Environmental Assessment

Department of Commerce

National Telecommunications and Information Administration

March 2024

Airraq Network – Phases 1 and 2

Platinum, Eek, Napaskiak, Oscarville, Bethel, Quinhagak, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk, Alaska

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Executive Summary

The National Telecommunications and Information Administration and U.S. Department of Agriculture Rural Utilities Service have awarded federal funding to Bethel Native Corporation and Unicom, Inc., a wholly owned subsidiary of GCI Communication Corporation, to bring high-speed broadband internet service to Alaska's Lower Kuskokwim River Delta as part of the Airraq Network (Proposed Action). The Proposed Action would extend broadband service from Dillingham to 10 communities via approximately 559 miles of fiber optic cable (FOC).

The Proposed Action is composed of two phases. Phase 1 is the primary FOC route, which would lay cable through Bristol Bay, Kuskokwim Bay, and southwestern Alaska to serve five communities: Platinum, Eek, Napaskiak, Oscarville, and Bethel. Phase 2 would build off the Phase 1 FOC route within Kuskokwim Bay to bring broadband to Quinhagak and Tuntutuliak in addition to extending beyond Bethel to Atmautluak, Nunapitchuk, and Kasigluk.

An alternative to the Proposed Action includes a No Action Alternative. Under the No Action Alternative, the Proposed Action would not be constructed. As a result, these 10 communities in southwestern Alaska would remain underserved, and would continue to rely on long-haul microwave and geostationary satellite earth stations for internet service. The Proposed Action is the preferred of the two alternatives and is the only alternative that meets the purpose and need.

The Proposed Action Alternative and No Action Alternative have been assessed based on the Council on Environmental Quality's regulations for implementation of the National Environmental Policy Act context and intensity criteria (40 Code of Federal Regulations 1508.27) based on resource group. This document considers the environmental impacts of both alternatives. Table ES-1 provides a summary of environmental impacts.

Table ES-1. Summary of the Environmental Impacts for the Proposed Action and No Action Alternatives

Alternative	Impact Category	Description of Potential Impacts
Noise	—	—
Proposed Action	Less than Significant	No permanent impacts; construction activities would cause temporary and minor noise impacts on land and marine noise-sensitive receptors
No Action Alternative	No Impact	No permanent or temporary impacts
Air Quality	—	—
Proposed Action	Less than Significant	Negligible permanent impacts; may result in temporary and minor indirect effects from construction vehicle and equipment emissions as well as dust particulates from construction activities
No Action Alternative	No Impact	No permanent or temporary impacts
Geology and Soils	—	—
Proposed Action	Less than Significant	Minor localized permanent impacts from installation of permanent facilities; may result in temporary and minor impacts from soil compaction, soil infiltration potential, and alteration of surface water runoff from other construction activities and FOC burial
No Action Alternative	No Impact	No permanent or temporary impacts

Alternative	Impact Category	Description of Potential Impacts
Surface Water	—	—
Proposed Action	Less than Significant	No permanent impacts; may result in temporary and minor, direct and indirect effects from trenching within riverbeds and banks during construction activities as well as surface laying FOC within rivers
No Action Alternative	No Impact	No permanent or temporary impacts
Marine, Coastal Zone, Estuary, and Intertidal Areas	—	—
Proposed Action	Less than Significant	Marine activities will permanently alter the marine environment by displacing sediment; may result in temporary and minor, direct and indirect effects from turbidity and sediment disturbance within marine and intertidal locations from construction activities
No Action Alternative	No Impact	No permanent or temporary impacts
Groundwater	—	—
Proposed Action	No Impact	No permanent or temporary impacts
No Action Alternative	No Impact	No permanent or temporary impacts
Wetlands	—	—
Proposed Action	Less than Significant	Minor localized permanent impacts; may result in temporary and minor direct and indirect impacts from construction
No Action Alternative	No Impact	No permanent or temporary impacts
Floodplains	—	—
Proposed Action	No Impact	No permanent or temporary impacts
No Action Alternative	No Impact	No permanent or temporary impacts
Threatened and Endangered Species	—	—
Proposed Action	Less than Significant	Permanent impacts not likely; may result in temporary and minor indirect effects from vessel noise during construction
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, and minor direct and indirect effects from construction activities
No Action Alternative	No Impact	No permanent or temporary impacts
Fisheries and Essential Fish Habitat	—	—
Proposed Action	Less than Significant	Would result in negligible, temporary and permanent, direct and indirect impacts from habitat alteration and direct interaction with construction equipment, and a temporary increase in turbidity during construction activities
No Action Alternative	No Impact	No permanent or temporary impacts
Vegetation and Habitat	—	—
Proposed Action	Less than Significant	May result in negligible permanent impacts associated with the installation of Proposed Action structures, and minor direct and indirect effects from construction activities
No Action Alternative	No Impact	No permanent or temporary impacts
Historic and Cultural Resources	—	—
Proposed Action	No Impact	A *No Historic Properties Affected* finding has been made for the Proposed Action
No Action Alternative	No Impact	No permanent or temporary impacts

Alternative	Impact Category	Description of Potential Impacts
Aesthetic and Visual Resources	—	—
Proposed Action	Less than Significant	Minor localized impacts on visual resources through the construction of small buildings within communities; would cause minor, short-term impacts from the presence of construction equipment within the Proposed Action area
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 permanent or temporary adverse impacts; may facilitate economic development, educational opportunities, and health access, which may positively facilitate infrastructure development within communities
No Action Alternative	Less than Significant	A lack of internet alternatives may encumber local infrastructure if Lower Kuskokwim River communities exhibit population growth
Socioeconomic Resources	—	—
Proposed Action	Beneficial – No Adverse Impact	No permanent adverse impacts; may have short- and long-term beneficial impact by improving services to residents
No Action Alternative	Significant	A lack of adequate broadband service would continue to delay economic development as use of the existing system would continue to operate with high latency, low bandwidth, and the limited capacity of satellite systems
Human Health and Safety	—	—
Proposed Action	Beneficial – Less than Significant Adverse Impact	May provide education opportunities as well as increase health care access and safety
No Action Alternative	Significant	Public health and safety facilities would continue to be underserviced and not meet statewide broadband standards
Cumulative Effects	—	—
Proposed Action	Less than Significant	Negligible cumulative impacts on biological and water resources as well as all other resources have been identified from construction activities
No Action Alternative	No Impact	No cumulative impacts would result from this alternative

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Acronyms and Abbreviations

AAAQS	Alaska Ambient Air Quality Standards
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AHRS	Alaska Heritage Resources Survey
AICP	American Institute of Certified Planners
APE	area of potential effect
AST	aboveground storage tank
AWB	Associate Wildlife Biologist
BA	Bachelor of Arts
BBMA	Bristol Bay Management Area
bgs	below ground surface
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMH	beach manhole
BOEM	Bureau of Ocean Energy Management
BS	Bachelor of Science
BSAIMA	Bering Sea Aleutian Islands Management Area
BU	branching unit
CEP	Certified Environmental Professional
CEO	Chief Executive Officer
CFR	Code of Federal Regulations
CGP	Construction General Permit
CLS	Cable Landing Station
CO	carbon monoxide
CTP	Certified Transportation Planner
CV	Connection Vault
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibels
dB re 1µPa	dB relative to one micropascal

DHSS	Alaska Department of Health and Social Services
DPS	Distinct Population Segment
DRO	diesel range organics
DWPA	Drinking Water Protection Area
EFH	Essential Fish Habitat
ENV SP	Envision Sustainability Professional
EO	Executive Order
ESA	Endangered Species Act
FMP	Fishery Management Plan
FOC	fiber optic cable
ft	foot/feet
FTTP	Fiber to the Premise
GCI	GCI Communication Corporation
GHG	greenhouse gas
GRO	gasoline range organics
HAP	hazardous air pollutant
HTL	high tide line
IHS	Indian Health Services
KMA	Kuskokwim Management Area
LOC	Letter of Concurrence
MA	Master of Arts
MAEST	Masters of Applied Environmental Science and Technology
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MBTA	Migratory Bird Treaty Act
mi	mile(s)
MLW	mean low water
MMPA	Marine Mammal Protection Act
mph	mile(s) per hour
MS	Master of Science
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act

nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NTIA	National Telecommunications and Information Administration
NWI	National Wetland Inventory
NWP	Nationwide Permit
O_3	ozone
OHW	ordinary high water
PCB	polychlorinated biphenyls
PCE	perchloroethylene
PLGR	pre-lay grapnel run
$PM_{2.5}$	particulate matter less than 2.5 microns in aerodynamic diameter
PM_{10}	particulate matter less than 10 microns in aerodynamic diameter
Proposed Action	Airraq Network
PSO	Protected Species Observer
PWS	Professional Wetland Scientist
QEP	Qualified Environmental Professional
ROV	remotely operated vehicle
RPA	Registered Professional Archaeologist
RRO	residual range organics
RS	Revised Statute
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SWPPP	Stormwater Pollution Prevention Plan
Unicom	Unicom, Inc.
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture

USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VOC	volatile organic compound
VOO	Vessel of Opportunity
WGS84	World Geodetic System Datum 1984
WOTUS	waters of the United States
yd^3	cubic yard(s)
YK	Yukon-Kuskokwim

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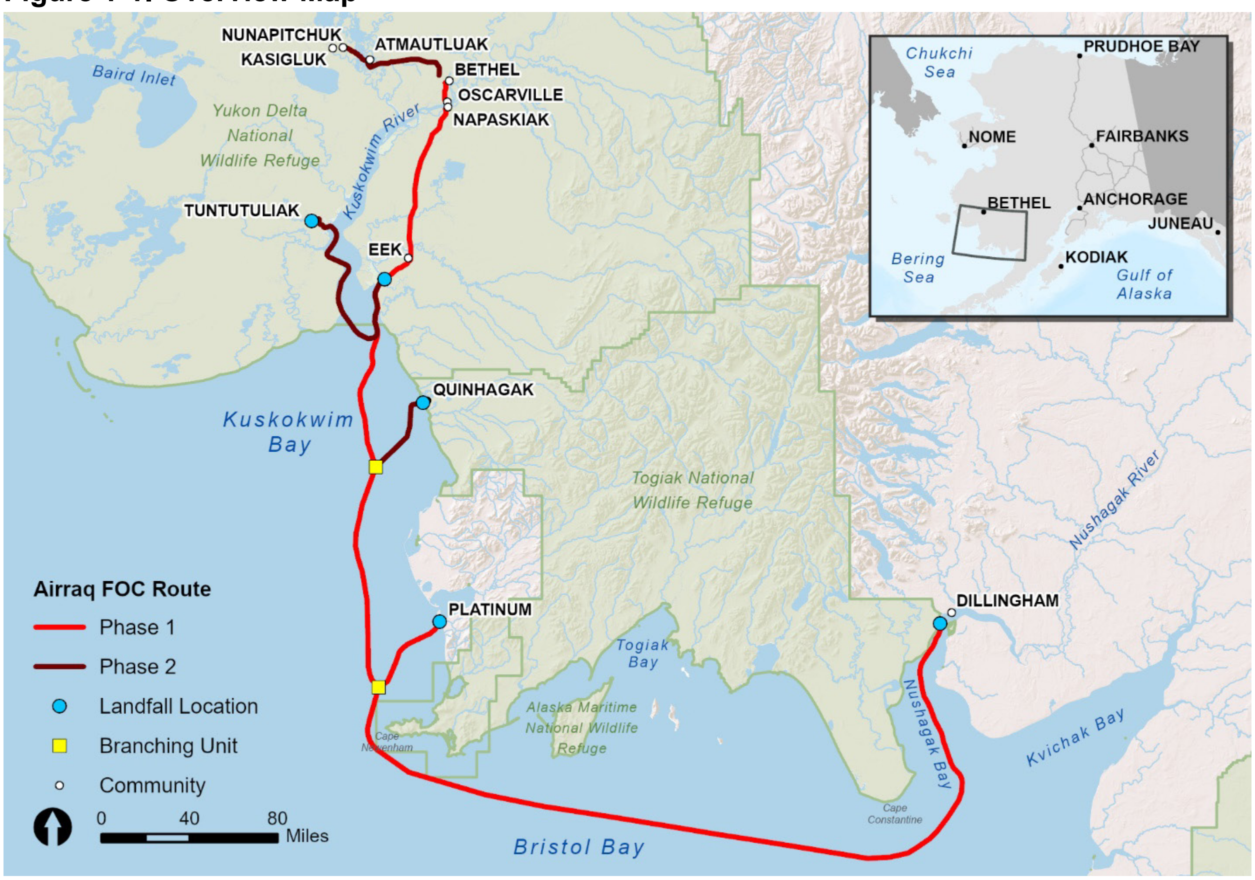
1 Introduction and Purpose and Need

1.1 Introduction

The National Telecommunications and Information Administration (NTIA) and U.S. Department of Agriculture (USDA) Rural Utilities Service have awarded federal funding to Bethel Native Corporation and Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation (GCI), to bring high-speed broadband internet service to Alaska's Lower Kuskokwim River Delta as part of the Airraq Network (Proposed Action). The Proposed Action would extend broadband service from Dillingham to 10 communities via approximately 556 miles (mi) of fiber optic cable (FOC).

The Proposed Action is composed of two phases. Phase 1 is the primary FOC route, which would lay cable through Bristol Bay, Kuskokwim Bay, and southwestern Alaska to serve five communities: Platinum, Eek, Napaskiak, Oscarville, and Bethel. Phase 2 would build off the Phase 1 FOC route within Kuskokwim Bay to bring broadband to Quinhagak and Tuntutuliak in addition to extending beyond Bethel to Atmautluak, Nunapitchuk, and Kasigluk (Figure 1-1).

Figure 1-1. Overview Map



The Yukon-Kuskokwim (YK) Delta is among the world's largest river deltas, with Bethel being its most populous community. The community of Bethel has a population of 6,500 individuals and lies approximately 68 river miles up the Kuskokwim River from Kuskokwim Bay on its northern bank. The other nine communities are geographically isolated throughout the region. No roads connect the towns within the Lower YK Delta or with the rest of the state, and they are only accessible by boat, plane, and snowmachine. All 10 communities that the Proposed Action would service are Yup'ik, with at least 74 percent of these communities' populations being Alaska Native.

The Proposed Action would provide a long-term solution, connecting these 10 underserviced communities within western Alaska with high-speed broadband connectivity The Proposed Action is designed to overcome the region's harsh elements while creating a more efficient and modern way for western Alaska to connect with the rest of the world.

