 dB re 1 μ Pa at 1 m), and short duration (~1 second) (Watkins 1981; Wiggins and Hildebrand 2020). The 20 Hz note is the most commonly reported fin whale sound. Males produce 20 Hz pulses in repetitive doublet or triplet sequences (song); singing is only exhibited by males and is considered a reproductive display (Croll et al. 2002). The note pattern (i.e., singlets or doublets), internote interval, and sometimes frequency of the songs varies geographically among regions (Watkins et al. 1987; Hatch and Clark 2004). This geographic variation may reflect population

structure. The 40-Hz call is not well understood, but evidence suggests it is associated with feeding behavior and may serve a foraging function (Watkins 1981; Širović et al. 2013).

While there is no direct data on hearing in low-frequency cetaceans, the applied frequency range is expected to be between 7 Hz and 35 kHz (NMFS 2018). Estimates based on scans of a fin whale calf skull indicate the range of best hearing for fin whale calves to range from approximately 20 Hz to 10 kHz, with maximum sensitivities between 1 to 2 kHz (Cranford and Krysl 2015).

Fin whales in the action area

Fin whales are typically found in deep water (Matsuoka et al. 2013; Rone et al. 2017b) away from the immediate coast (Clarke et al. 2020); Because of their size and preference for deeper waters, it is unlikely that fin whales would overlap with effects from the nearshore cable-laying activities. However, the cable-laying ship could pass through waters occupied by fin whales along the bulk of the alignment from Nome to Naknek.

Additional information on fin whale biology and habitat is available at:

[Fin Whale Species Description](#)

[Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales](#)

[2019 Status Review](#)

Sperm Whale

The sperm whale (*Physeter macrocephalus*) was listed as an endangered species under the ESCA in 1970 (35 FR 8491, June 2, 1970; 35 FR 18319, December 2, 1970), and continues to be listed as endangered following passage of the ESA. Critical habitat has not been designated for sperm whales. Sperm whales are globally distributed and have extensive home ranges that can span ocean basins. The population structure of sperm whales has not been adequately defined, and there are no recent and reliable estimates for population size or trend for sperm whales off Alaska (i.e., the North Pacific Stock) (NMFS 2010b; Young et al. 2023).

Sperm whales are primarily found in deep waters, and sightings of sperm whales in water less than 300 m (984 ft) are uncommon. They are usually found far offshore, except in cases where the shelf break or submarine canyons occur close to land (Mizroch and Rice 2013). They feed primarily on medium-sized to large-sized squids but also take substantial quantities of large demersal and mesopelagic sharks, skates, and fishes (Rice 1989). Research suggests that sperm whales are relatively nomadic, with movements closely tied to geographical and temporal variations in the abundance of pelagic squids (Mizroch and Rice 2013). Sperm whales exhibit latitudinal sex segregation; all age classes and both sexes range throughout temperate and tropical regions, but only males move into higher latitudes to forage (NMFS 2010). Females, dependent young, and immature males form cohesive social groups, while young males form bachelor groups and ultimately become solitary as they sexually mature. Adult males show variable movement patterns at high latitude feeding grounds, and periodic, but not seasonal,

directed transits into low latitude feeding/breeding grounds with repeat visitation to female groups (Whitehead 2003; Straley et al. 2014). However, movement patterns are complex and timing of departure into lower latitudes is variable among individual whales (Straley et al. 2014).

During the summer months, adult males are found in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands (Mizroch and Rice 2013). Females and juveniles generally remain in tropical and temperate latitudes, ranging no further than 50-51 °N in the southern Gulf of Alaska. Discovery Mark data from commercial whaling days indicate extensive movement of females into the Gulf of Alaska, western Aleutians, and Bering Sea occurred historically (Mizroch and Rice 2013, NMFS 2010). Matrilineal groups are considered to rarely occur in Alaskan waters currently. However, contemporary studies document the presence of female social groups in the Gulf of Alaska and Aleutian Islands (Fearnbach et al. 2012; Rone et al. 2017b; Posdaljian et al. 2023), possibly representing a return to pre-whaling distributions of sperm whales.

Sperm whales produce a variety of loud, low-frequency clicks ranging from 0.1 to 20 kHz, with source levels up to 236 dB re 1 μPa (Weilgart and Whitehead 1993; Goold and Jones 1995; Møhl et al. 2003; Weir and Goold 2007). These include patterned clicks (codas), which are used during social behavior and in interactions within social groups, usual clicks which are used during foraging/diving behavior, creaks (a series of rapid clicks), associated with prey detection, and slow clicks believed to be only produced by males in the context of mating (Whitehead and Weilgart 1991; Weilgart and Whitehead 1993; Miller et al. 2004; Rendell and Whitehead 2004; Zimmer et al. 2005). Sperm whales are odontocetes (toothed whales) and are considered mid-frequency cetaceans with an applied frequency range of 150 Hz to 160 kHz (NMFS 2018). The only direct measurement of hearing was from a young stranded individual from which auditory evoked potentials were recorded and indicated a hearing range of 2.5 to 60 kHz (Carder and Ridgway 1990).

Bering Sea/Aleutian Islands

Sperm whales have been frequently documented in the western Aleutian Islands, from Unalaska to the east out to the far islands. Surveys conducted by Forney and Brownell (1997) south of the eastern Aleutians found sperm whales in depths from 4,000-5,000 m over the Aleutian Abyssal Plain or north of the Aleutian Trench over deep basins. During 12 cetacean surveys in the summers of 2001-2007 and 2009-2010, 393 sightings of adult male sperm whales were made (Fearnbach et al. 2012). They were considered the most frequently sighted large cetacean in coastal waters around the central and western Aleutian Islands (Allen and Angliss 2011). In February 2008, a group of approximately 50 female and immature sperm whales were seen near Koniui Island, in the central Aleutian Islands (Fearnbach et al. 2012). This was the first time such a large aggregation of females and juveniles were seen so far north since whaling ended. More recent studies by Posdaljian et al. (2023) acoustically detected female groups in the Aleutian Islands, with peak presence occurring in winter. There are few records of sperm whales north of the Aleutian Islands due to the difficulty

Sperm whales in the action area

Because sperm whales occur in coastal waters south of Nome in the eastern Aleutian Basin out to the end of the Aleutian Islands, there is the possibility that they might be in the action area

during the project. Studies near Kodiak and the Gulf of Alaska, found that they are typically found in deep water (Matsuoka et al. 2013; Rone et al. 2017a); therefore, it is less likely that individual whales would overlap with the effects of the nearshore cable laying at the three BMH locations. However, the cable-laying vessel could pass through habitat occupied by sperm whales.

Additional information on sperm whale biology and habitat is available at:

[Sperm Whale Species Description](#)

[2015 Status Review](#)

[Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales](#)

Arctic Ringed Seal

NMFS published a final rule listing the Arctic subspecies of ringed seals (*Pusa hispida hispida*) as threatened under the ESA on December 28, 2012, primarily due to threats associated with long-term reductions in sea ice and on-ice snow expected to occur within the foreseeable future (77 FR 76706).

A reliable population estimate for Arctic ringed seals is not available (Muto et al. 2022). Kelly et al. (2010) estimated the total population in the Chukchi and Beaufort seas in Alaska to be at least 300,000 based on estimates from aerial surveys conducted in the late 1990s and 2000 (Frost et al. 2004; Bengtson et al. 2005), which they noted is likely an underestimate since the Beaufort Sea surveys were limited to within 40 km of shore. In the Bering Sea, as discussed by Muto et al. (2022), Conn et al. (2014) calculated an abundance estimate of 174,418 ringed seals (95 percent confidence interval: 141,588 to 201,090) in these waters using a limited sub-sample of aerial survey data collected from the U.S. portion off the Bering Sea in 2012. Because this estimate did not account for availability bias or include ringed seals in shorefast ice, the actual number of ringed seals in the U.S. portion of the Bering Sea is likely much higher (Muto et al. 2022). A 2021 survey of the Beaufort Sea by NMFS (analysis pending), in combination with previous surveys in the Bering and Chukchi Seas (Boveng et al. In Prep), will allow for the determination of an estimate of ringed seal abundance in waters surrounding Alaska. It is anticipated that the total estimate of seals in this region will exceed 1 million individuals (NMFS 2024).

Arctic ringed seals are highly associated with sea ice, which they use as a platform for whelping and nursing pups in spring, molting in spring to early summer, and resting throughout the year (Kelly et al. 2010)(Figure 5). Ringed seals are able to open and maintain breathing holes in the ice, which allows them to inhabit heavily ice-covered areas. At some breathing holes with sufficient snow cover, ringed seals excavate lairs in snowdrifts on the surface of the ice within which they rest and give birth to and nurse pups (Smith and Stirling 1975; Williams et al. 2006; Hauser et al. 2021). These subnivean lairs are important to pup survival because they provide shelter from extreme cold and concealment from predators (Lukin and Potelov 1978; Smith et al. 1991; Smith and Lydersen 1991; Stirling and Smith 2004).

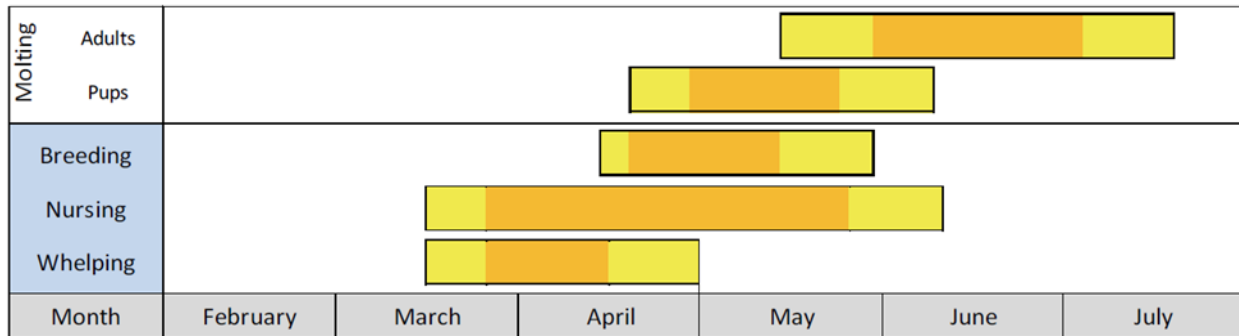


Figure 5. Approximate annual timing of Arctic ringed seal reproduction and molting. Yellow bars indicate the “normal” range over which each event is reported to occur and orange bars indicate the “peak” timing of each event (Kelly et al. 2010).