The federally funded Proposed Action has the potential to affect the human environment and is therefore subject to the requirements of the National Environmental Policy Act of 1969 (NEPA; 42 United States Code [USC] 4321 et seq.). This Environmental Assessment has been prepared in accordance with the Council on Environmental Quality's regulations (40 Code of Federal Regulations [CFR] 1500–1508) and guidance outlined in 7 CFR 1970.

1.2 Purpose and Need

The purpose of the Proposed Action is to deliver fast, reliable, broadband service to 10 rural Alaska Native villages as part of a program that meets grant funding requirements provided by federal agencies. In doing so, the Proposed Action would help close the digital divide as well as promote economic development and social services within the YK Delta.

Servicing rural Alaska with broadband is a long-standing challenge. Only 63 percent of rural Alaska residents have access to adequate internet speeds compared to 85 percent of all Alaska residents (State of Alaska 2021). The State of Alaska's (2021) Taskforce on Broadband has identified the communities to be serviced by the Proposed Action as historically underserved. These communities are currently served by a combination of long-haul microwave and geostationary satellite earth stations for internet needs. While this form of internet has provided an important service, it is logistically challenging to maintain, and provides a slower and more expensive form of internet that has difficulties keeping up with data demands. As such, internet provided by microwave towers cannot meet modern bandwidth and latency needs of the region and is only considered adequate where FOC is infeasible. Unicom's FOC framework would provide capacity for current needs and be able to meet increased future demand. The current microwave-based terrestrial service would be maintained to provide a redundant limited backup to essential services. The existing underserved status of rural Alaska communities' internet access demonstrates the need for this Proposed Action. Implementing the Proposed Action would provide additional opportunities for rural residents in the fields of education, employment, health, and communication.

Upon completion, the Proposed Action would provide more than 10,000 residents of rural communities with upgraded internet connectivity. This would create opportunities transformational for historically underserviced areas of western Alaska, changing the way people across the YK Delta work, learn, and connect with each other and outside communities. Importantly, this Proposed Action provides framework for potential future projects to build on, which broadens the positive impact for rural communities across the state.

2 Proposed Action and No Action Alternative

This Environmental Assessment considers two alternatives: the Proposed Action Alternative and the No Action Alternative. Figure 1-1 provides a Proposed Action vicinity map.

2.1 Proposed Action

The Proposed Action would consist of two phases. Phase 1 would combine a 437-mi FOC build and Fiber to the Premises (FTTP) last mile network[1] upgrades within five communities: Platinum, Eek, Napaskiak, Oscarville, and Bethel. Using a middle mile network [2], the Proposed Action would interconnect with an existing FOC and microwave network within Dillingham.

Phase 1 has an extensive marine component, extending FOC along the ocean floor from Unicom facilities in Dillingham to Kuskokwim Bay, where a cable branching unit (BU) would direct FOC to Platinum. The main FOC segment would extend beyond the Platinum BU and continue the marine route, paralleling the Kuskokwim Bay shoreline until it reaches a landfall location within the Eek River immediately upstream of its confluence with the Kuskokwim River. This would begin the overland route to Eek. From Eek, the FOC route would continue the overland route to Napaskiak, where it would cross the Kuskokwim River to Oscarville and end within Bethel. The Proposed Action would also establish a second FOC delivery technology, FTTP, within most connected communities. FTTP local network access would provide high-speed broadband access to residences and businesses within the communities of Platinum, Eek, Napaskiak, and Oscarville. The existing hybrid fiber-coaxial access networks within Bethel would be upgraded to help facilitate broadband distribution within the community.

Phase 2 would include installation of 119-mi of FOC, which would be interconnected with Phase 1 by combining middle mile network transport segments and FTTP installation in five additional communities: Quinhagak, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

Phase 2 would build off the Phase 1 FOC route with both terrestrial and marine components. A BU along the Phase 1 marine route within Kuskokwim Bay would direct FOC to Quinhagak. A separate marine cable segment would route FOC from the Apogak landfall location back into the Kuskokwim River to Tuntutuliak. The overland route would connect FOC from Bethel to Atmautluak, Nunapitchuk, and Kasigluk. Phase 2 would also construct a FTTP network within each community.

Proposed Action activities include the following components (see Table 2-1 for a summary):

- **Marine Route:** This route involves installation of broadband submarine FOC within marine environments below mean low water (MLW). These segments are either trenched or laid on the seafloor.
- **Landfall Route:** This route involves installation of broadband submarine FOC between MLW and the beach manhole (BMH). BMHs are excavated manholes that provide

[1] Last mile network refers to any broadband infrastructure that connects directly to an end-user location.
[2] Middle mile network refers to any broadband infrastructure that does not connect directly to an end-user location.

connection points between submarine cable and either lightweight submarine or terrestrial cable. Landfall components would be trenched.

- **Overland Route:** This route involves installation of broadband FOC along terrestrial landscapes, including wetlands, inland lakes, and stream crossings. Each overland route segment would begin and terminate within a BMH or a Connection Vault (CV).
- **Community Shore Route:** This route is the terrestrial FOC segment that connects BMHs or CVs with Cable Landing Stations (CLSs). CLSs house the infrastructure needed to convert incoming terrestrial cable to FTTP cable.
- **FTTP Route:** This route would bring cable from the CLSs, either trenched or attached to existing utility poles, to residential and commercial users. This segment would terminate the FOC route within each community.

Table 2-1. Proposed Action Summary

Proposed Action Component	Phase 1 Total Length (mi)	Phase 2 Total Length (mi)	Proposed Action Total Length (mi)	Phase 1 Associated Facilities	Phase 2 Associated Facilities
Marine (below MLW)	330.4	75.7	406.1	BU: 1	BU: 1
Landfall (MLW to BMH)	0.6	0.2	0.8	BMH: 3	BMH: 2
Overland	49.3	27.6	76.9	CV: 5	CV: 4
Community Shore Routes	1.2	0.6	1.8	CLS: 4	CLS: 2
FTTP	55.3[a]	15.2	70.5	None	None
Total	**436.8**	**119.3**	**556.1**	**—**	**—**

[a] Includes length of hybrid fiber-coaxial upgrades in Bethel

The following sections describe the construction methods and equipment used for the Marine Route, Landfall Route, Overland Route, Community Shore Route, and FTTP as well as the proposed construction schedule for the Proposed Action.

2.1.1 Marine Route

The marine route is defined as components taking place below MLW. Both phases of the Proposed Action have marine components. Phase 1 would construct the primary marine cable route and have one BU, while Phase 2 would build off Phase 1 with a second BU and a marine segment originating at the Apogak landfall. The path chosen for the marine routes was identified through desktop studies and a marine route benthic survey (Benthic GeoScience 2023). 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 fault. The International Cable Protection Committee 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 benthic surveys avoids high-impact fishing grounds where possible. Where ground fishing areas cannot be avoided, the cable would be buried. Nearshore 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 four or more vessels for construction operations. The vessel used for cable-laying operations would be dependent upon water depth, location, and cable-laying method. A cable ship (Figure 2-1) would be used for cable-laying operations within areas of the marine route with water depths exceeding 40 feet (ft) and would rely on dynamic positioning. Proposed Action elements in waters shallower than 40 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, landfall locations would be assisted by a landing craft. These vessels would have a shallow draft, making shallow waters and landings more accessible. Cable segments routed into the Kuskokwim River would be laid with a cable-laying barge and tug when they reach a depth of 40 ft within Kuskokwim Bay. Tug and barge operations would continue for these segments until they reach a landfall location within tributaries of the Kuskokwim River. The tug and barge would lay 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 1 inch in diameter, is constructed from benign materials and would not carry an electrical current.

Figure 2-1. *C.S. IT Intrepid*, Typical Cable Laying Ship

For marine components, the cable would either be laid on top of the seafloor or buried within a trench (i.e., trenching). 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 trenching (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, trenching would be used where there is significant risk of outside disturbance to the cable. Local reroutes or cable armoring would be implemented in high-risk areas where the substrate does not allow for trenching.

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 2-2) along the route over the seabed. Any debris recovered by the grapnel would be discharged ashore upon completion of the operations and disposed 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 2-2. PLGR Grapnel on Board Cable Laying Ship

Burial within waters deeper than 40 ft would be conducted using a cable plow. Burial within deep sea segments would protect the 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.

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 2-3 shows a typical jet sled.

Figure 2-3. Typical Jet Sled

Upon completion of cable-laying operations, a post-lay inspection and burial would be conducted using a ROVJET 207, or similar remotely operated vehicle (ROV). The purpose of the post-lay inspection and burial is to inspect portions of the cable ship route where laying operations may have encountered difficulties. These difficulties include plow failure, unplanned cable repair, uncontrolled cable payout, or other unplanned events. Where burial corrections need to be made, the ROV would use jet burial, similar to that of the jet sled, and trench the cable. The ROV would be operated remotely from the cable laying ship; pulsed sounds would be generated from the ROV, and cameras would be used for positioning and orientation.

2.1.1.1 PHASE 1

The Phase 1 marine route includes sections between Dillingham MLW and Apogak MLW, in addition to a segment between the Platinum BU in Kuskokwim Bay to Platinum MLW. To reach the Apogak landing site, the cable would be routed up the Kuskokwim River and into the Eek River. The cable would be surface laid across the riverine areas during ice-free periods within the deepest portion of the channel so natural sediment transport can passively bury the cable. The cable is anticipated to be fully buried within 1 year of being surface laid. Approximately 50 mi of cable would be buried in the marine environment for Phase 1. Table 2-2 summarizes the cable lengths for the Proposed Action's marine portions during Phase 1.

Table 2-2. Phase 1 Marine Route Summary

FOC Route Segment	Cable Installed by Cable Ship (mi)[a]	Cable Installed by VOO, Tug and Barge, or Landing Craft (mi)[b]	Total Length (mi)
Dillingham MLW to Apogak MLW	234.8	73.6	308.4
Platinum BU to Platinum MLW	11.1	10.9	22.0
Phase 1 Total	**245.9**	**84.5**	**330.4**

[a] In waters deeper than 40 ft, cable may be surface laid or trenched with a cable plow.
[b] In waters shallower than 40 ft, cable may be surface laid or trenched with a jet sled.

2.1.1.2 PHASE 2

Marine elements of Phase 2 consist of a BU extending from the Phase 1 marine route to Quinhagak, while a segment of submarine FOC would connect the Apogak landfall to Tuntutuliak. Approximately 1 mi of FOC would be trenched within the marine environment for Phase 2. The cable would be surface laid in the Eek, Kuskokwim, and Kinak Rivers to reach Tuntutuliak when the rivers are free of ice. The cable would be laid in the deepest portion of the channel. Sediment transport is expected to self-bury the cable within the substrate. The marine portion of the FOC route would terminate when it reaches Tuntutuliak above tidal influence at ordinary high water (OHW). Table 2-3 summarizes the cable lengths for the Proposed Action's marine portions during Phase 2.

Table 2-3. Phase 2 Marine Route Summary

FOC Route Segment	Cable Installed by Cable Ship (mi)[a]	Cable Installed by VOO, Tug and Barge, or Landing Craft (mi)[b]	Total Length (mi)
Quinhagak BU to Quinhagak MLW	0.0	20.1	20.1
Apogak MLW to Kinak River OHW at Tuntutuliak	0.0	55.6	55.6
Phase 2 Total	**0.0**	**75.7**	**75.7**

[a] In waters deeper than 40 ft, cable may be surface laid or trenched with a cable plow.
[b] In waters shallower than 40 ft, cable may be surface laid or trenched with a jet sled.

2.1.2 Landfall Route

Landfall construction (Figure 2-4) includes segments of the cable route between MLW and each landfall's collocated BMH. Landfall construction would occur concurrently with marine construction.

At each landfall, 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 lightweight submarine or terrestrial cable that would connect to existing Unicom facilities. BMHs are positioned above the high tide line (HTL) and measure 3 ft by 4 ft by 4 ft. Landfall trenching would be conducted with either a rock saw or backhoe. When deemed necessary, additional protections may be provided to the cable at landfall locations with split pipe articulated armor. 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 2-4. Typical Landfall Installation Showing Split Pipe Articulated Armor

While conducting landfall 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 are summarized in Section 4.13.

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
- Landing craft similar to the *Unalaq*

2.1.2.1 PHASE 1

Phase 1 would include landfall locations at Dillingham (Figure 2-5), Platinum (Figure 2-6), and on the eastern side of the Eek River (i.e., Apogak Landfall [Figure 2-7]). Table 2-4 provides BMH locations for Phase 1.

Table 2-4. Phase 1 BMH Locations

BMHs	Location (coordinates, WGS84)
Dillingham BMH	59.003215°, -158.535947°
Platinum BMH	59.009890°, -161.821450°
Apogak BMH	60.148781°, -162.175582°

Notes: WGS84 = World Geodetic System Datum 1984

Figure 2-5. Dillingham Landfall

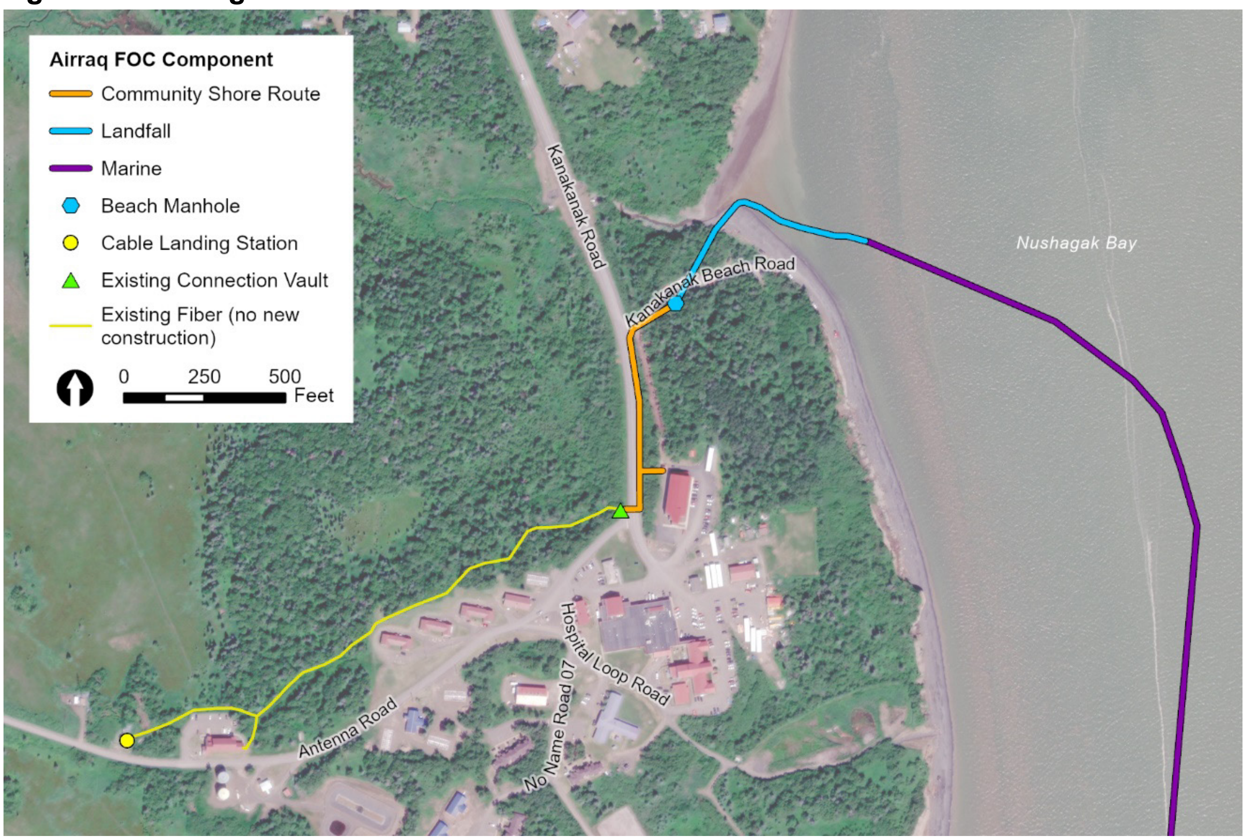


Figure 2-6. Platinum Landfall

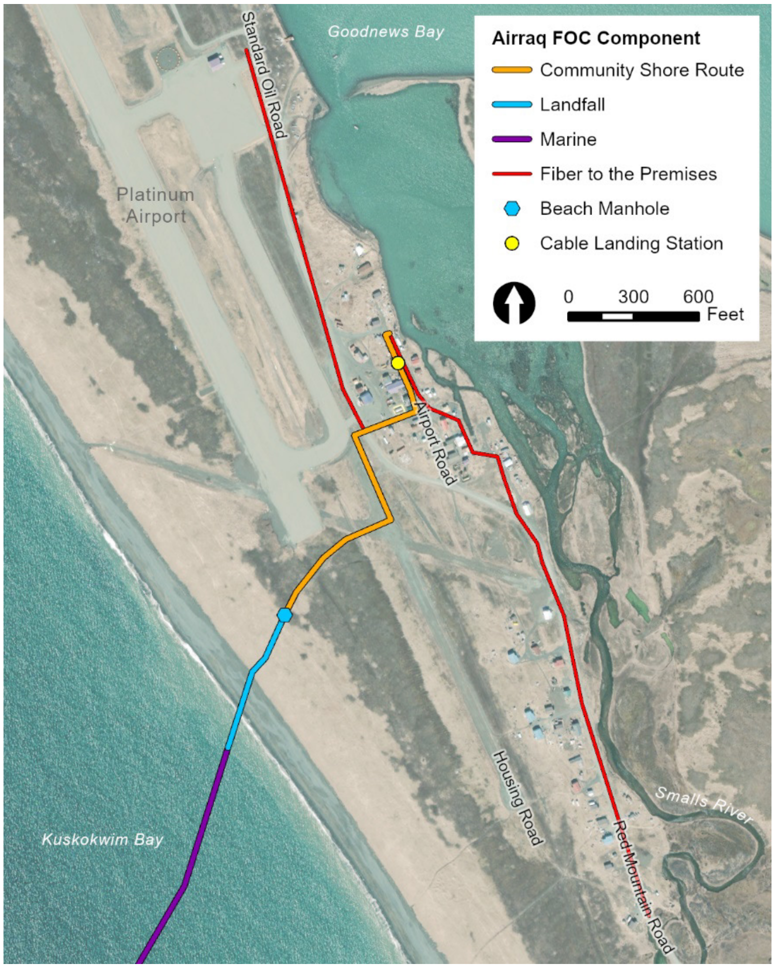
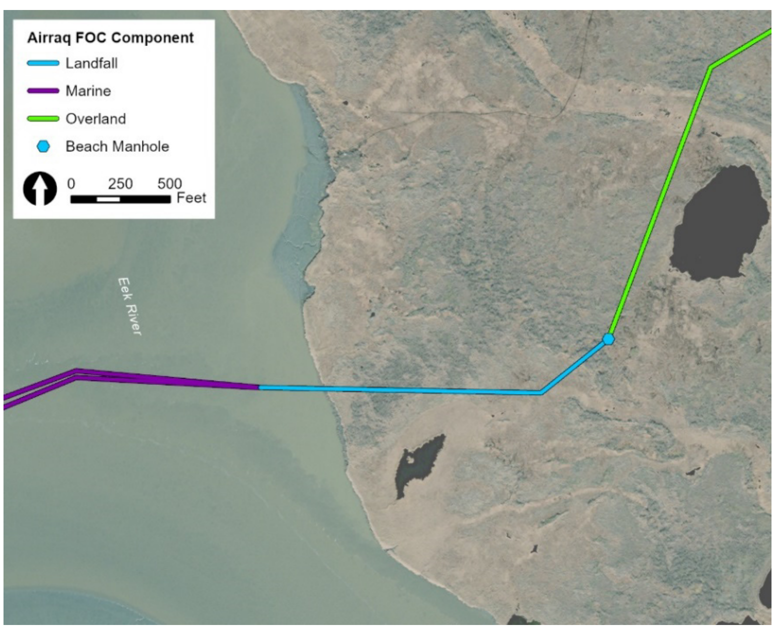


Figure 2-7. Apogak Landfall



2.1.2.2 PHASE 2

Phase 2 would have two landfall locations accompanied by BMHs: one in Quinhagak (Figure 2-8), and one in Tuntutuliak (Figure 2-9). The Tuntutuliak landfall location occurs on the banks of the Kinak River (Figure 2-9); however, typical landfall construction methods would still apply. Table 2-5 provides BMH locations for Phase 2.

Table 2-5. Phase 2 BMH Locations

BMHs	Location (coordinates, WGS84)
Quinhagak BMH	59.742160°, -161.927619°
Tuntutuliak BMH	60.337980°, -162.663123°

Notes: WGS84 = World Geodetic System Datum 1984

Figure 2-8. Quinhagak Landfall

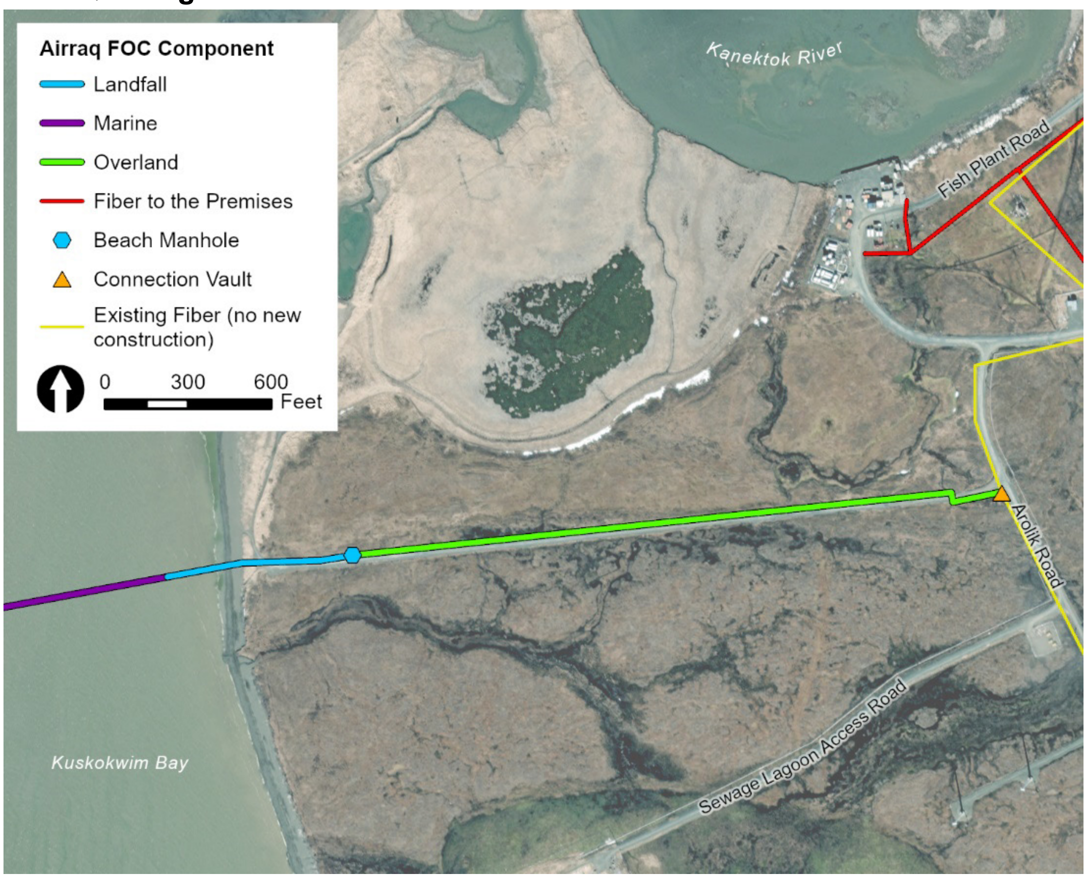
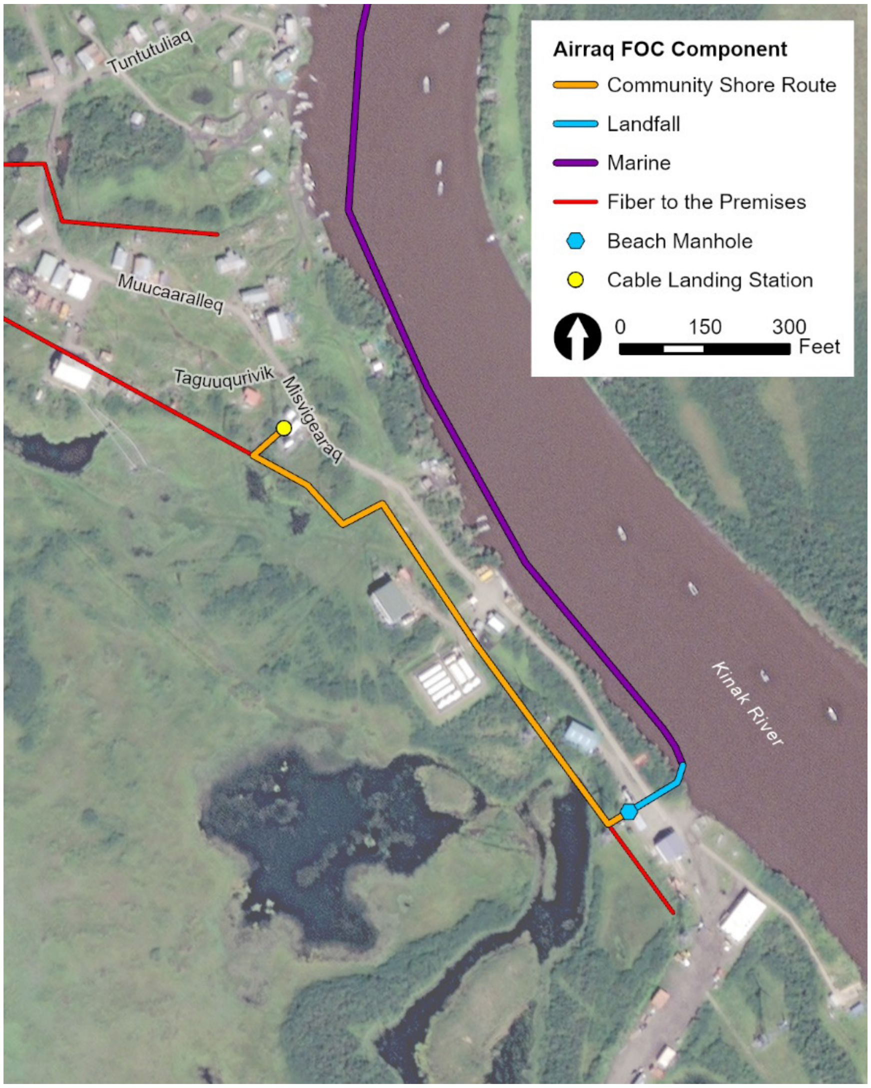


Figure 2-9. Tuntutuliak Landfall



2.1.3 Overland Route

The overland route is defined as FOC segments that both originate and terminate within a BMH or CV. Inland communities not collocated with a marine landfall location would use a CV in lieu of a BMH. CVs house the splice between incoming lightweight submarine cable and outgoing terrestrial cable. Excavation dimensions and considerations for BMHs would be the same for CVs.

Overland 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 20,000-ft (3.78-mi) segment spools 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 10 inches in diameter and 6.5 ft long would be located approximately every 20,000 ft (3.78-mi) along the route, joining spool 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, therefore, the preferred installation method. The cable would be buried where 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 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 8 inches but would vary with the terrain.

Where crossing lakes and ponds, the cable would be laid with adequate slack on the ice surface to allow it to passively drop into the waterbody during spring break-up. When the cable sinks into the waterbody, the weight of the cable would allow it to self-bury within aquatic bed sediments. Submarine cable would be used to cross streams and rivers. The cable would be spliced with the overland route cable and buried into each stream bank below OHW. Split pipe articulated armor may be deployed in stream crossings for extra stabilization and protection.

Segments crossing major rivers (i.e., Pikmiktalik and Johnson Rivers) would use a landing craft to lay single or double armored submarine cable encased in split pipe articulated armor, if necessary, across the river. Natural sediment transport would passively bury the cable. Additionally, the cable would be equipped with an outer plastic covering to avoid frazil ice buildup. Care would be taken to position the crossings on stable banks to provide erosion protection. Major river crossings would be supported by small boats and conducted during ice free periods.

When constructing on soft and unstable sediments, heavy equipment would be placed on mats. The position of the laid cable would be recorded with a survey quality Global Positioning System. Post-lay inspection for terrestrial components would be conducted following snow and ice melt. Any cable left suspended after 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.