During winter and spring, ringed seals are found throughout the Chukchi and Beaufort seas (Frost 1985; Kelly 1988), and aerial surveys indicate that they use nearly the entire ice field over the Bering Sea shelf (Braham et al. 1984; Lindsay et al. 2021). Most ringed seals that winter in the Bering and southern Chukchi seas are thought to migrate north in spring as the ice recedes (Frost 1985). Tracking data indicate that ringed seals extensively use the continental shelf waters of the Chukchi and Beaufort seas during the open-water season, and some seals make excursions into deep waters north of the shelf break (Crawford et al. 2012; Quakenbush et al. 2019; Quakenbush et al. 2020; Von Duyke et al. 2020). Ringed seals (primarily juveniles) have also been observed near river mouths and in lagoons in some areas during the open water season, especially during fall (Oceana and Kawerak 2014; Gryba et al. 2021).

Arctic ringed seals typically lose a significant proportion of their blubber mass in late winter to early summer and then replenish their blubber reserves in late summer or fall into winter (Ryg et al. 1990; Young and Ferguson 2013; Quakenbush et al. 2020). Diet studies indicate that ringed seals in Alaska eat a wide variety of vertebrate and invertebrate prey species, but certain prey species, such as Arctic cod, saffron cod, shrimps, and amphipods occupy a prominent role in their diet (Dehn et al. 2007; Quakenbush et al. 2011b; Crawford et al. 2015; Quakenbush et al. 2020).

The behavioral context of ringed seal underwater vocalizations is not well known, but they are thought to play a role in the seals’ reproductive behavior (Stirling 1983; Kelly 2022). NMFS defines the functional hearing range for phocids (earless seals) as 50 Hz to 86 kHz (NMFS 2018). A study on the hearing of captive ringed seals suggests that the species has the ability to detect signals surrounded by background noise (Sills et al. 2015).

More information on ringed seal biology, habitat, and distribution is available at:

[Ringed Seal Species Description](#)

[Marine Mammal Stock Assessment Report: Pinnipeds-Phocids](#)

[2024 Status Review Arctic Ringed Seal Critical Habitat](#)

Arctic ringed seals in the action area

The most likely timeframe when FOC laying activities could overlap with the presence of Arctic ringed seals would be when the vessel is closer to land during the open water season, or if cable laying occurs when pack ice is broken in late winter or early spring. During open water periods in late fall, juveniles may be hauled out along river mouths or feeding in waters less than 200m. Since cable-laying will occur in spring and summer (from April through October), many Arctic ringed seals will have likely moved or be moving north with the receding ice. However, it is reasonable to assume that seals may be present on remaining ice or in nearshore marine waters during cable-laying or nearshore BMH related actions.

Bearded Seal

The Beringia DPS of the *Erignathus barbatus nauticus* subspecies of bearded seal was listed as threatened under the ESA on December 28, 2012, primarily due to threats associated with long-term reductions in sea ice expected to occur within the foreseeable future stemming from climate change (77 FR 76739).

A reliable population estimate is not available (Muto et al. 2022). However, as discussed by Muto et al. (2022), using a limited sub-sample of spring aerial survey data collected from the U.S. portion of the Bering Sea in 2012, Conn et al. (2014) calculated a preliminary abundance estimate of 301,836 bearded seals (95 percent confidence interval: 238,195 to 371,147) in these waters.

Bearded seals are associated with moving pack ice that produces leads and other openings in the ice, and only rarely use areas of thick, continuous shorefast ice. They use sea ice as a platform for whelping and nursing of pups, pup maturation, and molting (shedding and regrowing hair and outer skin layers), as well as for resting (Cameron et al. 2010).

In late winter and early spring, bearded seals are widely but not uniformly distributed in broken, drifting pack ice the Bering Sea (Burns 1981; Braham et al. 1984). Some bearded seals also inhabit suitable pack ice the Chukchi and Beaufort seas over winter and spring (MacIntyre et al. 2015; Frouin-Mouy et al. 2016; Olnes et al. 2020; Quakenbush 2020). As the ice recedes in spring, many of the bearded seals that overwintered in the Bering Sea migrate north through the Bering Strait (mid-April to June) and spend the summer along the ice edge in the Chukchi and Beaufort seas, though some remain in open-water areas from the Bering Sea north (Burns 1981; Olnes et al. 2020; Quakenbush 2020).

During the open-water season, some bearded seals (largely juveniles) occur in small bays, lagoons, near river mouths, and up some rivers, particularly in late summer and fall (Oceana and Kawerak 2014; Gryba et al. 2021)². While adult bearded seals have rarely been seen hauled out

² Northwest Arctic Borough. 2016. Important areas for marine and coastal species. Pages 415-529 in Iñuuniaġiqput Iġiġugu Nunaġġuanun: documenting our way of life through maps. Northwest Arctic Borough, Kotzebue, Alaska. Accessed at: <https://www.nwabor.org/subsistence-mapping-program/digital-atlas/>. (December 2019).

on land in Alaska (Burns 1981; Nelson 1981), (solitary) juvenile bearded seals have been observed or documented via satellite telemetry during the open-water season hauled out on land in some areas (Oceana and Kawerak 2014; Gadamus et al. 2015; Olnes et al. 2020).

Bearded seals feed primarily on benthic organisms including invertebrates (crabs, shrimp, clams, worms, and snails) and some fish found on or near the seafloor (in waters typically less than 200 m deep; Cameron et al. 2010). Bearded seals of the Beringia DPS primarily feed on bivalves and crustaceans, along with fishes such as sculpins, cods, and flatfishes (Dehn et al. 2007; Quakenbush et al. 2011a; Crawford et al. 2015; Quakenbush et al. 2020).

Bearded seals vocalize intensively underwater in association with territorial and mating behaviors, which occur in the spring (Van Parijs et al. 2003; Van Parijs and Clark 2006). NMFS defines the functional hearing range for phocids (earless seals) as 50 Hz to 86 kHz (NMFS 2018).

Additional information on bearded seal biology and habitat is available at:

[Bearded Seal Species Description](#)

[2010 Status Review](#)

[Marine Mammal Stock Assessment Report: Pinnipeds-Phocids](#)

[Bearded Seal Critical Habitat](#)

Bearded seals in the action area

The most likely timeframe when FOC laying activities could overlap with the presence of bearded seals would be when the vessel is closer to land during the open water season, or if cable laying occurs when pack ice is broken in late winter or early spring. During open water periods in late fall, juveniles may be hauled out along river mouths or feeding in waters less than 200m. Since cable-laying will occur in spring and summer (from April through October), many bearded seals will have likely moved or be moving north with the receding ice. However, it is reasonable to assume that seals may be present on remaining ice or in nearshore marine waters during cable-laying or nearshore BMH related actions.

Western DPS Steller Sea Lion

The Steller sea lion (*Eumetopias jubatus*) was listed as a threatened species under the ESA effective December 4, 1990 (55 FR 49204, November 26, 1990). Based on genetic, morphological, ecological, and population trend data, NMFS reclassified the Steller sea lion into two DPS's, effective June 4, 1997 (62 FR 24345, May 5, 1997). The western DPS, comprised of animals originating from breeding sites west of 144° W longitude, was listed as endangered due to persistent decline and lack of recovery, while the eastern DPS remained listed as threatened. Effective on December 4, 2013, the eastern DPS was removed from the endangered species list (78 FR 66140, November 4, 2013).

The western stock of the Steller sea lion decreased from 220,000 to 265,000 animals in the late 1970s to less than 50,000 in 2000 (Loughlin et al. 1984; Loughlin and York 2000; Burkanov and Loughlin 2005). The sharp drop in abundance of the western DPS observed in the 1980s was caused largely by a steep decline in juvenile survival and a smaller decline in adult survival (York 1994; Holmes and York 2003). The minimum population estimate for the U.S. portion of the range of western DPS Steller sea lions in 2023 was 49,320 Steller sea lions; 11,987 pups (95% credible interval of 11,291-12,703) and 37,333 non-pups (95% credible interval of 34,274-40,245), respectively (Sweeney et al. 2023). Non-pups and pups in the western DPS of Alaska increased 1.05 and 0.50% y⁻¹, respectively, between 2007 and 2022; however, there was high variability among regions (Sweeney et al. 2023). Steller sea lions in the western Aleutian Islands region continued to decline, along with pups in the adjacent central Aleutian Islands region. East of Samalga Pass, Aleutian Islands, pup production slowed or plateaued in the early 2010s, with subsequent non-pup plateauing or declines starting in the late 2010s in all regions (Sweeney et al. 2023). The 2014-2016 North Pacific marine heatwave (PMH), one of the most severe heatwaves ever recorded, resulted in reduced survival of adult female Steller sea lions in the Gulf of Alaska and reduced survival of adult female and adult male Steller sea lions in Southeast Alaska (Hastings et al. 2023) indicating that Steller sea lion populations in Alaska remain sensitive to environmental anomalies such as these (Suryan et al. 2021; Hastings et al. 2023).

Steller sea lions range throughout the North Pacific Ocean occurring from central California along the Pacific Rim through Alaska and Russia to Japan (Kenyon and Rice 1961; Loughlin et al. 1984). The western DPS of Steller sea lions are primarily found north of Sumner Strait in Southeast Alaska (Hastings et al. 2020). Most adult Steller sea lions occupy rookeries during the summer pupping and breeding season (mid-May through July) and exhibit a high level of site fidelity (Raum-Suryan et al. 2002; Hastings et al. 2017). During the breeding season, some juveniles and non-breeding adults occur at or near the rookeries, but most are on haulouts (sites that provide regular retreat from the water on exposed rocky shoreline, gravel beaches, and ice) (Call and Loughlin 2005; Ban and Trites 2007). Steller sea lions disperse widely after the breeding season, likely to access seasonally important prey resources (Gende and Sigler 2006; Sigler et al. 2009; Womble et al. 2009). During fall and winter many sea lions disperse from rookeries and increase use of haulouts, particularly on terrestrial sites but also on sea ice in the Bering Sea (Calkins 1998).