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

2.1.3.1 PHASE 1

Phase 1 overland routes would be composed of four different FOC segments: Apogak BMH to Eek South CV, Eek North CV to Napaskiak CV, Napaskiak CV to Oscarville CV, and Oscarville CV to Bethel South CV. Cable would be routed from Oscarville to Bethel on existing utility poles. The portion of the route between Eek and Napaskiak would be the longest overland segment and would cross extensive wetlands with lakes, ponds, and streams.

Bethel and Eek would have two collocated CVs, while Napaskiak and Oscarville would have one CV in each community. No CVs would be installed in Platinum. Table 2-6 provides CV locations for Phase 1, and Table 2-7 provides the overland route cable distances for Phase 1. Figure 2-10 shows the overland route between Apogak and Bethel.

Table 2-6. Phase 1 CV Locations

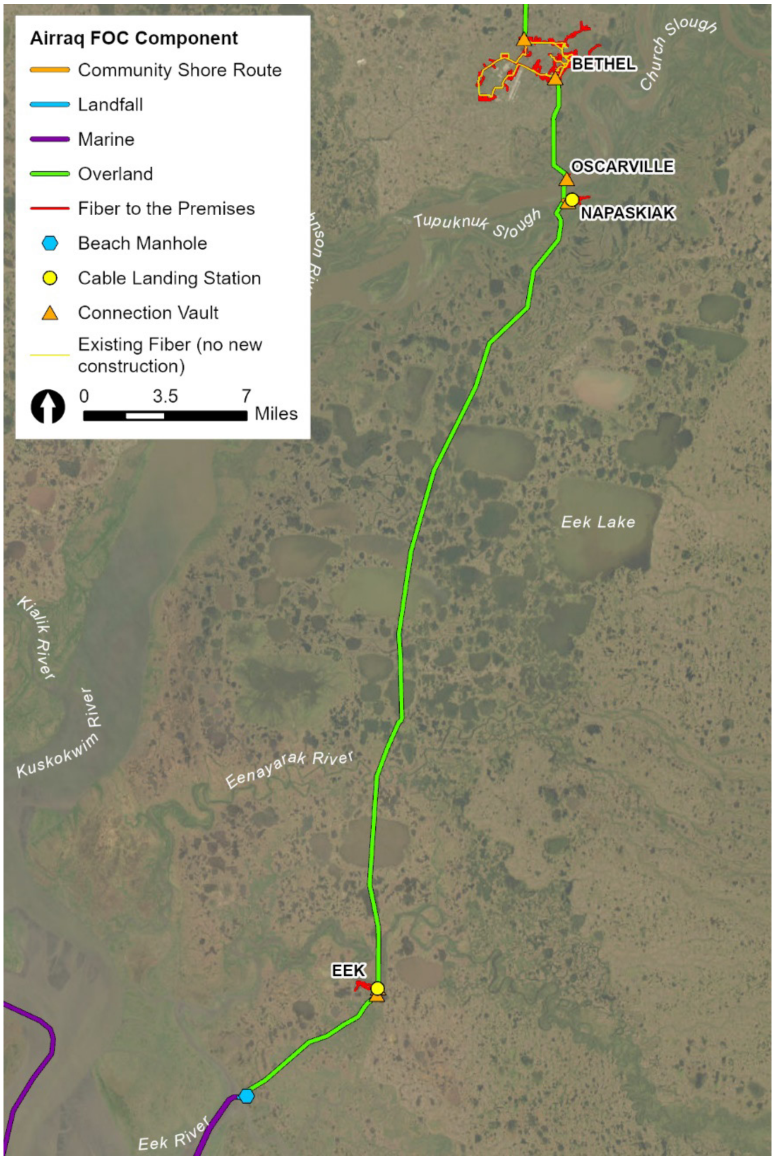
CVs	Location (coordinates, WGS84)
Eek South CV	60.212762°, -162.012925°
Eek North CV	60.216803°, -162.011294°
Napaskiak CV	60.706784°, -161.769940°
Oscarville CV	60.720960°, -161.771455°
Bethel South CV	60.783900°, -161.785578°

Notes: WGS84 = World Geodetic System Datum 1984

Table 2-7. Phase 1 Overland Route Cable Distances

FOC Route Segment	Cable Surface Laid (mi)	Cable Attached to Existing Aerials (mi)	Cable Trenched (mi)	Total Distance (mi)
Apogak BMH To Eek Village South CV	6.8	—	0.5	7.3
Eek Village North CV to Napaskiak CV	35.0	—	1.3	36.3
Napaskiak CV to Oscarville CV	0.9	—	0.1	1.0
Oscarville CV to Bethel South CV	—	4.7	—	4.7
Phase 1 Total	**42.7**	**4.7**	**1.9**	**49.3**

Figure 2-10. Overland Route – Apogak to Bethel



2.1.3.2 PHASE 2

The Phase 2 overland route would be composed of FOC segments from the Bethel North CV to Atmautluak CV, Atmautluak CV to Nunapitchuk CV, and Quinhagak BMH to Quinhagak CV. The overland route between Nunapitchuk and Kasigluk would be conducted on existing infrastructure and would not incur any impacts from the Proposed Action. Additionally, overland route construction would be conducted with an excavator and use standard trenching within Quinhagak.

Each community in Phase 2, except Tuntutuliak and Kasigluk, would require one new CV. Table 2-8 provides CV locations for Phase 2, and Table 2-9 provides overland route cable distances for Phase 2. Figure 2-11 shows the overland route between Bethel and Kasigluk.

Table 2-8. Phase 2 CV Locations

CVs	Location (coordinates, WGS84)
Bethel North CV	60.808306°, -161.825368°
Atmautluak CV	60.858050°, -162.281393°
Nunapitchuk CV	60.896319°, -162.455318°
Quinhagak CV	59.742777°, -161.914919°

Notes: WGS84 = World Geodetic System Datum 1984

Table 2-9. Phase 2 Overland Route Cable Distances

FOC Route Segment	Cable Surface Laid (mi)	Cable Attached to Existing Aerials (mi)	Cable Trenched (mi)	Total Distance (mi)
Bethel North CV to Atmautluak CV	19.6	—	0.6	20.3
Atmautluak CV to Nunapitchuk CV	6.7	—	0.2	6.9
Quinhagak BMH to Quinhagak CV	—	—	0.5	0.5
Phase 2 Total	**26.3**	**—**	**1.3**	**27.7**

[a] The overland route between Nunapitchuk and Kasigluk would be on existing infrastructure.

Figure 2-11. Overland Route – Bethel to Kasigluk

2.1.4 Community Shore Route

Community shore routes include FOC segments between each community's BMH or CV and CLS. The BMHs and CVs located adjacent to communities would house the splice between overland or marine route cable and terrestrial cable. The terrestrial cable would extend beyond these splicing houses to a CLS built on pilings and a gravel pad measuring 50 ft by 60 ft. Each CLS would be equipped with fully redundant heating, ventilation, and air conditioning as well as direct current power systems with 8-hour battery backup. The redundant power generators and transfer switching capability would provide additional resiliency and the quick provision of long-term back-up power in the event of a community power grid failure. All facilities would be designed for full-capacity power consumption at commissioning and would not require upgrades as the network carries more traffic. Cable segments within community shore routes would be trenched or attached to existing utility poles and located adjacent to existing Unicom facilities when possible.

In general, equipment used for community shore routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.1.4.1 PHASE 1

Each Phase 1 community, except for Oscarville and Bethel, would have one collocated CLS. Table 2-10 provides the CLS locations for Phase 1, and Table 2-11 provides community shore route cable lengths by community for Phase 1.

Table 2-10. Phase 1 CLS Facility Locations

CLS	Location (coordinates, WGS84)
Dillingham	58.999463°, -158.544930°
Platinum	59.013073°, -161.818662°
Eek	60.215998°, -162.011887°
Napaskiak	60.707111°, -161.764616°

Notes: WGS84 = World Geodetic System Datum 1984

Table 2-11. Phase 1 Community Shore Route Cable Distances

Community	Cable Trenched (mi)	Cable Attached to Existing Aerials (mi)	Total Distance (mi)
Dillingham	0.2	—	0.2
Platinum	0.3	—	0.3
Eek	0.3	—	0.3
Napaskiak	0.2	0.2	0.4
Phase 1 Total	**1.0**	**0.2**	**1.2**

Note: Total values may not add up due to rounding.

2.1.4.2 PHASE 2

Table 2-12 provides CLS locations for Phase 2, and Table 2-13 provides community shore route cable lengths by community for Phase 2.

Table 2-12. Phase 2 CLS Facility Locations

CLS	Location (coordinates, WGS84)
Tuntutuliak	60.339825°, -162.666535°
Nunapitchuk	60.897441°, -162.456898°

Notes: WGS84 = World Geodetic System Datum 1984

Table 2-13. Phase 2 Community Shore Route Cable Distances

Community	Cable Trenched (mi)	Cable Attached to Existing Aerials (mi)	Total Distance (mi)
Tuntutuliak	—	0.2	0.2
Atmautluak[a]	<0.1	—	<0.1
Nunapitchuk	—	0.3	0.3
Phase 2 Total	**<0.1**	**0.5**	**0.6**

Note: Total values may not add up due to rounding.
[a] Community shore route connects CV to an existing Unicom facility operating as a CLS.

2.1.5 FTTP

FTTP begins at the CLS, which houses the FTTP local access distribution equipment. FTTP is then routed throughout the community, connecting to local nodes where splitters enable branching into feeder lines that deliver connectivity to the premise locations.

FTTP would be distributed throughout communities by trenching or attaching cable to existing utility poles. No new utility poles would be constructed for the Proposed Action; it would instead use existing utility poles where they are present. Where utility poles are not present, the FTTP route would be trenched.

In general, equipment used for FTTP routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.1.5.1 PHASE 1

No FTTP installation would occur within Bethel. Instead, Bethel would rely on hybrid fiber-coaxial upgrades to their existing fiber network for broadband distribution. Table 2-14 provides FTTP cable distances for Phase 1.

Table 2-14. Phase 1 FTTP Cable Distances

Community	Trenched FTTP (mi)	Aerial Hanging FTTP (mi)	Total FTTP (mi)
Platinum	1.1	—	1.1
Eek	—	2.9	2.9
Napaskiak	—	2.8	2.8
Oscarville	—	0.5	0.5
Phase 1 Total	**1.1**	**6.2**	**7.3**

2.1.5.2 PHASE 2

Table 2-15 provides FTTP cable distances for Phase 2.

Table 2-15. Phase 2 FTTP Cable Distances

Community	Trenched FTTP (mi)	Aerial Hanging FTTP (mi)	Total FTTP (mi)
Quinhagak	—	3.9	3.9
Tuntutuliak	—	3.1	3.1
Nunapitchuk	—	2.4	2.4
Atmautluak	—	2.1	2.1
Kasigluk	—	3.7	3.7
Phase 2 Total	**—**	**15.2**	**15.2**

2.1.6 Construction Schedule

Unicom anticipates initiating terrestrial construction activities beginning early in 2024, conducting marine construction activities during the ice-free months of 2024, and completing the Proposed Action in 2026. Appendix A provides the construction schedule.

2.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed, and the 10 southwestern Alaska communities would continue to rely on the existing long-haul microwave and geostationary satellite earth stations network. The No Action Alternative is included in the analysis for baseline comparison to compare the magnitude of the existing impacts against the proposed impacts.

The current system is a long-haul microwave and geostationary satellite earth stations. This form of internet limits the efficacy of providing healthcare, government, and educational services to remote Alaska that could otherwise be efficiently delivered by broadband (State of Alaska 2021). Under the No Action Alternative, the heavy data demands would continue to inundate this pre-existing form of telecommunication. High latency and low bandwidth make the ever-growing capacity requirements for these services much too “heavy” for effective and efficient carriage over geo-synchronous satellite systems. Economic development is also slowed because businesses in southwestern Alaska cannot employ the same technologies as their competitors due to the high latency and low bandwidth as well as the capacity of satellite and long-haul microwave systems. Additionally, satellite and long-haul microwave systems are costly and logistically challenging to maintain.

2.3 Proposed Action Corridor Analysis

The route chosen for the Proposed Action was sited considering key environmental, biological, social, cultural, and economic factors to minimize impacts from the Proposed Action.

2.3.1 Marine Corridor

To reduce environmental impacts, landfall locations were generally located within previously disturbed areas and considering erosion potential. Landfall locations were chosen to provide close community access as well as reduce logistical and material challenges. The route between landfall locations was chosen based on several factors, including risks from bottom trawling, surface to mid-water depth fishing, vessel anchoring, ice-related events, hard bottom, and sediment transport (Benthic Geoscience 2023). Depending on the risk level of these factors throughout the route, certain precautions may be made to prevent interaction with the FOC. Table 2-16 defines the risks and mitigation, while Table 2-17 shows the threat level of these risks. Information from anchoring and fishing activities was synthesized from both interviews and electronic surveillance datasets. Interviews occurred with local subject matter experts (i.e., vessel captains, shipping company representatives, local leadership, other stakeholders). The route designed to avoid these risks is the one that is least likely to require future disturbance in the form of system repairs due to cable breakage. Additionally, the marine route was intentionally routed away from endangered and threatened species critical habitat and along active commercial transportation routes.

Table 2-16. Cable Risk Assessment

Risk Event	Threat/Risk to FOC	Mitigation
Bottom trawling	High	• Avoidance where possible; burial where not possible • Implementation of a long-term cable protection and fisheries liaison program
Surface to mid-water depth fishing	Low	• Due diligence during survey data processing • Implementation of a cable protection and fisheries liaison program
Vessel anchoring	High	• Avoidance where possible; burial where not possible • Establishment of a long-term cable protection and marine liaison program
Ice-related events (e.g., scour, shove, ground ice, frazil)	High	• Avoidance where possible; burial greater than 3.3 ft where not possible • Use of heavy armor cable, horizontal directional drilling, articulated pipe, and/or mattressing; coatings may be available, which could help prevent adhesion of frazil
Hard bottom	High	• Plan for route development during the marine survey • Up-armor if possible
Sediment transport	Moderate to High	• Plan for route development during the marine survey • Up-armor if possible • Conduct current analysis surveys prior to the marine installation and survey

Table 2-17. Marine Route Risk Assessment

Risk Event	Nushagak River	Bristol Bay	Kuskokwim Bay	Platinum to Tuntutuliak BU	Tuntutuliak BU to Apogak Landfall	Tuntutuliak BU	Quinhagak BU
Erosion	High	Low	High	High	High	High	High
Bottom trawling	High	High	Low	Low	Low	Low	Low
Shipping/ vessel traffic	High	High	High	High	Low	High	High
Full burial (Yes/No)	No	No	No	No	Yes	Yes	No
Ice gouging risk	Low	Low	Low	Low	Moderate	Moderate	Low

Source: Benthic Geoscience 2023

2.3.2 Terrestrial Corridor

Terrestrial components of the Proposed Action include routing within and perpendicular to freshwater rivers and streams as well as land-based routing. Kuskokwim River routing was based on placing the cable within the thalweg or deepest part of the river to minimize the potential for ice scour and to allow for passive burial of the cable through natural river processes. Areas of anchoring hazards, navigational buoys, and ice scour were also avoided, where feasible. Areas where hazards were unavoidable are proposed for burial. Stream bank crossings were sited based on erosion and ice scour potential (Benthic GeoScience 2023).

Land-based portions of the Proposed Action were routed based on factors such as land ownership, reducing environmental impacts, construction feasibility, and input received from community outreach. The Proposed Action was sited to avoid Native allotments, which have a high likelihood of containing cultural resources; federal property; and private property while providing a relatively straight route to communities. Wetlands and streams were mapped within the Proposed Action area and avoided when possible to reduce wetland impacts and avoid erosion along stream banks. When possible, trenching locations and CLSs within communities were selected to take advantage of existing rights-of-way and disturbance to the highest degree possible. This was done by routing terrestrial FOC primarily within existing roadways and utility lines, and placing CLSs on existing gravel pads. Communication with stakeholders is ongoing. Community outreach efforts have engaged with regional organizations, Tribal and Alaska Native organizations, city governments, boroughs, and community members. This includes interviews with community members and local experts at landfall sites for route construction (Benthic Geoscience 2023).

2.4 Alternatives Considered but Eliminated from Further Discussion

2.4.1 Fixed-Wireless Network Distribution

This alternative would have the same marine elements as the Proposed Action but would distribute the telecommunications connection throughout the Proposed Action's communities via fixed-wireless signal local distribution networks.

The Fixed-Wireless Network Distribution Alternative would meet the Proposed Action's purpose to provide reliable broadband communications to the 10 southwestern Alaska communities; however, it would result in a lower quality user experience, and is logistically unfeasible and economically prohibitive. Some of the specific factors that contribute to this alternative being dismissed include:

- Some subscribers may experience variable delivery during busy hour conditions within certain areas of the community.
- Available radio spectrum may be subject to harmful interference, decreasing overall system performance (i.e., vessel radars).
- System infrastructure exposed to the high winds and severe icing weather conditions within the YK Delta region would likely unacceptably decrease the system's reliability.
- Bandwidth expansion capability and overall technical life is less than FOC local access distribution alternatives.

While a fixed-wireless local access system may be able to deliver acceptable speeds, due to unavoidable capacity constraints, it would result in a lower quality experience for end-users than is possible over fiber. Fiber optic technology is the preferred method of internet distribution and likely eliminates the need for ground-disturbing construction in the future to upgrade the network to meet future technology needs. Also, fixed-wireless access relies on the construction of multiple towers throughout each community, which would introduce new permitting and land use issues that are largely avoided with a local fiber optic network.

2.4.2 Utility Pole Distribution

This alternative would have the same marine elements as the Proposed Action but would attach overland FOC to overhead utility poles in lieu of trenching.

This alternative would reduce the need to excavate cable trenches; however, it would require the installation of potentially thousands of utility poles across YK Delta wetlands. Ultimately, this alternative would not meet the Proposed Action's purpose to provide reliable broadband communications to the 10 YK Delta communities. FOC in overland segments are buried out of necessity due to high winds, ground freeze/thaw conditions, and severe weather that make pole lines prone to failure. This alternative would result in unacceptably frequent service outages, and the costs of repairing these outages would be very high because most of the Proposed Action area is remote and difficult to access. This alternative would also affect the Togiak National Wildlife Refuge and Wood-Tikchik State Park.

2.4.3 Low Earth Orbit Satellite

The current system for this region is based on a combination of long-haul microwave and geostationary satellite earth stations. The Low Earth Orbit Satellite Alternative would be carried out by transitioning to the low earth orbit satellite system. While this alternative would provide an upgrade to current conditions, it would not provide fast, reliable internet services that meets the Proposed Action's purpose. Latency issues and unreliable bandwidth have made satellite services at the community level inadequate for modern communications.

3 Description of the Affected Environment

This Environmental Assessment describes the affected environment of the Proposed Action and surrounding areas. The affected environment describes the areas and resources that may experience environmental effects from the Proposed Action (see Section 2.1). This affected environment includes a network of marine waters and shorelines within Bristol Bay, the Kuskokwim River, and its tributaries; terrestrial landscapes within the Kuskokwim Delta; and subsurface resources.

3.1 Noise

Natural sounds such as wind, water, and birds and wildlife as well as human-made sounds such as vehicles, aircraft, and boats comprise the acoustical environment. Sounds are considered “noise” when they are unwanted and have the potential to affect the natural acoustical environment, noise-sensitive receptors (i.e., wildlife and people who experience increased sensitivity or exposure to noise during activities), and values. Noise impacts are identified when the sound events or levels disrupts normal activity or diminishes quality of life.

Air-transmitted noise is measured in decibel (dB) units. The dB system of measuring sound provides a simplified relationship between sound level and its perceived loudness to the human ear. The dB scale is logarithmic, which means that the 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, and a 30-dB level is 1,000 times more intense. When the dB is adjusted to correct for the relative frequency of the human ear, the unit is referred to as an “A-weighted” decibel (dBA). Several factors influence sound, including distance from the sound’s source, terrain, vegetation or ground cover, and atmospheric conditions (e.g., wind, weather, temperature). Noises above 70 dB over a prolonged period can damage human hearing, while noises above 120 dB can cause immediate harm to one’s ears (CDC 2023). Wild ungulates have exhibited avoidance of habitats producing more than 57 dB (Kleist et al. 2020).

Underwater noise also attenuates by distance from the source. The frequency of the noise level affects the distance traveled, and low-frequency noise levels tend to carry long distances within water. Underwater sound levels are typically referenced as dB relative to one micropascal (dB re 1μPa). Ambient underwater noise sources can include tides, currents moving ice, and noise produced by marine mammals and humans. Fish and marine mammals can be disturbed by intermittent loud noises (e.g., pile driving, blasting) that would result in fleeing behavior, as well as cumulative sound exposures that could result in physical injury. Proposed Action consultation with the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) addresses anticipated construction and project noise levels to determine impacts and necessary mitigation.

The Proposed Action area covers a variety of settings, from uninhabited landscapes in both the terrestrial and marine environment to small communities. Approximately 150 mi of FOC would be installed within the terrestrial environment, and approximately 406 mi of the FOC route would be installed within the marine environment. Both environments have the potential to be influenced by underwater or air-influenced noise.

3.1.1 Terrestrial

The terrestrial component comprises 10 distinct communities and their overland routes. Each of these communities are small and remote. Outside these communities, natural sounds dominate the soundscape, interrupted by intermittent anthropogenic (human-made) sound sources such as snowmachines, aircraft, and motorized boats. Within these communities, more frequent vehicle idling and travel noises would be heard, as well as noises from construction, diesel generators, arriving/departing aircraft, human voices, pets, and other activities. Table 3-1 provides common noise sources and their typical levels.

Table 3-1. Common Noise Sources and Typical Levels

Source	Noise Level (dB)
Snowmachines	60–79
All-terrain Vehicles	Varies
Small Airplane Overhead Transit	<91 at 500 feet
Passenger Vehicles (idling)	58
Passenger Vehicles	<80, depending on distance
Construction Vehicles/Equipment	80–120
Single-engine Boats	65–90

Source: USEPA 1971a; Kuyek 2015; PAME 2019; USFWS 2021; Przydatek et al. 2023; DEOHS 2004

Terrestrial settings outside communities are generally remote and minimally influenced by noise. Anthropogenic noise within these areas is primarily generated by snowmachines (generally 60 to 79 dB), all-terrain vehicles (varies by location, noise often subject to regulation), boats (generally 65 to 90 dB), and airplane transit (generally less than 91 dB at 500 ft) (Kuyek 2015; PAME 2019; USFWS 2021).

Bethel's residential land use district prohibits "loud noise" between 11:00 p.m. and 6:00 a.m. Alaska Standard Time. "Loud noise" is defined by a decibel level that exceeds 80 dBA maximum at the parcel line within the residential district that is receiving the noise (City of Bethel 2023).

Dillingham sets noise levels by use district that are not to exceed a specified octave band center frequency (Official Site of Dillingham, Alaska 2023). If the noise occurs between 11:00 p.m. and 7:00 a.m. Monday through Saturday, or anytime on Sundays or holidays, 7 dB will be subtracted from each specified dB level (Official Site of Dillingham, Alaska 2023).

Noise restrictions are not regulated within the other communities serviced by the Proposed Action.

3.1.2 Marine

Within the Proposed Action area, the marine acoustic environment varies by season. During ice-covered months, large-scale ice motion and deformation due to weather conditions generates ice cracking, shearing, ridging, and fracturing, which produce broadband sounds that can dominate the soundscape (Kinda et al. 2013). During ice-free months, abiotic noise sources are primarily driven by wind and the development of breaking waves (Menze et al. 2017).

The contribution of winds to the acoustic environment near the Proposed Action have been increasing for the last 25 years due to strength and position changes of the Beaufort High and the Aleutian Low systems (Pickart et al. 2013).

During ice-fee months, when this Proposed Action may occur, 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 1µPa at 3.3 ft, combined average of 173 ± 7 dB re 1µPa at 3.3 ft [Veirs et al. 2016]), primarily the result of non-impulse sounds generated by the collapse of air bubbles (cavitation) created when propeller blades move rapidly through the water.

3.2 Air Quality

Ambient air quality in a given location may be characterized by comparing the concentration of various pollutants in the ambient air with the standards set by federal and state agencies. Under the authority of the Clean Air Act, the U.S. Environmental Protection Agency (USEPA) has established nationwide air quality standards, known as the National Ambient Air Quality Standards (NAAQS) for six air pollutants. These standards set maximum allowable atmospheric concentration of these six criteria pollutants and were established to protect the public health within an adequate margin of safety. All communities to be serviced by the Proposed Action, as well as Dillingham, meet air pollutant standards to be classified as attainment areas (ADEC 2023a). The Alaska Department of Environmental Conservation (ADEC) has also adopted and established State of Alaska Ambient Air Quality Standards (AAAQS). Pollutants for which standards have been set include carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 or 2.5 microns in aerodynamic diameter (PM_{10} and $PM_{2.5}$), ozone (O_3), sulfur dioxide (SO_2), and lead.

Two additional pollutants of concern, nitrogen oxides (NO_x) and volatile organic compounds (VOCs), are also regulated because they contribute to the formation of O_3 in the atmosphere; however, no NAAQS or AAAQS have been established for these pollutants. USEPA has also established emissions and equipment standards for 187 listed hazardous air pollutants (HAPs) for several industrial categories. Additionally, greenhouse gases (GHGs) became regulated pollutants on January 2, 2011, because of their contribution to global climate change effects.

Emissions from natural sources such as wildfires and human-induced air pollutant emissions from industrial processes and mobile emissions affect air quality. The Proposed Action is within a remote area of the Northern Alaska Intrastate Air Quality Control Region, where few major pollutant emission sources exist. The emissions produced are generally localized within residential populated areas and would be expected to be below applicable USEPA-approved NAAQS and AAAQS. The ADEC regulatory monitoring network is generally limited to population centers and does not adequately characterize conditions within rural areas. The current ADEC ambient monitoring network consists only of required regulatory sites, except for the Bethel Special Purpose Monitoring site, which was established in Bethel between 2018 and 2020. During that timeframe, it exceeded the NAAQS for $PM_{2.5}$ once, due to summertime wildfire smoke, but did not exceed the NAAQS for PM_{10} (ADEC 2023b). No other criteria pollutants are measured at this station. Bethel is the only community within the Proposed Action area that has had an air quality monitoring station (ADEC 2022a).

ADEC is deploying AQMesh sensor pods to communities throughout Alaska as part of a Community-Based Air Monitoring Project. The sensor pods measure multiple parameters, including particulate matter, gases, and meteorological data. However, the data quality does not meet regulatory requirements and should not be compared to standards. They are used for tracking real-time conditions and identifying trends. In Bethel, a sensor shows particulate matter (both $PM_{2.5}$ and PM_{10}), SO_2, and NO_x. A sensor in Napaskiak captures CO, NO_x, O_3, and particulate matter ($PM_{2.5}$, PM_{10}). Real-time data are available at the Alaska air quality network[3].

In general, air quality within the Proposed Action area is considered good. Neither Bethel nor any of the Proposed Action area communities are regulated by ADEC for exceedances of NAAQS or AAAQS. Particulate matter is considered a community concern, and ADEC runs programs designed to educate and minimize sources of particulate matter within rural areas. Particulate matter within the Proposed Action area communities is often a result of wind erosion, natural and human-made fires, combustion by-products, and vehicle travel on unpaved roads within communities.

3.3 Geology and Soils

The Proposed Action area is located within the YK Coastal Lowland physiographic province. Within the lowlands, permafrost underlies much of the landscape, except for major river terraces, alluvial fans, and active floodplains. Lowland soils are more developed and consist of loess, sand, and gravelly alluvium derived from mountainous regions as well as higher amounts of organic matter. Large areas of wet organics form extensive plains within the lowland areas, particularly in the YK Delta (BLM 2020).

The landscape is populated by basalt hills and volcanic cinder cones. Soil infiltration is impeded by discontinuous permafrost. Much of the soils within the Proposed Action area are poorly developed because the cold climate prevents most soil-forming processes, and leads to the formation and preservation of permafrost. Soils present within the Proposed Action area tend to have a thick, organic surface layer and are saturated (BLM 2020).

The geology of the area is predominantly unconsolidated deposits, which consist primarily of alluvial, colluvial, marine, lacustrine, eolian, and swamp deposits. The geology also includes widespread glacial and periglacial deposits that consist of end, lateral, and ground moraine; outwash; rock glacier deposits; and other glacial and periglacial deposits as well as glacially scoured bedrock that may be covered with thin, glacially derived deposits. These glacial deposits are Holocene and Pleistocene in age, and may include small areas of potentially late Tertiary deposits (Wilson et al. 2015).

The Farmland Protection Policy Act is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses (USDA 2023a). Farmland can be identified as prime farmland, which has the best combination of physical and chemical characteristics to produce agricultural products; or farmland of statewide importance, which has statewide importance for agricultural production (7 CFR 657). No prime farmland has been identified within the Proposed Action area (NRCS 2023a).