Steller sea lions forage near and off shore, in both benthic and pelagic zones, and eat a wide variety of prey, including many species of fish and cephalopods (including squid and octopus) (Pitcher and Calkins 1981; Calkins and Goodwin 1988; Calkins 1998; Sinclair et al. 2013; Tollit et al. 2017), and occasionally other marine mammals and birds (Pitcher and Fay 1982; NMFS 2008). During the breeding season, adult females must forage close enough to her rookery to return often to nurse her pup. Females attending pups usually forage within 20 nm of breeding rookeries (Merrick and Loughlin 1997), which is the basis for designated critical habitat around rookeries and major haulout sites. Steller sea lions are not known to migrate annually, but individuals, especially juveniles and males, may disperse widely outside of the breeding season (Raum-Suryan et al. 2004; Trites et al. 2006; Lander et al. 2009; Jemison et al. 2013; Fritz et al. 2016; Sigler et al. 2017; Jemison et al. 2018).

The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. NMFS categorizes Steller sea

lions in the otariid pinniped functional hearing group, with an applied frequency range between 60 Hz and 39 kHz in water (NMFS 2018).

Information on Steller sea lion biology and habitat is available at:

[Steller Sea Lion Species Description](#)

[Marine Mammal Stock Assessment Reports: Pinnipeds-Otariids](#)

[2020 Status Review](#)

[Occurrence of Western DPS Steller Sea Lions East of 144° W. Longitude](#)

[Steller Sea Lion Critical Habitat](#)

Steller Sea Lion Critical Habitat

NMFS designated critical habitat for Steller sea lions on August 27, 1993 (58 FR 45269; Figure 6. In Alaska, designated critical habitat includes the following areas as described at 50 CFR 226.202.

1. Terrestrial zones that extend 3,000 feet (0.9 km) landward from each major haulout and major rookery in Alaska.
2. Air zones that extend 3,000 feet (0.9 km) above the terrestrial zone of each major haulout and major rookery in Alaska.
3. Aquatic zones that extend 3,000 feet (0.9 km) seaward of each major haulout and major rookery in Alaska that is east of 144° W longitude.
4. Aquatic zones that extend 20 nm (37 km) seaward of each major haulout and major rookery in Alaska that is west of 144° W longitude.
5. Three special aquatic foraging areas: the Shelikof Strait area, the Bogoslof area, and the Segum Pass area, as specified at 50 CFR 226.202(c).

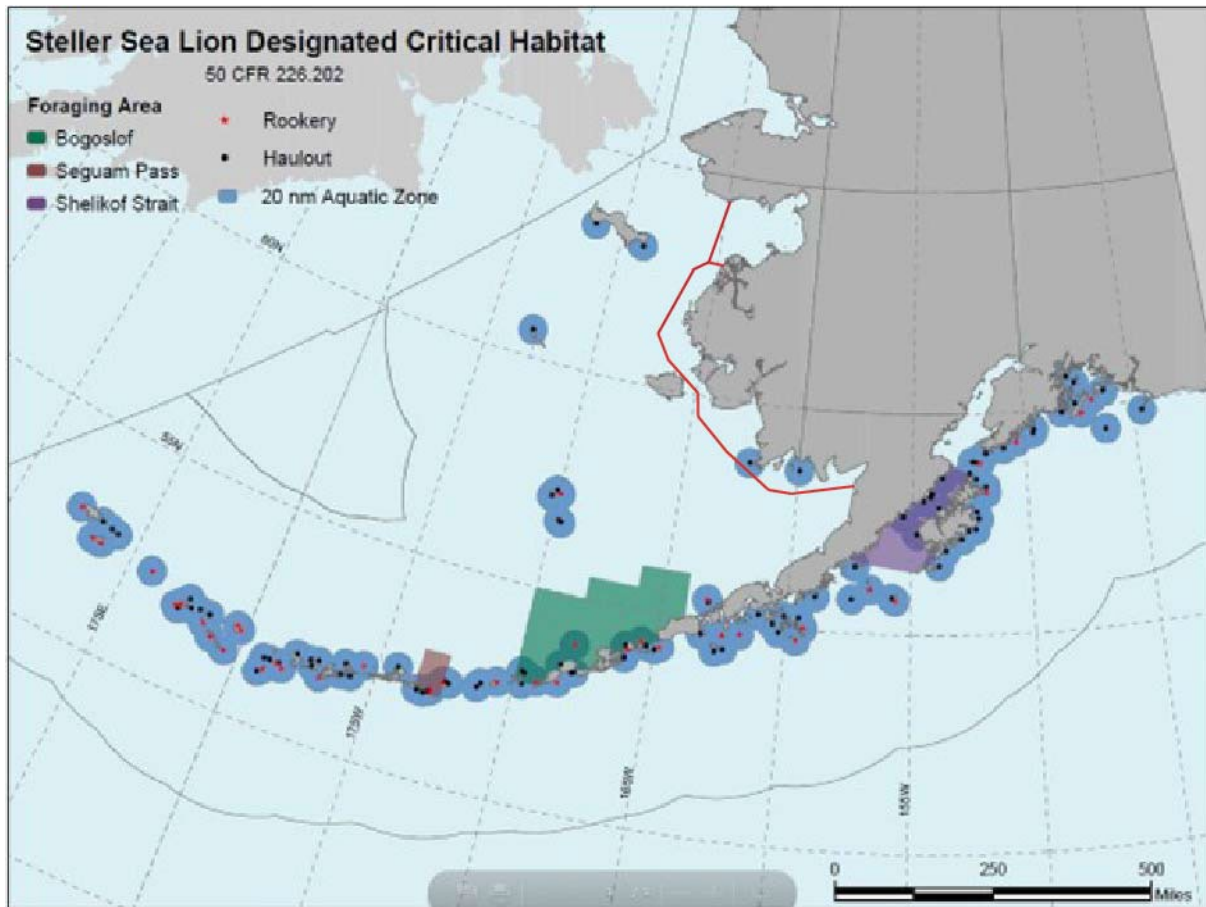


Figure 6. Designated Steller sea lion critical habitat in Alaska. Red line indicates the approximate cable-laying route for the NTHE project (NTIA 2024).

WDPS Steller sea lions and critical habitat in the action area

Segment one passes approximately 98 nm east of the major haulout at St. Lawrence Island near the connection with Segment two that will serve Emmanok. Segment three passes approximately 14 nm from Cape Newenham, which places it within the 20 nm aquatic zone off of a major haulout for designated Steller sea lion critical habitat (Figure 6). The route also passes approximately 25 nm south of the major haulouts at Twins at Walrus and Round Island, which will be just outside of the 20 nm aquatic zone. Because of the proximity to known haulouts, it is reasonable to assume that Steller sea lions may be in waters traversed by the cable-laying vessel along much of its route from Nome to Bristol Bay.

Effects of the Action

“Effects of the action” are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR 402.02). The applicable standard to find that a proposed action may affect but is “not likely

to adversely affect” listed species or critical habitat is that all of the effects of the action are expected to be insignificant, extremely unlikely to occur, or completely beneficial. “Insignificant effects” relate to the magnitude of the impact and are those that one would not be able to meaningfully measure, detect, or evaluate; insignificant effects should never reach the scale where take occurs.

While the ESA does not define “harass,” NMFS issued guidance interpreting the term “harass” under the ESA as to: “create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering” (Wieting 2016). NMFS considers the following steps to assess whether proposed activities are likely to harass.

1. Whether an animal is likely to be exposed to a stressor or disturbance (i.e., an annoyance).
2. The nature of that exposure in term of magnitude, frequency, duration, etc. Included in this may be type and scale as well as considerations of the geographic area of exposures (e.g., is the annoyance within a biologically important location for the species, such as a foraging area, spawning/breeding area, or nursery area?).
3. The expected response of the exposed animal to a stressors or disturbance (e.g., startle, flight, alteration [including abandonment] of important behaviors).
4. Whether the nature and duration or intensity of that response is a significant disruption of those behavior patterns which include, but are not limited to, breeding, feeding, sheltering, resting, or migrating.

The potential effects of the proposed action on listed species and critical habitat include vessel strikes, disturbance from noise generated by vessels, and localized turbidity created by the grapnel and cable burying during the cable-laying process.

Vessel Strike Risk

Ship strikes can cause major wounds or death to marine mammals. An animal at the surface could be struck directly by a vessel, a surfacing animal could hit the bottom of a vessel, or a vessel propeller could injure or kill an animal below the water’s surface. From 1978 to 2011, there were at least 108 recorded whale-vessel collisions in Alaska, with the majority occurring in Southeast Alaska between May and September (Neilson et al. 2012). Small recreational vessels traveling at speeds over 13 kn (24 km/hour [hr]) were most commonly involved in ship strike encounters; however, all types and sizes of vessels were reported (Neilson et al. 2012).

The majority of vessel strikes involved humpback whales (86 percent), and the number of humpback strikes increased annually by 5.8 percent from 1978 to 2011. Fin whales accounted for 2.8 percent of reported collisions, while gray whales were 0.9 percent, and sperm whales were 0.9 percent.

The probability of strike depends on the frequency, speed, and route of the marine vessels, as well as the distribution and density of marine mammals in the area. Vanderlaan and Taggart

(2007) used observations to develop a model of the probability of lethal injury based on vessel speed. They projected that the chance of lethal injury to a whale struck by a vessel travelling at speeds over 15 kn (27.78 km/hr) is approximately 80 percent, while for vessels travelling between 8.6 and 15 kn (15.92 km/hr), the probability of lethal injury drops to about 20 percent. The cable-laying vessel will be travelling at much slower speeds (typically 0.5-2.0 kn [1-4 km/hr]), essentially eliminating the possibility of vessel strike.

Although risk of ship strike has not been identified as a significant concern for Steller sea lions (Loughlin and York 2000), the recovery plan for this species (NMFS 2008) states that Steller sea lions may be more susceptible to ship strike mortality or injury in harbors or near rookeries or haulouts where animals are concentrated. To minimize this risk, project vessels will avoid travelling within 3 nm (5.6 km) of major Steller sea lion haulouts or rookeries. The closest approach from the planned FOC alignment passes approximately 14 nm west of the haulout at Cape Newenham (Figure 6). Even if project vessels encounter Steller sea lions, collisions are extremely unlikely due to sea lions' speed and maneuverability and the slow velocity of project vessels.