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[3] Air Quality Real-Time Data (alaska.gov)

Additionally, the USDA Web Soil Survey mapper contains no soils data for the Proposed Action area (NRCS 2023b).

3.4 Water Resources

Water resources are protected by a number of federal and state regulations. Surface waters and wetlands are protected federally under Section 404 of the Clean Water Act (CWA), which regulates the discharge of fill into all federally jurisdictional waters of the United States (WOTUS). WOTUS include rivers, streams, lakes, wetlands, and marine waters subject to U.S. Army Corps of Engineers (USACE) jurisdiction.

Under Section 10 of the Rivers and Harbors Act, USACE regulates navigable WOTUS, and a permit is required to do any work in, over, or under a navigable water, which includes marine waters.

In Alaska, construction projects require an Alaska Pollutant Discharge Elimination System permit from ADEC for the discharge of stormwater generated from construction activities. As a requirement of the Alaska Pollutant Discharge Elimination System permit, a Stormwater Pollution Prevention Plan (SWPPP) would need to be developed to manage stormwater discharges generated during construction activities. Sediment and erosion control measures outlined in the SWPPP should be consistent with those described in the Section 404 permit. Per Executive Order (EO) 11988, *Floodplain Management*, federal agencies are directed to avoid actions, to the extent practicable, that will result in the location of facilities within floodplains and/or affect floodplain values. Additionally, the USDA Departmental Regulation 9500-3, *Land Use Policy*, discourages the unwarranted alteration of floodplains, unless no practicable alternative action exists to avoid the direct or indirect encroachment on floodplains.

The Wild and Scenic Rivers Act of 1968 protects certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations.

The following sections describe these resources:

- Surface water;
- Marine water, coastal zone, estuary, and intertidal areas;
- Groundwater;
- Wetlands;
- Floodplains; and
- Wild and Scenic Rivers.

3.4.1 Surface Water

The Proposed Action occurs within two major watersheds, as defined by the U.S. Geological Survey (USGS). Table 3-2 presents these watersheds, denoted by 8-digit Hydrologic Unit Codes (USGS 2023a).

Table 3-2. Watersheds within the Proposed Action Area

Watershed Name	Hydrologic Unit Code
Kuskokwim Delta	19030502
Lower Nushagak River	19030303

The following named waterbodies are near to or intersecting the Proposed Action area (see Appendix B, Figures 1 through 3): Bering Sea, Bristol Bay, Eek Lake, Eek River, Eenayarak River, Johnson River, Kinak River, Kongeruk River, Kukthluk River, Kuskokwim Bay, Kuskokwim River, Nunavakanukakslak Lake, Nushagak Bay, Nushagak River, Pikmiktalik River, and Tupuknuk Slough. Section 10 waters include all waters subject to the ebb and flow of the tide as well as the Eek, Kuskokwim, and Nushagak Rivers (USACE 2023).

The Kuskokwim River Basin is the largest river basin providing freshwater input to Kuskokwim Bay, and is drained by the Kuskokwim River and many of its tributaries (BLM 2020). The river basin includes 11 percent of the State of Alaska. The region is contained within the Alaska Range on the south and east, and the Kuskokwim Mountains on the north and west. Water quality within the region is generally described as good to excellent, which can be attributed to low dissolved solids, dissolved oxygen near saturation, and neutral to moderately basic pH; however, runoff near developed areas can contain natural or human-caused sediment and/or pollutants during spring snowmelt and heavy rainfall events. Additionally, non-active reclaimed placer gold mining, active placer mining with erosion control issues, and runoff from wildlife areas may contribute additional sediment and other pollutants to surface waters within the area. Flows reach a minimum in March and maximum in July and August. Periods of maximum flow are attributed to snowmelt and precipitation events. Winter surface water flows are approximately 20 percent of summer discharge (BLM 2020).

Six major watersheds drain into Bristol Bay: the Togiak, Nushagak, Kvichak, Naknek, Egegik, and Ugashik River watersheds. The Nushagak and Kvichak River watersheds are the largest among them, occupying approximately 50 percent of the region. They comprise five distinct physiographic divisions: the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak-Bristol Bay Lowland (USEPA 2014). These watersheds are turbid and dominated by seasonal runoff. These features range from sea level to 9,186 ft, and contain more than 33,554 mi of streams (NMFS 2013).

Surface waters provide a drinking water source for several communities within the Proposed Action area. The largest among these surface water service locations and their populations served are: Quinhagak Water System (724), Eek Water System (280), Goodnews Bay (250), Oscarville Watering Point (75), and Platinum City Water (51) (USEPA 2023a).

3.4.2 Marine, 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, Alaska withdrew from the voluntary National Coastal Zone Management Program.

The marine waters within the Proposed Action area include Nushagak Bay, Bristol Bay, and Kuskokwim Bay, all of which open to the Bering Sea. Coastal, estuary, and intertidal components within the Proposed Action area lie along the coast between Dillingham and the Kuskokwim River. This stretch of coastline is composed of beaches, ocean spits, tidal mud flats, coastal salt marshes, and coastal wetlands. Reduced sea ice along the coasts in conjunction with rising sea levels result in rapid erosion of coastal soils. Rising sea levels and storm surges result in frequent influx of marine waters into coastal wetlands, moving saltwater inland and promoting erosion (USEPA 2023b, USDA 2023b). Coastal areas provide important habitat for many species within the region such as brown bears (*Ursus arctos*), migrating waterfowl, Steller sea lions (*Eumetopias jubatus*), and fish.

Eroding cliffs depositing soils into Upper Nushagak Bay create a highly turbid environment. While no known industrial point source discharges into the Nushagak Bay, floating fish processors operate seasonally within the area and contribute to large effluents containing fish waste. Additionally, dredging at the Dillingham harbor increases turbidity and introduces contaminants to the water profile that are distributed by tides currents throughout the bay (Hartwell et. al. 2017). In summer during periods of significant freshwater out-welling, the ebb tide currents often substantially exceed the flood tides. This input keeps Nushagak Bay colder in spring relative to the rest of Bristol Bay. As terrestrial waters warm later in summer with increasing ambient temperatures, so does Nushagak Bay. Turbidity weakens primary production within the bay; however, high nutrient levels are driven by out-welling discharge from detritus, dissolved organic material, and salmon-derived nutrients. In addition to fish and invertebrates, the nutrients help support aquatic vegetation such as eel grass and kelp species (NMFS 2013).

The Kuskokwim River flows into Kuskokwim Bay. The southern tributaries of the Kuskokwim River are dominated by glaciated drainages that produce a substantial quantity of suspended sediments during summer months. Kuskokwim Bay is subject to significant tides, reaching 13 ft. Unlike much of the more open waters within the region, Kuskokwim Bay has the potential to be entirely covered with ice during winter, with water temperatures dropping as low as 29 degrees Fahrenheit (USFWS 2012).

3.4.3 Groundwater

The soils within the southeastern portion of the Proposed Action area, composed of the Nushagak-Bristol Bay Lowland and the Nushagak-Big River Hills, are composed of course-textured glacial drift with abundant, high permeability gravels. This composition facilitates a highly passive relationship between surface and groundwaters, which is aided by wetlands and ponds (Rains 2011). The connection between surface and groundwater flows influences surface water temperatures, keeping some systems above the freezing point through winter (Power et al. 1999).

The Proposed Action passes through Drinking Water Protection Areas (DWPAs), which include both surface and groundwater. DWPAs are composed of Zone A and Zone B. Zone A DWPAs are defined by areas where it takes several months or less for a contaminate to reach the drinking water intake. Zone B DWPAs are defined by areas where it takes 2 years or less for a contaminant to reach the drinking water intake. DWPAs intersected by the FOC route are provided in Appendix C. Most of the Proposed Action is outside DWPAs. However, portions of the Proposed Action extend into both Zone A and Zone B Protection Zones in Platinum, Eek, Napaskiak, Atmautluak, and Nunapitchuk.

Groundwater location is heavily influenced by permafrost. In places with shallow permafrost, groundwater is nearer to the ground surface. This facilitates rapid runoff into surface waters. Permafrost within the Proposed Action area is primarily composed of lowland and upland areas underlain by discontinuous permafrost (BLM 2020).

The region's aquifers are mostly formed by unconsolidated alluvial deposits or glacial outwash. Associated groundwater tends to be suitable for domestic use with little treatment (BLM 2020). Groundwater sources provide public drinking water to most of the Dillingham and Bethel Census Areas. The largest of these groundwater service locations and their populations served are: Bethel Heights Water System (2,220), Bethel City Water (1,650), Bethel Trailer Court (500), Dillingham Water System (2,419), Nunapitchuk Water System (496), Tuntutuliak Washeteria and Watering PT (350), Napaskiak W.S. Central Well (330), Atmautluak Water System (311), New Kasigluk Water System (276), and Old Kasigluk-Akiuk (240) (USEPA 2023a).

3.4.4 Wetlands

The Yukon and Kuskokwim River Deltas comprise the largest expanse of wetlands on North America's western coast. The area is composed of streams, rivers, lakes, and wetlands that form an over 42,000 square mi delta within the poorly drained coastal plain. Within this area, intertidal mudflats compose approximately 768,500 acres. Shrub wetlands comprise most riparian landscapes within the region. 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 2017).

National Wetland Inventory (NWI) maps were available for most of the Proposed Action area. Where not available, wetlands were assumed to be present in all undisturbed, vegetated areas above MHW. Existing satellite imagery was used to determine where HTL and MHW were at each landfall location. Where available, NWI maps were used to determine the types of wetlands the Proposed Action area intersects. Table 3-3 shows the percentage of wetlands the Proposed Action area crosses within a 50-ft buffer.

Table 3-3. NWI Wetlands within 50 ft of the Proposed Action FOC Route

System	Acres[a]	Percent of Total Proposed Action Area Buffer
Marine	46.1	0.7
Estuarine	973.9	14.4
Lacustrine	183.3	2.7
Palustrine	12.8	0.2
Riverine	328.1	4.9
Freshwater Emergent	415.4	6.2
Freshwater Forested/Shrub	141.0	2.1
Total	**6,740.6[b]**	**31.2**

[a] NWI maps are not available for the entire Proposed Action area. System acres are for areas where NWI maps were available.
[b] Total acres is for the whole Proposed Action area, including where NWI maps were not available.

3.4.5 Floodplains

Bethel and Dillingham are the only communities within the Proposed Action area that participate in the National Flood Insurance Program and have mapped flood zones (FEMA 2023a). Additionally, the Flood Frequency data from the Natural Resources Conservation Service is unavailable for the entire Proposed Action area, and USGS does not have any active stream gage monitoring areas within the Proposed Action area (FEMA 2023b, USGS 2023b).

Generally, the region is susceptible to flooding due to the low relief of the landscape and prevalence of permafrost. Flooding typically occurs during spring break-up and in late fall with intense precipitation and storm-driven flood tides.

3.4.6 Wild and Scenic Rivers

No federally designated Wild and Scenic Rivers occur within the Proposed Action area.

3.5 Biological Resources

The lakes, streams, tidal flats, wetlands, and coast within the YK Delta provide important habitat for the region’s wildlife species. Biological resources, including threatened and endangered species, terrestrial mammals, marine mammals, bald and golden eagles, migratory birds, invasive species, fisheries and Essential Fish Habitat (EFH), and vegetation and habitat, are discussed in the following sections.

3.5.1 Threatened and Endangered Species

The Endangered Species Act (ESA) requires that federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and NMFS, must ensure that projects they fund, authorize, or carry out are not likely jeopardize the continued existence of any listed species nor result in the destruction or adverse modification of designated critical habitat of such species. NMFS is primarily responsible for marine species, while USFWS tends to have jurisdiction over terrestrial species. The law also prohibits any action that causes a "taking" of any species listed under the ESA. Within the Proposed Action area, 13 species are protected under the ESA (Table 3-4).

The Proposed Action alignment crosses through designated critical habitat for the Western Distinct Population Segment (DPS) of Steller sea lion, where major haulouts are around Cape Newenham National Wildlife Refuge and Round Island (50 CFR 226.202). The Proposed Action is more than 3 nautical miles (nm) from these haulouts.

Consultation with NMFS and USFWS has been completed under Section 7 of the ESA (Appendices D and E, respectively) for the species listed in Table 3-4.

Table 3-4. ESA-Listed Species within the Proposed Action Area

Species	ESA Status	Critical Habitat within Proposed Action Area	Managing Agency
Bearded Seal – Beringia DPS (*Erignathus barbatus*)	Threatened	No	NMFS
Fin Whale (*Balaenoptera physalus*)	Threatened	No	NMFS
Gray Whale Western – North Pacific DPS (*Eschrichtius robustus*)	Threatened	No	NMFS
Humpback Whale – Mexico DPS (*Megaptera novaeangliae*)	Threatened	No	NMFS
Humpback Whale Western – North Pacific DPS (*Megaptera novaeangliae*)	Threatened	No	NMFS
North Pacific Right Whale (*Eubalena japonica*)	Threatened	No	NMFS
Ringed Seal Arctic Subspecies (*Pusa hispida*)	Threatened	No	NMFS
Sperm Whale (*Physeter macrocephalus*)	Threatened	No	NMFS
Steller Sea Lion – Western DPS (*Eumetopias jubatus*)	Endangered	Yes	NMFS
Steller's Eider (*Polysticta stelleri*)	Threatened	No	USFWS
Spectacled Eider (*Somateria fischeri*)	Threatened	No	USFWS
Short-tailed Albatross (*Phoebastria albatrus*)	Endangered	No	USFWS
Northern Sea Otter – Southwest Alaska DPS (*Enhydra lutris kenyoni*)	Threatened	No	USFWS

3.5.2 Terrestrial Mammals

Caribou (*Rangifer tarandus*), moose (*Alces alces*), wood bison (*Bison athabascae*), brown bear, and black bear (*Ursus americanus*) are found within the Kuskokwim River Delta (BLM 2020). Additionally, important furbearers overlapping the Proposed Action area identified by trappers within the region are Canada lynx (*Lynx canadensis*), beaver (*Castor canadensis leucodenta*), wolverine (*Gulo gulo*), river otter (*Lutra canadensis*), red fox (*Vulpes vulpes*), and mink (*Mustela vison*) (Bogle 2022).

3.5.3 Marine Mammals

In addition to those marine mammals listed under the ESA, all marine mammals are protected from take (hunting, killing, capture, and/or harassment) under the Marine Mammal Protection Act (MMPA).

Marine mammals potentially found within the Proposed Action area under NMFS's jurisdiction include beluga whale (*Delphinapterus leucas*), Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), killer whale (*Orcinus orca*), minke whale (*Balaenoptera acutorostrata*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), ribbon seal (*Histriophoca fasciata*), and spotted seal (*Phoca largha*). USFWS's jurisdiction includes Pacific walrus (*Odobenus rosmarus*). Both agencies can authorize take of marine mammals under Section 104 of the MMPA.

Harbor seal, spotted seal, and ribbon seal may be found within the Proposed Action area. Harbor seals are one of the most common marine mammals found on the United States East and West coasts. The Bristol Bay harbor seal stock is the stock most likely to be found in the Proposed Action area (Young et al. 2023). They feed on fish, shellfish, and crustaceans within marine, estuarine, and occasionally fresh waters. Harbor seals can be found hauled out, often in groups, on drifting glacial ice, reefs, rocks, and beaches (Young et al. 2023). Spotted seals within the Proposed Action area belong to the Alaska stock, the only stock found in United States waters (Young et al. 2023). They feed primarily on fish and crustaceans, and can be found hauled out on the edge of sea ice during winter (Lowry et al. 1998), small ice floes during spring, and coastal areas during summer and fall (Fay 1974; Lowry et al. 2000). Ribbon seals in the Proposed Action area belong to the Alaska stock, the only stock found in United States waters (Young et al. 2023). They spend a lot of their time in the open ocean, but use the Bering Sea ice front during spring for whelping (birthing), and some seals move north as the ice recedes from May to mid-July to continue use of the sea ice edge (Burns 1981).

The Pacific walrus population winters on the Bering Sea pack ice. During spring, females with young migrate north toward the Bering and Chukchi Seas, while most adult males migrate to Bristol Bay. By late fall, the population begins its return migration (ADF&G 2023a). Walruses haul out in large groups, up to tens of thousands in number, on sea ice, rocks, sandy beaches, and grassy hills. Walruses feed on soft invertebrates, including clams, snails, worms, sea cucumbers, and tunicates (ADF&G 2023a).

The Bering Sea stock of harbor porpoise is the population most likely to be found within the Proposed Action area. The Bering Sea stock ranges throughout the Aleutian Islands and all waters north of Unimak Pass (Young et al. 2023). While they occasionally appear within deeper waters, they are frequently found within waters less than 328 ft deep (Hobbs and Waite 2010). Harbor porpoise feed primarily on schooling fishes such as mackerel and herring; however, they will also eat squid and octopus. Dall’s porpoise are widely distributed across the North Pacific Ocean, but are typically not found near the Proposed Action area. All Dall’s porpoise in Alaska are part of the Alaska stock. Dall’s porpoise prefer waters deeper than 656 ft and can be found inshore, nearshore, or offshore in waters as deep as 8,202 ft (Hall 1979). Dall’s porpoise dive to depths up to 1,640 ft to prey on schooling fish such as hake, herring, and anchovies. They also prey on mid- and deep-water fish, cephalopods, and crustaceans.

The Bristol Bay stock of beluga whales is most likely to be found within the Proposed Action area year-round; however, beluga whales from the Eastern Bering Sea, Eastern Chukchi Sea, and Beaufort Sea stocks are known to overwinter within the Bering Sea and may be found near the Proposed Action area (Young et al. 2023). Beluga whale distribution is dependent upon many factors, including ice cover, tidal conditions, access to prey, temperature, and human interaction (Lowry 1985). Beluga whales feed on a wide variety of prey depending on availability, including salmon, eulachon, cod, herring, smelt, flatfish, octopus, squid, crabs, shrimp, clams, and snails.

The Eastern North Pacific Alaska Resident stock and Gulf of Alaska, Aleutian Islands, and Bering Sea Transient stock of killer whale are most likely to be found within the Proposed Action area. Resident killer whales differ from transient killer whales in terms of morphology, ecology, genetics, and behavior (Ford and Fisher 1982; Baird and Stacey 1988; Baird et al. 1992;

Hoelzel et al. 1998, 2002; Barrett-Lennard 2000; Dahlheim et al. 2008). Resident killer whales feed exclusively on fish, and transient killer whales eat primarily marine mammals and squid.

The Alaska stock of minke whale is the population most likely to be found within the Proposed Action area (Young et al. 2023). In the northern part of their range, including the Proposed Action area, minke whales are thought to be migratory, typically traveling in groups of two to three. They are opportunistic predators that prey on a variety of species, including crustaceans, plankton, and small schooling fish.

The North Pacific stock of Pacific white-sided dolphin is the population most likely to be found within the Proposed Action area. Pacific white-sided dolphins live in the open ocean and can also be found in nearshore waters (Ferrero and Walker 1996). They feed on squid and small schooling fish such as capelin, sardines, and herring.

3.5.4 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 USC 668–68d) and the Migratory Bird Treaty Act of 1918 (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. 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 Action area (ADF&G 2023b, 2023c). However, no mapped bald eagle nests are within 2,500 ft of the Proposed Action area (State of Alaska 2019). Golden eagles have historically been documented within the Lower Kuskokwim River area; however, studies indicate nests within the Lower Kuskokwim River area are almost exclusively on cliffs, which are not included as Proposed Action construction areas (Mindell 1983).

3.5.5 Migratory Birds

Migratory birds are protected under the 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. Information for Planning and Consultation identifies 17 species of migratory birds that are of particular concern and are known to occur along the Proposed Action area: Aleutian tern (*Sterna aleutica*), American golden-plover (*Pluvialis dominica*), bald eagle, black scoter (*Melanittta nigra*), black turnstone (*Arenaria melanocephala*), black-legged kittiwake (*Rissa tridactyla*), common loon (*Gavia immer*), dunlin (*Calidris alpina arcticola*), Hudsonian godwit (*Limosa haemastica*), long-tailed duck (*Clangula hyemalis*), pomarine jaeger (*Stercorarius pomarinus*), red phalarope (*Phalaropus fulicarius*), red-breasted merganser (*Mergus serrator*), red-necked phalarope (*Phalaropus lobatus*), red-throated loon (*Gavia stellata*), short-billed dowitcher (*Limnodromus griseus*), and white-winged scoter (*Melanitta fusca*). More information on these species is included in Appendix D.

The YK Delta is home to 50 percent of the world's black brant (*Branta bernicla*), a majority of the world's population of emperor geese (*Anser canagicus*), all of North America's nesting cackling geese (*Branta hutchinsii*), and a high density of nesting tundra swans (*Cygnus columbianus*). Additionally, scaup (*Aythya marila*), common eider (*Somateria mollissima*), spectacled eider (*Somateria fischeri*), northern pintail (*Anas acuta*), green-winged teal (*Anas carolinensis*), and northern shoveler (*Spatula clypeata*) can be found within the YK Delta. Hundreds of thousands of shorebirds use the area during both spring and fall migration (Reid and Fehringer 2017).

3.5.6 Invasive Species

Per EO 13112, invasive species are defined as alien species whose introduction causes or is likely to cause economic or environmental harm or harm to human health. By law, federal agencies are required to prevent the introduction of invasive species; provide for their control; and minimize the economic, ecological, and human health impacts attributed to them.

According to the 2016 Alaska Exotic Plants Information Clearinghouse, six occurrences of non-native invasive terrestrial plant have been documented near the Proposed Action area, all of which occurred around Bethel (BLM 2020).

3.5.7 Fisheries and Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) defines EFH as "waters and substate necessary to fish for spawning, breeding, feeding, or growth to maturity." A provision of the Magnuson-Stevens Act requires that Fisheries Management Councils identify and protect EFH for fish species managed by a federal Fishery Management Plan (FMP; USC 1853(a)(7)). In accordance with the requirements of the Magnuson-Stevens Act, an EFH assessment was prepared for the Proposed Action to describe how its components may affect designated EFH and/or managed fish species (Appendix F). The EFH Assessment identifies species and life stages for which EFH is designated, presents an analysis of potential impacts on EFH and managed fish species, and identifies proposed measures to minimize potential effects.

The North Pacific Fishery Management Council (NPFMC) identifies the estuarine and marine waters of the Eastern Bering Sea as EFH for mature adult Chinook, chum (*Oncorhynchus keta*), coho (*O. kisutch*), sockeye (*O. nerka*), and pink (*O. gorbuscha*) salmon (NPFMC 2021a). These waters are also designed as EFH for chum, coho, pink, and sockeye salmon during their marine juvenile lifestage as well as for Chinook, chum, and sockeye salmon during their immature adult lifestage (NOAA 2023a).

The Proposed Action area also intersects EFH designated for several species (and lifestages) of groundfish and crab, in addition to Pacific salmon. Table 3-5 identifies FMP-managed groundfish with marine EFH designations within 1 mi of the Proposed Action (NOAA 2023a).

Freshwater streams, lakes, ponds, wetlands, and other waterbodies that support Pacific salmon, as identified by the Alaska Department of Fish and Game (ADF&G) Anadromous Waters Catalog, are also designated as EFH.

Table 3-5. Groundfish and Crab EFH Designations within 1 mi of the Proposed Action

Common Name	Latin Name	EFH Designation Timing and Lifestage
Alaska plaice	*Pleuronectes quadrituberculatus*	Spring: Adult Summer: Adult, Egg, Larvae
Alaska skate	*Bathyraja parmifera*	Summer: Juvenile
Aleutian skate	*Bathyraja aleutica*	Spring: Adult
Arrowtooth flounder	*Atheresthes stomas*	Summer: Adult, Juvenile
Flathead sole	*Hippoglossoides elassodon*	Summer: Adult, Juvenile, Egg
Great sculpin	*Myoxocephalus polyacanthocephalus*	Spring: Adult Summer: Juvenile
Kamchatka flounder	*Atheresthes evermanni*	Summer: Juvenile
Northern rock sole	*Lepidopsetta polyxystra*	Spring: Adult Summer: Adult, Juvenile, Larvae
Octopus[a]	*Enteroctopus dolfeini*	Spring: Adult
Pacific cod	*Gadus macrocephalus*	Spring: Adult Summer: Adult, Juvenile
Red king crab	*Paralithodes camtschaticus*	Spring and Summer: Adult
Rex sole	*Glyptocephalus zachirus*	Summer: Egg
Rougheye rockfish	*Sebastes aleutianus*	Spring, Fall, and Winter: Adult
Sablefish	*Anoplopoma fimbria*	Summer: Juvenile
Snow crab	*Chionoecetes opilio*	Summer: Adult
Southern rock sole	*Lepidopsetta billineta*	Spring, Summer, and Fall: Adult Summer: Adult, Juvenile, Larvae
Tanner crab	*Chionoecetes bairdi*	Summer: Adult
Walleye pollock	*Theragra chalcogrammus*	Spring: Adult Summer: Adult, Juvenile, Larvae, Egg
Yellow Irish lord	*Hemilepidotus jordani*	Summer: Juvenile
Yellowfin sole	*Limanda aspera*	Spring: Adult Summer: Adult, Juvenile, Larvae, Egg

Sources: NOAA 2023a; NPFMC 2020, 2021b
[a] At least eight species of octopus occur within Alaska, with the giant octopus listed in this table.

Per the Anadromous Fish Act (Alaska Statute 16.05.841–901), ADF&G is responsible for protecting freshwater anadromous fish habitat and providing free passage for all fish in fresh waterbodies. This includes notifying and receiving permit approval from ADF&G prior to altering or affecting the natural flow or bed of a specified anadromous waterbody. These specific waterbodies are listed within the *Catalog of Waters Important for the Spawning Rearing or migration of Anadromous Fishes* (Geifer and Graziano 2023). This document is maintained annually and acts as the legal record of known anadromous fish streams in the state. To fulfil these requirements, a Fish Habitat Permit application was prepared for the Proposed Action and describes activities that intersect anadromous waterbodies (Appendix F).

Two state fishery management areas overlap the Proposed Action area: the Kuskokwim Management Area (KMA) and the Bristol Bay Management Area (BBMA) (Smith and Gray 2022; Tiernan et al. 2022). Within these management areas are sport, commercial, subsistence, and personal use fisheries. Additionally, federally managed fisheries within the Proposed Action area provide subsistence and commercial opportunities.

Surveys between 2010 and 2014 within the KMA indicated that salmon contributed 40 percent of the total subsistence resource harvest within Kuskokwim River communities (Smith and Gray 2022). The BBMA supports the largest wild sockeye salmon fishery in the world, providing approximately 46 percent of the average global abundance of wild sockeye salmon (USEPA 2022). Harvest diversity includes sockeye, Chinook, chum, pink, and coho salmon. Sockeye salmon are the most harvested salmon within the district and provide significant economic benefits to the region. Between 2018 and 2022, three of the largest sockeye salmon harvests ever recorded for the district occurred. Due to dwindling Chinook salmon returns for the district, ADF&G is recommending it be listed as a stock of concern within the Nushagak District (Tiernan et al. 2022).

Sockeye, Chinook, chum, pink, and coho salmon have been harvested within the KMA. In recent years, Chinook and chum salmon returns within the Kuskokwim River have been inconsistent. Chinook salmon runs in 2012, 2013, and 2014 were the lowest three on record. Escapement made a slight rebound reaching a nearly average run total in 2019, only to significantly decline again in 2020 and 2021. Chum salmon return numbers were below average in 2020, while 2021 was the lowest on record. Sockeye salmon abundance in 2021 was mixed throughout the Kuskokwim River drainage and ranged from average to below average (Smith and Gray 2022).

The BBMA includes a herring sac roe fishery (Tiernan et al. 2022). The Bering Sea Aleutian Islands Management Area (BSAIMA), a state managed area for shellfish, has several registration areas overlapping the Proposed Action area that target tanner (*Chionoecetes bairdi*), snow (*C. opilio*), Dungeness (*Metacarcinus magister*), and king (Lithodidae) crab as well as scallops (Pectinidae) (Nichols and Shaishnikoff 2022). Federal subsistence and commercial fisheries also occur off the western coast of Alaska, along the Proposed Action area. These fisheries occur within the federally managed BSAIMA, which are both commercial and subsistence groundfish fisheries. These fisheries have 19 different target species, with walleye pollock (*Gadus chalcogrammus*) being the most popular among them.