Similarly, smaller pinnipeds such as the Arctic ringed and bearded seals are highly maneuverable and are unlikely to interact with the cable-laying ship. Most ships in the Arctic purposefully avoid areas of ice and thus prefer periods and areas which minimize the chance of encountering ice. This necessarily mitigates many of the risks of shipping to populations of Arctic ringed and bearded seals, since they are closely associated with ice throughout the year. The 2024 status review for Arctic seals found that oil spills rather than vessel collisions were the greater risk factor for increased shipping traffic in the Bering and Chukchi seas (NOAA 2024).

Project vessels will be traveling at slower speeds (<10 kn) and will adhere to National Oceanic and Atmospheric Administration (NOAA)/NMFS marine mammal viewing guidelines (NOAA 2017). Humpback whales are more common in Alaska during the summer months when cable laying is planned, but we expect a maximum of seven percent will be from the listed Mexico DPS and one percent will be from the WNP DPS (Table 5). Given the expected effectiveness of the included mitigation measures, the low density of listed cetaceans along the cable-laying route, slow vessel speeds, and the ability of listed pinnipeds to avoid vessels due to their maneuverability, the probability of a vessel striking a listed marine mammal is very small, and thus adverse effects to these species are extremely unlikely to occur. Therefore, we conclude that adverse effects to marine mammals from vessel strikes related to the Nome to Homer FOC project are discountable.

Disturbance Due to Vessel Presence

Auditory or visual disturbance to listed marine mammals could potentially occur along the FOC-laying route. The primary underwater noise associated with the proposed vessel operation is the continuous noise produced from propellers, including propeller harmonics (Gray and Greeley 1980) and cavitation. When calculating the action area, the NTIA (in their BA) determined a disturbance radius (to the 120 dB isopleth) of 1.8 km (1.1 mi) for the cable-laying ship.

Marine mammals' reactions to vessel disturbance may include approach or deflection from the noise source, low level avoidance or short-term vigilance behavior, or short-term masking of

echolocation or acoustic communication among individuals. Behavioral reactions to vessels can vary depending on the type and speed of the vessel, the spatial relationship between the animal and the vessel, the species, and the behavior of the animal prior exposure. Response also varies between individuals of the same species exposed to the same sound, depending on age and individual whale's past experiences. Vessels moving at slow speeds and avoiding rapid changes in direction or engine speed may be tolerated by some whales. Other individuals may deflect around vessels and continue on their migratory path; these behaviors are not likely to result in significant disruption of normal behavioral patterns. Whales have been known to tolerate slow-moving vessels within several hundred meters, especially when the vessel is not directed toward the animal and when there are no sudden changes in direction or engine speed (Wartzok et al. 1989, Richardson et al. 1995, Heide-Jørgensen et al. 2003).

Although some listed marine mammals could receive sound levels in exceedance of the acoustic threshold of 120 dB from the vessels during this proposed project, take is unlikely to occur. Vessel transit for this proposed project is not likely to acoustically harass listed species, per the steps to assess harassment in the Interim Guidance on the ESA Term "Harass" (Wieting 2016). While listed marine mammals will likely be exposed to vessel noise from this proposed project, the noise will be low-frequency, with much of the acoustic energy occurring below frequencies associated with best hearing for the marine mammals expected to occur in the area. The duration of the exposure will be temporary (a few minutes) because the vessel will be in transit. Project vessels are travelling at very low speeds, and the noise from the vessels will be continuous, alerting marine mammals of their presence before the received level of sound exceeds 120 dB. Therefore, a startle response is not expected. Rather, deflection and avoidance are expected to be common responses in those instances where there is any response at all. The implementation of mitigation measures is expected to further reduce the probability of marine mammals reacting to transiting vessels.

The lack of adverse effects to marine mammals from cable-laying vessels is supported by recent marine mammal observations in the Arctic and the PSO report from the 2022 Aleutians I FOC project (Smultea Sciences 2022). In 2016, NMFS conducted a formal consultation for Quintillion Subsea Operations, a similar cable-laying project in the Arctic. Final marine mammal PSO reports (2016 and 2017) for the Quintillion project (Blees et al. 2017; Green et al. 2018) provided the following information.

- In 2016 and 2017, reactionary behaviors were documented during only two to three percent of all cetacean observations. Reactions included change of direction, avoidance, and swimming speed increase.
- None of the remaining 299 groups or 669 cetacean individuals encountered over the two years of monitoring exhibited a reaction to the presence of the cable ship.
- A majority of pinniped groups and individuals in 2016 and 2017, respectively, did not react to vessel activities. The most commonly observed reaction was "look", meaning the animal acknowledged the presence of the vessel. Other reactions included diving, increased swimming speed, or clearly changing travel direction. No reactions were indications of the animals exhibiting threat or flee responses but were rather more curiosity or avoidance behaviors.
- The 2022 PSO report from the Aleutians I FOC project recorded similar results. Out of 196 observations comprising 378 marine mammals, only 1.5 percent of individuals were

observed to react to the presence of the FOC vessel. All reactions recorded were incidences of Steller sea lions (3) or sea otters (2) orienting to look at the vessel.

The information from the Quintillion and Aleutians I reports provides substantiation that marine mammal response, if any, to these cable-laying vessels is not expected to rise to the level of harassment or take of ESA-listed species.

Given the potential for habitat use by the ice seals in the nearshore areas involved in the project, we expect that a small number of individual ringed or bearded seals could potentially be encountered during work at the BMH areas at Nome and Naknek or the intertidal area near Emmonak. Seals may also be in the waters along the FOC alignment. Bearded seals generally prefer water near ice on which they can haul-out, though seals may also swim in areas of open water. In addition, although bearded seals usually associate with sea ice, young seals may be found in ice-free areas, such as bays and estuaries, and could be more exposed to the vessel or nearshore activity than adult bearded seals. Ringed seals are predominantly found in water with greater than 80 percent ice cover, and most ice seals move north in the summer season when the cable laying is expected to occur. Therefore, because the cable laying will be a short-term, transient disturbance, and will occur when fewer ice seals are likely to be present, we conclude that the potential for impacts to bearded or Arctic ringed seals due to vessel presence to be insignificant.

With implementation of the mitigation measures incorporated into the project design, vessel transit is not expected to significantly disrupt normal marine mammal behavioral patterns (breeding, feeding, sheltering, resting, migrating, etc.), making harassment of listed marine mammals very unlikely. Previous monitoring during similar projects supports the conclusion that marine mammals successfully avoid or are largely undisturbed by cable-laying vessels. Much of the nearshore work will use HDD to avoid vessels and other work in and around more sensitive areas. Therefore, disturbance from the cable-laying vessel or the BMH installations are extremely unlikely to harass listed marine mammals, and any such effects will be insignificant.

Turbidity and Seafloor Disturbance from Cable Laying Activities

The cable-laying vessel will clear the FOC alignment using a large grapnel (Figure 3). The grapnel work will be conducted by the *Integrity*, and closely followed by the *Infinity* towing the heavy plow which will install and bury the cable. The grapnel is designed to scrape the seafloor and collect any debris, move smaller rocky material to the side, and prepare the seafloor for cable installation. This will create increased turbidity in and around the FOC alignment within tens of feet above the seafloor. Larger materials will sink quickly, but smaller particles may remain suspended for an hour or longer. Because the two vessels will closely follow one another, the total disturbance will be less than if two separate passes were made along the alignment. The impacts of the short-term increase in turbidity are unlikely to affect larger cetaceans, but pinnipeds including Steller sea lions and ringed and bearded seals forage along the seafloor and could be disturbed or hindered in their foraging by the turbidity generated by the grapnel or plow. The grapnel will be periodically drawn to the surface and cleaned. The materials it collects will be disposed of at licensed landfill locations. Therefore, the materials will not pose a threat to any marine mammals. The grapnel and plow will be under tension at all times which will limit

any risk of entanglement, and the equipment will be towed closely behind the vessel further reducing the likelihood of interactions with marine mammals.

The turbidity will be short-term and localized to the FOC alignment. It is expected that the waters will return to pre-disturbance conditions within a few hours of the grapnel or plow passing. It is possible that foraging seals may be attracted to the disturbance out of curiosity or because potential prey will be dispersed by the disturbance. However, they would be attracted to the disturbed area after the equipment has passed and even if they do forage in the areas affected by the plow, the equipment will no longer pose a threat.

The impact of seafloor disturbance and turbidity is very minor, and thus adverse effects to listed whales and pinnipeds will be immeasurably small. Therefore, we conclude that the adverse effects from turbidity generated by the grapnel and cable plow on listed species are insignificant.

The proposed project vessel will pass within designated critical habitat for Steller sea lion and may impact critical habitat by causing disturbance during foraging or breeding. We evaluate effects to each of the physical and biological features of Steller sea lion critical habitat below.

Analyzing Effects upon Critical Habitat

Steller Sea Lion Critical Habitat

NMFS identified physical and biological features essential for conservation of Steller sea lions in the final rule to designate critical habitat (58 FR 45269; August 27, 1993), including terrestrial, air, and aquatic habitats (as described at 50 CFR 226.202) that support reproduction, foraging, rest, and refuge. Construction of the proposed project may impact Steller sea lion critical habitat by causing disturbance at rookeries. We evaluate effects to each of the physical or biological features below.

1. Terrestrial zones that extend 3,000 feet (0.9 km) landward from each major haulout and major rookery in Alaska.

No landward part of the project will be located near a major haulout or rookery. Therefore, we conclude there will be no effect to this PBF.

2. Air zones that extend 3,000 feet (0.9 km) above the terrestrial zone of each major haulout and major rookery in Alaska.

No landward part of the project will be located near a major haulout or rookery. Therefore, we conclude there will be no effect to this PBF.

3. Aquatic zones that extend 3,000 feet (0.9 km) seaward of each major haulout and major rookery in Alaska that is east of 144° W longitude.

No part of the project will be located east of 144° W longitude. Therefore, we conclude there will be no effect to this PBF.

4. Aquatic zones that extend 20 nm (37 km) seaward of each major haulout and major rookery in Alaska that is west of 144° W longitude.

The cable-laying ship will pass within approximately 14 nm from Cape Newenham, which places it within the 20 nm aquatic zone off of a major haulout for designated Steller sea lion critical habitat. It is expected that the cable-laying ship will transit this area sometime between April and October 2026. Spring and summer are seasons when Steller sea lions may be breeding and foraging in the area. The vessel's path will cross approximately 30 nm (33.6 mi) of the aquatic zone at a maximum speed of approximately 10 kn (11 miles/hour). At this speed, the vessel will cross the aquatic zone in approximately three to four hours. Therefore, the potential for disturbance to sea lions foraging near the haul out will be short-term and transitory. We do not expect that the vessel's presence will create a substantial disturbance because it will be moving slowly and will be near the edge of the protective aquatic zone. Therefore, we conclude that any effect to this PBF will be insignificant.

5. Three special aquatic foraging areas: the Shelikof Strait area, the Bogoslof area, and the Seguam Pass area, as specified at 50 CFR 226.202(c).

No part of the project will be located in any of these special aquatic foraging areas. Therefore, we conclude there will be no effect to this PBF.

Conclusion

Based on this analysis, NMFS concurs with your determination that the proposed action may affect, but is not likely to adversely affect North Pacific right whale (*Eubalaena japonica*), Mexico DPS or Western North Pacific DPS humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), sperm whale (*Physeter macrocephalus*), Arctic subspecies of ringed seal (*Phoca hispida hispida*), Beringia DPS bearded Seal (*Erignathus barbatus nauticus*), or Western DPS Steller sea lion (*Eumetopias jubatus*) and its critical habitat. Reinitiation of consultation is required where discretionary federal involvement or control over the action has been retained or is authorized by law and if (1) take of listed species occurs, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter, or (4) a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16).

Please direct any questions regarding this letter to Leanne Roulson at leanne.roulson@noaa.gov, and to akr.prd.section7@noaa.gov.

Sincerely,



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United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Southern Alaska Fish and Wildlife Field Office
4700 BLM Road
Anchorage, Alaska 99507



In Reply Refer to:
FWS/R7/SAFWFO

Cameron Fisher
Principal, Aquatic Sciences
48 North Solutions, Inc.
1275 12th Ave NW, Suite 8
Issaquah, Washington 98027

Subject: Nome to Homer Express Middle Mile Project (Consultation Number 2025-0023173)

Dear Cameron Fisher:

Thank you for your August 16, 2024, letter requesting informal consultation with the U.S. Fish and Wildlife Service (Service), pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq., as amended; ESA). The National Telecommunications and Information Administration (NTIA) is funding Quintillion's Nome to Homer Express Middle Mile Project, which consists of approximately 1,078 miles of subsea and terrestrial fiber optic cable within Alaska. The NTIA has designated Cameron Fisher of 48 North Solutions as their non-Federal representative. You have determined the proposed project may affect but is not likely to adversely affect the federally threatened Steller's eider (*Polysticta stelleri*), spectacled eider (*Somateria fischeri*), and Southwestern Distinct Population Segment (SW-DPS) northern sea otter (*Enhydra lutris kenyoni*).

You have determined the project will have no effect on short-tailed albatrosses, polar bears and their designated critical habitat, northern sea otter designated critical habitat, and Steller's eider critical habitat. Thus, they will not be discussed further.

Project Description

The purpose of the project is to provide direct fiber access and communications facilities for Emmonak, Naknek, Igiugig, and Homer and will connect existing fiber telecommunication networks in Nome with fiber networks in Homer. Quintillion's existing subsea and terrestrial network would extend south from Nome to Emmonak, continuing along the Yukon-Kuskokwim Delta coast to Naknek, crossing terrestrially to Igiugig, across Iliamna Lake to Pile Bay and Williamsport, before ending in a subsea segment across Cook Inlet into Homer. Components include submarine fiber optic cable (FOC), terrestrial FOC, beach manholes, and cable landing stations. Marine cable installation is currently estimated to occur between March and November 2026.

Listed Species**Spectacled Eider**

Spectacled eiders are medium-sized sea ducks that remain at open sea or in polynyas (areas of open water in sea ice covered regions), or open leads (more temporary breaks in the sea ice) of the northern Bering Sea from November through March or April. As open water becomes available in spring, breeding pairs move to nesting areas on wet, coastal tundra. During the breeding season, hens and broods feed in freshwater ponds and wetlands where they eat aquatic insects, crustaceans, and vegetation (Petersen et al. 2000). Migration routes are primarily located offshore; molting occurs nearshore with flocks gathering to feed in shallow areas along the coast. Spectacled eider presence in the area is primarily limited to migration pathways.

Steller's Eider

The Steller's eider is a small sea duck that spends most of its life in the marine environment, occupying terrestrial habitats only during the nesting season (USFWS 2019). After breeding, Steller's eiders migrate from tundra nesting grounds to marine waters where they undergo a complete molt. Individuals remain flightless for about 3 weeks, but the overall period of flight feather molt for the species lasts from late July until late October (Petersen 1981, USFWS 2002). Most individuals then disperse further south to wintering grounds throughout the Aleutian Islands, Alaska Peninsula, and western Gulf of Alaska beginning as early as August. Spring migration back to nesting grounds generally occurs April to May. Migration routes are primarily located offshore; molting occurs nearshore with flocks gathering to feed in shallow areas along the coast. Steller's eiders presence in the proposed project area would include migration pathways and wintering areas.

Northern Sea Otter

Northern sea otters are small marine mammals that typically occur in waters 131 feet deep or less and within 0.6 to 1.9 miles of shore, and in areas of kelp forest, seagrass bed, and barrens (USFWS 2020). The SW-DPS occurs from western Cook Inlet to Attu Island in the Aleutian Chain. The proposed project area overlaps with the ESA-listed stock in western Cook Inlet.

Avoidance and Minimization Measures

Quintillion will implement the following Best Management Practices to help avoid and minimize potential effects on ESA listed species:

- If Protected Species Observers are employed, they will be informed of and include Steller's eiders, spectacled eiders, and northern sea otters in their procedures while monitoring the mitigation zone. This includes vessel crew that are assigned monitoring duties. See the enclosed 'ESA Listed Bird Identification' guide. If there are any incidents involving Steller's eider, spectacled eider, and/or northern sea otters, contact the Southern Alaska Fish and Wildlife Field Office as soon as possible. Any observation reports will also be submitted to the office upon project completion.

- All project vessel operators working in Cook Inlet, including supporting vessels, will be aware of and follow the sea otter guidance for vessel operators, where practicable (<https://www.fws.gov/sea-otters-boater-guidance>).
- Project vessels will down shield lighting to help reduce Steller's eider and spectacled eider collisions.

Effects of the Action

Project activities could affect Steller's or spectacled eiders if present, primarily through collision with vessels because most listed eiders remain offshore during migration (Johnson and Richardson 1982, Petersen et al. 1999). Marine cable lay activities would overlap with spring (approximately April to May) and fall (approximately July to October) eider migration and would likely occur 24 hours per day and 7 days per week; activities in Cook Inlet may overlap with Steller's eider wintering. Most eider migration occurs relatively close to the coast (Martin et al. 2015, Petersen et al. 1999), while much of the Nome to Naknek marine cable installation route is expected to occur approximately 30 miles from shore. This geographic separation of project activities from primary migration pathways should reduce the risk of encounters. While the risk of eider-vessel collisions may be low, risk of collision increases during darkness and bad weather or poor visibility conditions. Project vessels will down shield lights, which will help reduce potential eider-vessel collision. Thus, potential effects to listed eiders are expected to be insignificant.

Sea otters could be disturbed by project activity, through noise emitted during vessel transit and using Dynamic Positioning (the vessel's automated position and heading system). Using the sound source level for the cable laying ship provided in the JASCO Applied Science technical report (194.2 dB re 1 μ Pa rms at 3.3 feet, the most conservative estimate provided), the distance to the 160 dB re 1 μ Pa rms acoustic threshold for sea otters is 167 feet, assuming spherical spreading loss. The risk of negative effects from noise is expected to be minimal because the anticipated disturbance zone is relatively small. Sea otters may also be affected by vessel activity through vessel strike. The slow speed of the cable lay vessel and adherence to the 'Sea Otter Boater Guidance' by smaller support vessels will help reduce strike risk. Additionally, sea otters may avoid areas with temporary increases of vessel activity. Therefore, potential effects to northern sea otters are expected to be insignificant.

Conclusion

After reviewing the proposed project and evaluating its anticipated effects, the Service concurs with your determination that the proposed project is not likely to adversely affect Steller's eiders, spectacled eiders, and northern sea otters. Based on your request and our response, requirements of section 7 of the ESA have been satisfied. However, if new information reveals that project impacts may affect listed species or critical habitat in a manner or to an extent not previously considered, or if this action is subsequently modified in a manner which was not considered in this assessment, or if a new species is listed or critical habitat designated that may be affected by the proposed action, section 7 consultation should be reinitiated.

This letter relates only to federally listed or proposed species and/or designated or proposed critical habitat under jurisdiction of the Service. It does not address species under the jurisdiction of the National Marine Fisheries Service, or other legislation or responsibilities under the Fish and Wildlife Coordination Act, Migratory Bird Treaty Act, Marine Mammal Protection Act, Clean Water Act, National Environmental Policy Act, or Bald and Golden Eagle Protection Act.

If you have questions or need more information, please contact Fish and Wildlife Biologist, Kaitlyn Howell, at kaitlyn_howell@fws.gov or (817) 240-2179 and refer to Consultation Number 2025-0023173.

Sincerely,

**DOUGLASS
COOPER**

Digitally signed by
DOUGLASS COOPER
Date: 2024.12.19
10:30:51 -09'00'

Douglass M. Cooper
Ecological Services Branch Chief

Enclosure

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Appendix H – Cultural Resource Sites Within and Around the APE

Table H-1. AHRS sites within the NTHE APE

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
ILI-00066	ILI-00066	This site, a contributing feature of the Igiugig Archaeological District, consisted of chert flakes and FCR located on a relic beach at the southwestern end of the Igiugig airport airstrip.	CE	Inside APE	DOT&PF
ILI-00068	ILI-00068	This site, a contributing feature of the Igiugig Archaeological District, consisted of FCR, chert flakes, a biface, and shatter located on sandy, relic beach dunes at the southwest corner of the Igiugig airport airstrip.	CE	Inside APE	DOT&PF
ILI-00075	Igiugig Archaeological District	This archaeological district consists of 17 reported sites located along the modern riverbank and on five well-defined lake terrace/beach ridges. The sites are predominantly artifact scatters, indicative of short-term use sites (lookouts, hunting camps), although one appears to have been a moderate-sized habitation site. The northern border follows the Kvichak River's southern bank. The district's eastern boundary is First Creek. The district's western boundary extends to ILI-00002, the westernmost site in the district. The southern boundary follows better drained landforms instead of including swaths of wetlands.	DE	Inside APE	State of Alaska, Private, Alaska Native Allotments
ILI-00310	Tuqumalria 02	Tuqumalria 02 was on top of the terrace adjacent to the north side of the airstrip and 66 ft. south of Airport Way Road by the school. This grave site was approximately 125 ft. west of another set of graves. It is likely Tuqumalria 02 was the same as one of the 'Old Gravesites' recorded on the 2003 Igiugig Community Map. Annie Wilson, an Igyararmiut elder, recalled seeing multiple Russian Orthodox crosses at Tuqumalria 02 when she was a child indicating there was more than one grave at this location. The wooden crosses have since disappeared, and no testing has been done at the grave.	NDE	Inside APE	DOT&PF

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
NAK-00023	St John The Baptist Chapel, Naknek	St John the Baptist Chapel was located in the town of Naknek at the mouth of the Naknek River in Bristol Bay and was constructed in 1886 and enlarged in 1914. The nave and the altar were in a rectangular chamber measuring 30 x 19 ft. that was covered by a metal gable roof with a three-bar cross in the center. The variation in the window placement reflected the enlargement of the nave. The unfinished 10 x 10 ft. vestibule was a later addition. Near the south wall of the vestibule was an elevated platform with a metal bell rack containing one large bell.	L	Inside APE	Orthodox Church in America
NAK-00175	Leader Creek Bridge	The Leader Creek Bridge (Bridge No. 0400) was a three-span bridge made up of one steel I-beam span and two timber span approaches. The superstructure was 99 ft. long and 26.3 ft. wide, with a roadway width of 24.3 ft. The spans consisted of a 20 ft. long timber span, a 60 ft. long steel I-beam span, and a 20 ft. long timber span. The deck was laminated timber with an asphalt wear surface and three beam rails with 6 x 12 in. timber curb/ bull rails. The abutments consisted of steel pile (10BP42) with 12 x 12 in. treated timber caps and treated timber backing planks. The piers consisted of two steel pile (10 BP42) bents with steel caps and steel cross bracing. The bridge was located three mi. east of Naknek at mile 3.1 on the Naknek-King Salmon Road.	NDE	Inside APE	State of Alaska
NAK-00203	NAK-00203	This site was a fuel dock originally built around 1900 by Standard Oil Company. Wards Cove Packing Company purchased the fuel dock prior to 1947 and built a replacement dock, which was the structure that was currently in use. Both docks were constructed of creosote treated timber. Minor modifications to the dock included the addition of a small building, replacement of damaged piles and decking, and the addition and replacement of pipelines. The fuel dock was located in Naknek, Alaska.	DNE	Inside APE	Delta Western

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
NOM-00242	Nome-Council Road (Nome Quadrangle)	The Nome-Council Road is approximately 73 mi. long and runs from Front Street in downtown Nome to the south bank of the Niukluk River at Council on the Seward Peninsula. The road is owned by the Alaska DOT&PF and is located within the Nome Census Area of the Alaska Unorganized Borough.	DNE	Inside APE	State, Private, Alaska Native Allotments, Alaska Native Lands Patented or Interim Conveyed
XHB-00004	Hooper Bay	Consists of a prehistoric and modern Eskimo village site on a knoll above the slough, with deep midden, house remains, and a historic graveyard. Investigated since 1951; boundaries defined by roads and modern development. Artifacts eroded pre-breakwater; human remains found in 2006. Multiple surveys confirm the site is limited to the knoll.	DE	Inside APE	State, Private, Alaska Native Allotments, Alaska Native Lands Patented or Interim Conveyed
XHB-00115	XHB-00115	Consists of 10 features including house pits, storage, and midden on a 60×15m linear mound. Partial damage during 2006 sewer work. Recorded artifacts include ceramics, bone and stone tools, wood, and woven gras. Human remains were also recorded; excavation reached 103cm bd without sterile soil.	NDE	Inside APE	State, Private, Alaska Native Allotments, Alaska Native Lands Patented or Interim Conveyed

Table H-2. AHRS sites within 0.5 mi (0.8 km) of the APE

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
ILI-00002	Igiugig Site	The Igiugig Site is one of 14 archaeological sites that make up the Igiugig Archaeological District. The Igiugig Site was a collection of flaked projectile points, side blades, cores, scrapers, slate points and blades, notched stones, and pottery sherds located within an approximately 30 x 30 ft. area at the west end of the Igiugig airstrip.	CE	191 ft. west of the APE	FAA
ILI-00042	St Nicholas Chapel, Igiugig	Constructed around 1930, St. Nicholas Chapel was an 18 x 12 ft. log structure with a low gabled roof and a small vestibule with a shed roof, located in the Iliamna area. St Nicholas Chapel was the smallest of the chapels in the Iliamna area with two crosses on the roof ridge and a four-post bell tower with five bells.	L	142 ft. north of the APE	Orthodox Church in America
ILI-00062	ILI-00062	This site, a contributing feature of the Igiugig Archaeological District, consisted of a small lithic scatter located in a quarry site south of the east edge of the Igiugig airport. The site has been impacted by the extraction of a material source.	CE	1,300 ft. south-southeast of the APE	Alaska Native Allotment
ILI-00063	ILI-00063	This site, a contributing feature of the Igiugig Archaeological District, consisted of flakes, burned wood, and FCR. Located on a hill along the south edge of the runway at the Igiugig airstrip.	CE	415 ft. south-southeast of the APE	DOT&PF
ILI-00064	ILI-00064	This site, a contributing feature of the Igiugig Archaeological District, consisted of a gray chert flake and a midsection fragment of a microblade. Located along the south edge of the runway at the Igiugig airport, northeast of ILI-00063.	CE	466 ft. southeast of the APE	DOT&PF
ILI-00065	ILI-00065	This site, a contributing feature of the Igiugig Archaeological District, was comprised of two pieces of possible FCR found at the base of the cut along the south edge of the Igiugig airport runway.	CE	232 ft. east of the APE	DOT&PF
ILI-00067	ILI-00067	This site, a contributing feature of the Igiugig Archaeological District, consisted of an approximately 18 x 30 m scatter of flakes and FCR located at the west end of the Igiugig airport runway.	CE	154 ft. west of the APE	DOT&PF
ILI-00069	ILI-00069	This site, a contributing feature of the Igiugig Archaeological District, consisted of a large biface exposed on the surface, located along the north margin of the Igiugig airport runway.	CE	61 ft. south-southeast of the APE	DOT&PF

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
ILI-00070	ILI-00070	This site, a contributing feature of the Igiugig Archaeological District, consisted of a single yellowish-brown mottled chert artifact located east of several large, disturbed areas along the north margin of the runway at the Igiugig airport.	CE	37 ft. south-southeast of the APE	DOT&PF
ILI-00071	ILI-00071	This site, a contributing feature of the Igiugig Archaeological District, consisted of cultural material in an old borrow pit including an end blade, a small flake, and questionable FCR. The site was located at the Igiugig airport, along the northwest margin of the runway.	CE	204 ft. southeast of the APE	DOT&PF
ILI-00072	ILI-00072	This site, a contributing feature of the Igiugig Archaeological District, consisted of a scatter of flakes, microblades, blade flake spalls, and a polishing stone/anvil located 26 ft. north from the edge of Airport Way Road at the 90-degree turn in the road.	CE	29 ft. northwest of the APE	DOT&PF
ILI-00073	ILI-00073	This site, a contributing feature of the Igiugig Archaeological District, consisted of pottery pieces atop an eroding bank, possible FCR, and one large and four small depressions located within Tract D of ASLS91-111A, northwest of the village school and east of the Alaska Department of Fish and Game compound.	CE	917 ft. northwest of the APE	DOT&PF
ILI-00074	ILI-00074	This site, a contributing feature of the Igiugig Archaeological District, consisted of a large, leaf-shaped, waterworn flaked point, barbed ground-slate points, ground adze blades, a whetstone and miscellaneous pieces of flaked stone found under a private house and outbuildings located in the village of Igiugig. The artifacts were found by the property owner, Murphy Nikoli, in his garden.	CE	112 ft. north of the APE	Alaska Native Allotments, Alaska Native Lands Patented or Interim Conveyed
ILI-00079	ILI-00079	This site, a contributing feature of the Igiugig Archaeological District, consists of a single red chert flake and a possible piece of FCR. The site is located just southeast of ILI-00067, southwest of the west end of the runway at the Igiugig airport.	CE	34 ft. east of the APE	DOT&PF
ILI-00080	Cemetery Near Olympic Household in Igiugig	The cemetery included two individual graves that were discovered in the vicinity of the Olympic household during excavation in the late 1980s or early 1990s. The two graves included two crania with hair. The graves and the Olympic house were on Post Office Hill in downtown Igiugig. The original graves were either immediately north or west of Mary Olympic's Housing and Urban Development home. Igiugig residents	NDE	83 ft. north of the APE	Olympic Family

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
		reburied the human remains in Post Office Hill, but no one recalls exactly where.			
ILI-00081	Three Collapsed Crosses	This cemetery was marked by three Russian Orthodox style grave markers that had fallen or had been laid in a pile on the ground. There was some doubt that the markers were in their original location due to the markers being laid in a pile and the amount of recent building construction, but local residents confirmed that the markers were in the correct location and the graves were nearby. The cemetery was located to the west side of a Quonset building, on the north side of the road to the washeteria, 295 ft. west of ILI-00074, 25 m south of the bank of the Kvichak River, and within a thicket of brush behind the Russian Orthodox Church, in Igiugig.	NDE	310 ft. north of the APE	Igiugig Native Corporation
ILI-00184	ILI-00184	This site was a single grave with a toppled, milled-plank Russian Orthodox marker. Only one marker was found, but a local resident suggested that two graves may have been there. The site was located on USS 7796, lot 4, on a small ridge in the tundra south of the village of Igiugig.	NDE	1,529 ft. south of the APE	Murphy Nickoli
ILI-00206	House Pit and 5 Cache Pits	ILI-00206 was a house pit and cache pits located in Igiugig, Alaska	NDE	938 ft. northwest of the APE	State of Alaska, Undetermined
ILI-00210	ILI-00210	This site was an overgrown slight depression with nominally raised berms from a house built in 1949 by Simon Wasille, which was dismantled in 2006. The house appeared to be post and beam construction with an embedded wood beam within the east side of the depression and no plumbing. Mary Anne Olympic, a village elder, recounted a metal drum buried $\frac{3}{4}$ into the ground northwest of the house berm that was one of two smokers. Mary Anne Olympic also recalled her grandfather having a tent year-round on the site in the 1940s, leaving a 10 x 12 ft. depression. ILI-00210 was located on Igiugig townsite lot 1 with the north boundary of the lot coinciding on or near the bluff edge overlooking the Kvichak River and extending at a slight northeast angle to form a trapezoid.	DNE	66 ft. north of the APE	Private, Alaska Native Allotment
ILI-00307	Gram's Fish Camp	Gram's Fish Camp, one of the oldest fish camps in Igiugig, was built before 1951 and consisted of five buildings, most or all of which were sheeted in corrugated metal. Mary Ann 'Mayuu-Mayuu' Gregory-Olympic, widely known as Gram, moved to	NDE	394 ft. (120.1 m) north of the APE	Igiugig Native Corporation

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
		Igiugig at the age of 16 and her family established the fish camp. Wind and river erosion destroyed the last of the smoke houses, drying racks, and houses at the camp in the 2000s according to Julie Salmon, Mary's daughter. The location of the camp was at the toe of the terrace along the beach of the Kvichak River situated and organized to efficiently and effectively harvest and process salmon for the year. Scattered remains of the fish camp dotted the toe of the terrace and on top of the terrace. Wooden steps to the pink house, a fiberglass boat hull, and three 55-gallon steel drums with triangles cut in their tops were along the terrace base. On top of the terrace there was scattered corrugated metal and a midden with 1 ½ in. channel iron, corrugated metal, and a 5-gallon oil bucket. The fish camp was at the east end of Igiugig and 56 ft. east of ILI-00210.			
ILI-00308	Qalqaviiluk's Grave	The grave of Qalqaviiluk, an Igyararmiut ancestor, was covered by a former trail to a fish camp. Annie Wilson, an Igyararmiut elder, recalled seeing a Russian Orthodox cross marking a burial indicating a single burial, but the cross has since disappeared. No testing has been done at the grave. It is likely Qalqaviiluk's grave was the same as one of the 'Old Gravesites' recorded on the 2003 Igiugig Community Map. The grave was 508 ft. up the driveway from Airport Way Road on Charles Groat's Native Allotment. The grave was on the west side of the driveway marked by a grass patch in an alder patch.	NDE	380 ft. (115.8 m) west-southwest of the APE	Charles Groat
ILI-00309	Tirumala 01	Tuqumalria (Lake Iliamna Yup'ik dialect word for grave/cemetery) 01 was in a stand of tall birch. There were no obvious signs of use at the Tuqumalria 01 site. Annie Wilson, an Igyararmiut elder, recalled seeing multiple Russian Orthodox crosses at Tuqumalria 01 when she was a child indicating there was more than one grave at this location. The wooden crosses have since disappeared and no testing has been done at the grave. Tuqumalria 01 was on top of the terrace adjacent to the north side of the airstrip and 98 ft. south of the 90-degree turn in Airport Way Road by the school. This grave site was approximately 125 ft. east of another set of graves.	NDE	31 ft. south-southeast of the APE	DOT&PF

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
KWI-00059	Emmonak FSRC	The Emmonak FSRC property was comprised of two buildings, one exterior fuel tank, an exterior hazardous materials locker, and a shipping container. The original FSRC building was constructed by Century General, Inc. and Tombs and Company Builders beginning in 1964, completed in 1966, and referenced as EMM-1. A second building referenced as EMM-2 was constructed in 1984 to the east of EMM-1, with an enclosed arctic breezeway connecting the two. The buildings were located at a road intersection with access to both buildings from both Delta Street and City Office Road. The two, nearly identical buildings, were prefabricated, metal-frame buildings on wood-skid foundations and were situated in an L-shape.	NDE	17 ft. south of the APE	United States Department of Defense
NAK-00002	Paugvik	Paugvik was primarily occupied during historic (A.D. 1800-1900) period but contained some prehistoric (A.D. 1100-1400) material. This site had been investigated by Hrdlicka in 1931, Larsen in 1948, and the University of Oregon beginning in 1961. Ten house pits were visible on the surface. A few other house pits uncovered during excavation were not apparent on the surface. A substantial burial area was also present. Paugvik was located on the north bank of the mouth of the Naknek River, approximately 3,280 ft. upstream of the light at the mouth.	NDE	35 ft. south of the APE	Peter Pan Seafoods
NAK-00008	Leader Creek	An unspecified number of depressions were located on the east side of the creek, and a number of what were presumed to be outlying houses were located on the west side of the creek. Excavations conducted in 1973 produced evidence of Brooks River Bluffs occupation. Known locally as the site of a "Russian fort," Dumond found no evidence of historic occupation. In 1995, Harritt monitored a sewer line extension through a portion of the site. A radiocarbon date of 530+/-80 years Before Present (Beta-83101) or A.D. 1420, suggests a late camp phase occupation at this site. The location of the site was at the mouth of "Leader Creek," on the north bank of the Naknek River, between Coffee Point and Telephone Point.	NDE	715 ft. south of the APE	Private

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
NAK-00011	NAK-00011	This site included several depressions noted along a 150 m long stretch of the Naknek River, disturbed by an access road. Testing in 1973 produced evidence of a Brooks River Bluffs phase occupation. The site was located on the north bank of the Naknek River, approximately 164 ft. downstream of the Red Salmon Cannery, just upstream of Coffee Point.	NDE	790 ft. east-southeast of the APE	Private
NAK-00014	NAK-00014	This site is a single visible depression discovered and tested in 1973. The depression included rusty tin and fragments of glass which underlaid ash deposited in the Katmai region in 1912. The site was on the west bank of a small creek, on the north bank of Naknek River, about 1 km upstream of Telephone Point,	NDE	1,857 ft. southwest of the APE	Private
NAK-00026	Naknek	Originally a Native village reported around 1821 by Vasliev, Imperial Russian Navy, who gave its name as "Naugeik," this village was also reported by Sarichev (1826) and Tebenkov (1852). The Russians built a post (Fort Suvaroc) at or near the village. The 1880 census listed the village name as "Kinghiak." The village was on the north bank, near the mouth of the Naknek River.	NDE	210 ft. south of the APE	Native Withdrawal
NAK-00136	Reported Mammoth Diggings	This site included reported mammoth diggings approximately 0.5 mi. from the mouth of Monsen Creek down the coast towards the mouth of the Naknek River.	NDE	1,468 ft. northwest of the APE	Paugvik incorporated, Limited
NAK-00137	Native Site	This site is described as an eroding archaeological site between Pederson Point and Nornak Point.	NDE	141 ft. southeast of the APE	ANCSA Village
NAK-00233	Winter Watchman's House	Building 8, historically known as the winter watchman's house, was constructed in 1947, as part of the first construction project at the King Salmon United States Bureau of Fisheries, Bristol Bay District Headquarters. In 2002, the building was moved about 15 mi. west from the US Fish & Wildlife Services complex in King Salmon to Naknek, AK, near the fire station. The one-story, rectangular wood-framed dwelling has an unknown design origin and was in poor condition. The gable-roofed house, which was removed from its original foundation, rested on wooden blocks. Based on the date of construction, the original foundation was likely slab concrete. At its location in Naknek, the building was oriented on a roughly north-south axis. The frame was composed of dimensional wood studs, the	NDE	94 ft. south of the APE	Town of Naknek

Site No.	Site Name	Site Description	NRHP Eligibility	Location	Land Ownership
		roof was sheathed with raised seam metal, and the eaves had been boxed. The building was planned as a six-room frame house lined with knotty pine and cedar shakes on the outside. Building 8 was located near the fire station along Fire Department Access Road in Naknek, Alaska.			
XHB-00041	XHB-00041	Site includes at least 21 house pits on coastal dunes, clustered in two main groups with additional isolated features. One pit may be a two-room structure. Adjacent “Bone Lake” contains dense faunal remains of various species and artifacts. Site served as a historic disposal area and is considered part of the site. Human remains were reportedly observed in the lake by residents.	DE	PENDING	Sea Lion Corporation
XHB-00046	Grave	Site consists of multiple (undisclosed) graves that were reported to be 0.5 mi northeast of the airport runway, the graves were not located as of 1977 with no AHRs card updates at time of authoring this report.	NDE	PENDING	State, Private, Alaska Native Allotments, Alaska Native Lands Patented or Interim Conveyed
XHB-00114	XBH-00114	Consists of house and cache pits along and atop a bluff, some water-filled or eroded. Structural driftwood, artifacts, and a possible grave were identified. Residents described seasonal use by local villages, kayak racks, and semi-subterranean houses once in use; bluff top also noted as a berry patch.	DE	PENDING	State, Private, Alaska Native Allotments, Alaska Native Lands Patented or Interim Conveyed
XHB-00121	XHB-00121	Consisting of at least one house pit, several burials, and midden features (7 total). Human remains were found in an active ATV trail; two burials were documented. A C14 date of 660 ± 30 BP was obtained from the house pit floor.	DE	PENDING	State, Private, Alaska Native Allotments, Alaska Native Lands Patented or Interim Conveyed

Appendix I – Section 810 ANILCA Compliance Determination from the Bureau of Land Management

United States Department of Interior
 Bureau of Land Management
 Anchorage Field Office
 Section 810 ANILCA Compliance/Clearance
 Determination of Need

Casefile Number: AKAK106696481

NEPA Document Number: E A X X – 0 0 6 – 6 0 – 0 2 D – 1 7 6 4 7 6 1 8 7 4

Proposed Action: Quintillion Nome to Homer Express Middle Mile Network Fiber Optic Cable (FOC)

Applicant: Quintillion Subsea Operations, LLC

Location of Proposed Action: This evaluation and its findings would be limited to those portions of the proposed action that overlap with BLM-managed lands that are unencumbered and meet the definition of lands open to Subsistence Use. This includes the assessment of a 50-foot (ft.) Right-of-Way (ROW) spanning approximately 14.6 miles (mi.) across BLM-managed lands open to subsistence activities. The total area of disturbance would be approximately 71.0 acres. For the full project description please refer to Section 2 of the *Environmental Assessment: NTHE + HB Middle Mile Network*.

Section	Township	Range	Meridian
13,22,23,24 and 27	12 S	43 W	Seward
2,3,11,12, and 13	13 S	43 W	
18,19,30,31, and 32	13 S	42 W	
5,8, and 18	14 S	42 W	

Table 1: Legal Description

Description of Proposed Action and Alternatives:

Terrestrial Surface Lay

Surface lay is a method of installing the terrestrial FOC on top of the ground during winter. In remote areas of Alaska, surface-laying cables are a safe and effective method due to the minimal risk of damage and its reduced impact on the natural environment. A machine called a cable plow is used to pull the FOC along the path. This machine places the cable safely on the surface. To keep the cable from moving around or getting damaged, it may be secured with small anchors or ties, such as duckbill anchors installed using a hammer and drive pin where required.

Terrestrial cable segments between Naknek and Igiugig would cross streams and wetlands. FOC in these habitats would be laid on the surface during winter months, when the ground is frozen and covered with at least 6 inches (in.) of snow and the ground is frozen to a depth of at least 12 in., to minimize environmental disturbances. These segments would be installed with lightweight submarine cables, coiled inside of containers that are towed to the site using lightweight tracked vehicles. Additional slack would be provided when laying the cable to allow it to settle on the vegetation and conform to changing surface features and environmental conditions.

When constructing on soft and unstable sediments, heavy equipment would be placed on mats to avoid additional damage to the terrestrial surface. The position of the laid cable would be recorded with Global Positioning System. Terrestrial post-lay inspections would be conducted after any snow and ice melts. Any cable left suspended after the snow melts would be safely repositioned.

FOC repositioning would be done manually by moving the cable as needed. Natural processes such as erosion (the wearing away and transportation of sediments by natural forces such as water and wind) would passively cover the cable over time. FOC left on the vegetation would sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Additionally, the cable would be armored to avoid ice buildup. Helicopter and/or walking inspections would be conducted on an annual basis to monitor erosion.

Operations and Maintenance

Throughout operations, no routine discharges, fuels, or emissions would occur during service. The FOC operation would be monitored remotely following compliance with federal and state maintenance stipulations to ensure long-term service.

For maintenance, both the marine and terrestrial segments would be continuously monitored via a Network Operations Center. Routine maintenance is primarily preventive, and condition based. Terrestrial facilities would be inspected periodically (i.e., semi-annually) to verify the cable's integrity, access vault condition, and general system performance at landing sites and along the ROW. If an outage occurs, response would be tiered: terrestrial faults would be handled by regional field technicians using equipment like that used for cable installation.

Evaluation:

Under the proposed action, the FOC would be placed on approximately 14.6 mi. of unencumbered Federal lands managed by BLM. These lands are Federal Public Lands as defined in ANILCA Section 102(3) and fall under the regulatory authority of the Federal Subsistence Board and Subsistence Management Regulations for the harvest of wildlife, fish and shellfish on Federal Public Lands in Alaska.

The Federal lands that would be used for this proposed action fall within Unit 9, subunit 9B and 9C of the Federal Subsistence Regulations for 2024-2026. Federally qualified users of Unit 9B and 9C have Customary and Traditional Use Determinations for black bear, brown bear, caribou, moose, and sheep. Residents of Unit 9 are also allowed to harvest wildlife resources with no unit restrictions (i.e., coyote, lynx, wolverine, grouse, and ptarmigan).

In the region proposed for the FOC installation, wildlife subsistence hunting is very important. Per the ADF&G Intensive Management Frequently Asked Questions (2023), the Mulchatna caribou herd reached 200,000 animals at its peak in 1997. At this time, it provided as many as 4,770 caribou per year for the subsistence needs of more than 48 local communities. In the late 1990s and early 2000s, the herd began to decline, and by 2009 it was down to about 30,000 animals. By 2019 the population estimate dropped to 13,500 animals (about a 94% decline from the peak). As of 2023, the population estimate remains stable but low at around 13,000 individuals. In recent years, hunting closures have been implemented to promote recovery of the herd.

Inland communities, including Naknek and Igiugig, also rely on fisheries resources within the Bristol Bay Area. Salmonids (i.e., trout and salmon) remain a vital resource, harvested from rivers and lakes throughout the Bristol Bay watershed. These areas are accessed via traditional trails, rivers, and seasonal camps, forming a network of use areas that reflect generations of ecological knowledge and stewardship. Subsistence activities in both regions are important for food security, cultural continuity, and community well-being, and are closely tied to the land and sea.

Fisheries:

The FOC project would cross bodies of water containing subsistence fish species. However, the proposed action would not likely significantly reduce harvestable fisheries resources that are available for subsistence use given the timeframe of construction (winter) and the method of crossing water bodies. The proposed action is not likely to alter the distribution, migration, or location of harvestable fisheries resources. The proposed action would not create any legal or physical barriers that would limit access by subsistence users of the fisheries resource.

Wildlife:

In Unit 9B and 9C, subsistence hunts for caribou, moose, and other mammals generally occur in areas where the proposed fiber optic line would be located. Federal and State hunts for Mulchatna caribou have been closed due to the low population and recruitment within the herd since 2021.

Moose population numbers in the State GMU 9 have been stable at low densities, although surveys of populations have been limited due to snow conditions (ADF&G, 2017).

Impacts to these species would be highest during the construction period due to local noise and construction activities but would be temporary. The operation of the completed cable lay would have minimal effects to these species as the footprint is small (14.6 mi.).

The aircraft flights required for surveying the line and maintenance semi-annually may cause impacts to moose, caribou, and other wildlife used for subsistence by noise, disturbance, and avoidance of the sites and surrounding areas. Migrating caribou may be especially affected by repeated noise by aircraft in fall and spring. Additional cumulative impacts to these species from aircraft flights to survey, and maintenance along the same corridor on State, Tribal, and federal lands may also occur.

Flight noise disturbance can be mitigated by timing flights outside of subsistence hunting seasons for moose and caribou; as well as spring calving seasons and spring and fall caribou migrations periods. Noise disturbance may also be mitigated by maintaining helicopter flight paths at or above 2000 ft. altitude to reduce noise and minimize disturbance to wildlife movements or access by subsistence users. See Required Operating Procedure FW-3c (Bay Approved RMP/ROD, 2008).

Therefore, this proposal would not create any legal or physical barriers that would limit subsistence harvest and access. There may be limited movement and distribution changes caused by the elevated noise and human/machine presence related to the implementation and routine maintenance of the proposed action, but it is expected to be temporary in duration and geographically small compared to suitable habitat adjacent to the project area. The impacts to subsistence resources associated with this action would, therefore, be negligible. The proposed action should not significantly alter the distribution, migration, or location of harvestable wildlife resources.

Other Resources: The proposed action would not appreciably impact any other harvestable renewable resources such as wood, berries, vegetation, or water.

Expected reduction, if any, in the availability of resources due to alteration in resource distribution, migration, or location: The proposed action is not likely to alter the availability, distribution, migration, or location of subsistence resources to a significant degree. Any change in migration or distribution would be limited to site-specific areas and short in duration.

Expected limitation, if any, in the access of subsistence users resulting from the proposal: None. Access to subsistence resources will not be limited by the proposed action.

Availability of other lands, if any, for the purpose sought to be achieved: This EA evaluates the impacts to subsistence resources and access for a proposal to utilize BLM-managed lands to locate a communications line while the line also crosses State and Tribal lands as well. The proposed action on federal lands was chosen to enable the proposed system to operate, and to avoid areas where regulations and mandates prohibit actions including the proposed action (Alagnak Wild and Scenic River [WSR]).

Other alternatives, if any, which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes: There are two alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes and could avoid potential conflict with subsistence uses. However, these alternatives were eliminated from further consideration due to policies in place for the National Park Service (NPS) and environmental impacts. BLM manages public lands for multiple uses, and there is no substantial evidence that would indicate a significant impact to subsistence users or resources because of this proposed action.

Alternative Route through the NPS; Alagnak Wild and Scenic River (East Route)

In the design phase, an alternative (East) route for the segment connecting Naknek and Igiugig was considered but eliminated. This alternative crossed the NPS Alagnak WSR.

This route was designed with the intention of being as direct as possible to minimize cable length and thus decrease latency between FOC end points. The proposed installation would have included shallow burial across shallow channels and vegetated areas in winter, and armored cable laid in the riverbed's main channel. The cable would have been anchored to minimize drift and damage from ice.

The long-term project components within the WSR would have been fiber optic cable and stakes. Based on preliminary investigations, approximately 3.4 mi. of the NTHE cable route would have crossed the WSR corridor. This includes crossing approximately 0.7 mi. of the Alagnak River from bank to bank, of which 0.53 mi. would have been in-water.

Staging of equipment and materials would have occurred entirely outside of NPS boundaries to minimize impacts within the WSR corridor. All staging would have been compliant with local construction permits obtained at each location. These temporary staging areas would have been utilized to transit construction machinery and serve as temporary storage areas for excavated materials.

After consultation with NPS occurred to investigate the route plausibility and challenges, this route was eliminated because constructing inside of the boundaries of the Alagnak WSR would contradict the mandate of NPS to protect WSR from instream developments and impacts that do not enhance the free-flowing condition, water quality, and value of the river as it is.

Alternative Route Across the Kvichak River (West Route)

In the design phase, a second alternative (West) route for the segment connecting Naknek and Igiugig was considered but eliminated. This route would require the greatest number of aquatic crossings, including 15 fish-bearing stream crossings. Consequently, the greatest area of associated floodplains and wetlands (56.28 acres) would have also been temporarily impacted by construction machinery. Additionally, this route option was the longest (68 mi.), which would create a greater permanent footprint in the critical areas and surrounding landscape.

For both routes, the term of years needed would have been indefinite, as the fiber optic cable and related infrastructure would remain in place for the entirety of its lifespan, providing continuous advanced broadband service to the nearby communities. The average lifespan of FOC is approximately 25 years.

Finding:

This proposed action will not significantly restrict subsistence uses. As a result of the proposed action there are no reasonably foreseeable significant decreases in the abundance or distributions and availability of subsistence resources and no reasonably foreseeable limitations to subsistence access.

Craig Townsend, Wildlife Biologist

Date

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