3.5.8 Vegetation and Habitat

Vegetation communities within the Proposed Action area are generally described as low shrub communities. Dominant tall and low shrub cover types within the Kuskokwim Delta include willows (*Salix* spp.) and alders (*Alnus* spp.), while bog myrtle (*Myrica gale*) is subdominant. Common dwarf shrub within the area includes dwarf birch and ericaceous shrubs such as species of Labrador tea (*Ledum* spp.)*,* berries (*Vaccinium* spp.)*, and* crowberries (*Empetrum* spp.). Common herbaceous species include sedges (*Eriophorum* spp.*, Carex aquatilis*)*,* reed grass (*Calamagrostis* spp.)*,* cloudberries (*Rubus chamaemorus*)*, and* Arctic butterbur/sweet coltsfoot (*Petasites frigidus*) (Reid and Fehringer 2017). Only one Bureau of Land Management (BLM)-Alaska Sensitive plant species, Pacific buttercup (*Ranunculus pacificus*), is known to occur near the Proposed Action route (BLM 2020). Additional information regarding vegetation communities within the Proposed Action area can be found in Section 3.4.4.

3.6 Historic and Cultural Resources

Provisions under Section 106 of the National Historic Preservation Act require federal agencies to consider the potential effects of federal undertakings on historic properties (i.e., cultural resources eligible for or listed in the National Register of Historic Places), and to consult with the State Historic Preservation Office (SHPO), appropriate Tribal entities, and other stakeholders. Additionally, as outlined under the Archaeological Resources Protection Act, archaeological site information is confidential, and disclosure of such information is exempt from requests under federal and state freedom of information laws. Historical and cultural resources discussed below are found within a 2-mi corridor (1-mi on each side) along the Proposed Action FOC route. A 2-mi corridor was used to capture sufficient data on previously recorded historic and cultural resources to provide context for the types and frequency of resources that might be encountered during the field survey of the area of potential effects (APE) for cultural resources. The terrestrial APE consists of a 60-ft-wide corridor centered on the Proposed Action FOC route.

3.6.1 Paleontological Resources

Paleontological resources, or fossils, are the preserved remains of prehistoric life, excluding humans and archaeological resources. Fossils are commonly understood to encompass remains at least 10,000 years old and may include petrified or mineralized remains, traces, or imprints of prehistoric organisms. Paleontological resources on federally owned or managed lands are protected under the Antiquities Act of 1906 (Public Law 59-209), which prohibits disturbance of “historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest” without a federal permit. The Paleontological Resources Protection Act of 2009 (Public Law 111-011, Title VI, Subtitle D) provides for the management of fossils on certain federal lands and establishes policies for collection and scientific study. On state-owned or -managed lands, the Alaska Historic Preservation Act protects all historic, prehistoric, and archaeological resources, which include "deposits, structures, ruins, sites, buildings, graves, artifacts, fossils, or other objects of antiquity" (Alaska Statute 41.35.010, 41.35.230).

The Alaska Heritage Resources Survey (AHRS) database (OHA 2023) and the Alaska Paleontological Database (2009) do not indicate any paleontological resources or localities within 1 mi of the Proposed Action area.

3.6.2 Archaeological Resources

The AHRS database is maintained by the Alaska Office of History and Archaeology (OHA 2023) and represents a current inventory of reported cultural resources throughout the State of Alaska, including archaeological sites, historical buildings, graves, and historic or archaeological districts. The completeness and accuracy of AHRS data depends largely on the degree of prior survey coverage as well as the original methods of identification.

AHRS site data, including descriptions and locational information, originate from varied sources that often differ in terms of accuracy or reliability. Not all sites have been field verified, and locations may instead be approximated from historical maps or accounts. In cases where a site’s existence has been confirmed through formal cultural resource investigations, locational precision may further depend on the surveying instruments used to record the site. Alternatively, field investigations may not fully delineate site boundaries; many AHRS sites are represented by point features rather than polygons and, therefore, do not illustrate the complete extent of each site. These issues are important considerations when interpreting AHRS spatial data.

Review of the AHRS database in August 2023 indicated that 102 previously recorded AHRS sites are within 1 mi of the Proposed Action area (OHA 2023). Thirteen of these sites are within the APE, of which five are archaeological. Archaeological sites reported within the 1-mi buffer and APE include prehistoric house pits and other surface depression features, former village sites, fish camps, and cemeteries or gravesites. Descriptions of individual sites are provided in Appendix G.

In addition to the AHRS database, other sources of cultural resources data include the Alaska Department of Natural Resources Revised Statute (RS) 2477 Trail database (ADNR 2017), the Wrecks and Obstructions database managed by NOAA's Office of Coast Survey (2022); and shipwreck data from the Bureau of Ocean Energy Management (BOEM; BOEM 2011). A search of these databases identified seven RS 2477 trails and one wreck or obstruction within 1 mi of the Proposed Action (ADNR 2017; Office of Coast Survey 2022). BOEM data do not typically provide precise locational coordinates for each wreck but indicate more than four dozen ships lost within Bristol Bay or Kuskokwim Bay and the general Proposed Action vicinity since the late nineteenth century (BOEM 2011). These resources are discussed further in Appendix G.

In June 2023, an archaeological field survey was conducted within portions of the terrestrial APE to identify potential historic properties that could be affected by the Proposed Action. The survey concentrated on the approximately 80 mi of FOC that would be installed via surface-lay, rock saw trench, and standard trench (associated with the landfall, overland, and community shores components), and excluded the 70 miles of FOC that would be attached to existing aerial infrastructure (FTTP component), as that installation method has no anticipated potential to impact cultural resources, known or unknown. Ten of the 13 previously recorded AHRS sites are located along FTTP segments and were not revisited during the survey. These sites were not revisited because FTTP segments would be installed either aerially on existing utility poles or in existing utility trenches, and would not affect cultural resources. Of the remaining three previously recorded AHRS sites located along landfall, overland, and community shore route segments, one was revisited and updated (BTH-0007) and two were determined to be misplotted and not actually within the APE (DIL-00182 and DIL-00225). For another site (DIL-00054), archival research suggests it would have intersected the APE, but is no longer extant. Lastly, one new site consisting of four shipwrecked boats (AHRS site number pending) was identified in Dillingham during the survey.

The FOC route in the BTH-00007 vicinity was initially planned to be trenched, but has since been changed to aerial installation on existing poles. BTH-00007 would therefore not be affected by the Proposed Action. Likewise, the Dillingham boats site, while intersecting the edge of the APE, is not directly aligned with the FOC route and would be avoided by Proposed Action construction.

In October 2023, archaeologists reviewed sub-bottom profile and side scan sonar data to identify submerged cultural resources within the marine APE (600-ft-wide corridor centered on the Proposed Action FOC marine route) that could be affected by the Proposed Action. Preliminary results of the marine archaeological assessment show no submerged cultural resources within the marine APE.

3.6.3 Architectural Resources

Review of the AHRS database in August 2023 identified approximately 60 architectural resources within 1 mi of the Proposed Action area. Of the 13 cultural resources within 30 ft of the Proposed Action alignment, 8 are architectural. These architectural resources include historical homes, churches, a hospital, an airfield and aviation district, military structures, a historic-age road, and other buildings or structures. Descriptions of individual sites are provided in Appendix G. During the terrestrial archaeological survey, none of the eight previously recorded architectural resources were revisited (all are located along FTTP segments with no anticipated potential to be impacted), and no new architectural resources were identified.

In sum, no historic properties were identified within the APE. Any unevaluated resources (e.g., the Dillingham boats site) intersecting the APE would be avoided by Proposed Action construction and would not be affected.

3.6.4 Native American Traditional, Cultural, or Religious Resources

The Proposed Action is located within the Indigenous lands of the Yup'ik, a vast area covering portions of western and southwestern Alaska. At its eastern extent, this territory encompasses much of the area surrounding Iliamna Lake (*Nanvarpak*) and the northern Alaska Peninsula, continuing westward to the northern side of Bristol Bay (*Iilgayaq).* Yup'ik lands additionally extend hundreds of miles inland and include the drainages of the Nushagak (*Iilgayaq)*, Kuskokwim (*Kusquqvak*), Yukon (*Kuigpak*), Kvichak (*Kuicaak*), and Naknek (*Nakniq*) Rivers. To the north, Yup'ik territory continues to the shores of Norton Sound. Yup'ik encompasses numerous dialects, Tribes, and communities (Jacobson 2012). The Proposed Action falls primarily within the historical territory of three Yup'ik subgroups: the *Aglegmiut* or *Aglurmiut* of Nushagak Bay; the villages of *Canineq* within the Lower Kuskokwim River coastal region; and the *Akulmiut* of the tundra areas between the Kuskokwim and Yukon Rivers (Andrews 1989; CECI 2023; Pratt 2013).

Data regarding sites of traditional, cultural, or religious importance were obtained primarily from the *Yup'ik Atlas* (CECI 2023); supplementary data sources include Yup'ik dictionaries (Jacobson 2012), subsistence reports (Andrews 1989), USGS place names (Orth 1967), and community profiles from the Alaska Division of Community and Regional Affairs (2022). Review of the *Yup'ik Atlas* (CECI 2023) and other sources indicated at least 35 documented placenames are within 1 mi of the Proposed Action area. These placenames include former and present village locations, fish camps and subsistence areas, geographic toponyms, and gravesites. Additional descriptions of these placenames are provided in Addendum 1 to Appendix G.

On May 18, 2023, Section 106 consultation initiation letters were sent to SHPO and 34 potentially interested consulting parties/entities. During follow-up calls and emails, many parties confirmed that they received the Section 106 initiation letter. As of October 31, 2023, two parties—Calista Corporation and City of Dillingham—responded with a request to consult on the Proposed Action. On October 20, 2023, NTIA sent letters with a notification of a finding of no historic properties affected and the terrestrial cultural resources survey report to SHPO and these two parties. Table 3-6 provides a summary of the outreach effort by grouping the parties into four categories based on correspondence status.

Table 3-6. Summary of Consulting Party Outreach Efforts

Group #	# of Parties	Group Name	Description
A	2	Request to Consult: • Calista Corporation • City of Dillingham	These parties have either requested a formal meeting or to review the survey report.
B	15	Confirmed Receipt: • Association of Village Council Presidents • Atmautluak, Limited • Bethel Native Corporation • Bristol Bay Native Association • Bristol Bay Native Corporation • Choggiung, Limited • Iqfijouaq Company, Incorporated • Kasigluk Traditional Elders Council • City of Eek • City of Napaskiak • City of Nunapitchuk • Curyung Tribal Council • Napaskiak, Incorporated • Qanirtuuq, Incorporated • Tuntutuliak Land, Limited/Qinarmiut Corporation	These parties have acknowledged receipt of the letter. Six of these parties either stated they have no concerns, or are excited about the Proposed Action.
C	14	Receipt not confirmed: • City of Bethel • City of Platinum • City of Quinhagak • Kasigluk, Incorporated • Native Village of Eek • Native Village of Kwinhagak • Native Village of Napaskiak • Native Village of Nunapitchuk • Native Village of Tuntutuliak • Nunapitchuk, Limited • Orutsararmiut Traditional Native Council • Oscarville Traditional Village • Platinum Traditional Village • Village of Atmautluak	In all but one case, the organization reached via phone asked for the initiation letter to be resent or stated that someone would call back. In the one remaining case, a follow-up call was made but the number was out of service.
D	3	Receipt not confirmed, but party is aware of Proposed Action via Right-of-Entry request: • Alaska Moravian Church • Arviq, Incorporated • Oscarville Native Corporation	Follow-up calls were made but unsuccessful; however, these parties are aware of the Proposed Action with the Right-of-Entry request for fieldwork.

3.7 Aesthetic and Visual Resources

Aesthetics consist of the perception of beauty by one or a combination of the senses of sight, hearing, touch, and smell. Aesthetics and visual resources apply to the quality of life enjoyed by the local communities.

According to the BLM's (2023) visual resource inventory, which evaluates lands regarding their scenic quality, defined as the visual appeal of a particular tract of land, the Proposed Action area is rated as Class B (moderate scenic value). Visual sensitivity is defined as a measure of public concern for scenic quality. The visual sensitivity level rating is primarily high, with some areas rated as moderate. Visual distance zones are assigned based on the distance of lands from places people are known to be present on a regular basis. The visual distance zone for the Proposed Action area is primarily rated as seldom seen (BLM 2018).

3.8 Land Use

3.8.1 County and Municipal Ordinances and Zoning

The City of Bethel has adopted the following land use districts: preservation, public lands and institutional, open space, residential neighborhood commercial, downtown commercial, general use, and industrial district. Each district regulates permitted principal uses and structures; conditional uses; and lot size, setback, and height requirements. None of these districts mention FOC or associated structures within their permitted and principal uses and structures except for the downtown commercial use district, which lists "utility facilities."

Utility facilities are allowed as permitted and principal uses in the public lands and institutions, downtown commercial, and general use districts. Utility facilities that serve lots outside the district are allowed as a conditional use in the residential neighborhood commercial. Additionally, the industrial district allows "other industrial uses of a character similar to those uses listed in this section," which is believed to include utility facilities.

The City of Dillingham's zoning regulations also do not mention FOC installation. The remaining communities included in the Proposed Action do not have published zoning regulations.

3.8.2 Existing Land Use with the Proposed Action Area and Surrounding Areas

The Proposed Action area bisects large areas of relatively undisturbed ecosystems that support a diverse array of species. The Kuskokwim River system and surrounding landscape provide important fisheries, waterfowl habitat, and plant communities that provide major sources of subsistence resources for local communities. Additionally, the river provides a major transportation route for the region as ground transportation within the area is difficult (Beck et al. 2019).

The Proposed Action is located on non-federal land and includes private property, municipal property, municipal government, Tribal government, village corporations, regional corporations, and regional non-profits.

As stated in Section 3.3, no farmlands of prime, unique, or statewide importance are designated within the Proposed Action area (NRCS 2023a). Additionally, soils of local importance are also not present within the Proposed Action area (NRCS 2023b).

3.8.3 County and Local Comprehensive Plans

Dillingham, Bethel, Quinhagak, and Eek have comprehensive plans that outline community issues, goals, and growth. The *Bethel Comprehensive Plan 2035* (Agnew Beck Consulting 2011) vision statement notes,

> We value Bethel as a place where people care about each other, the natural environment, and living close to the land. We envision a future in which the quality of our natural environment is protected for subsistence and recreation,

> and the land managed for the sustained prosperity of Bethel's people. We are rich in many ways today, but need to strive for a better community for ourselves and our children. We will work to develop a healthy, more diverse economy, capitalizing on Bethel's current role as a regional hub for transportation, healthcare, education, government services and trade, but also building a stronger base of enduring, locally based economic activities. We will invest in more stable and affordable energy supplies, and strive to guide development to reduce energy and infrastructure costs.

The *Bethel Comprehensive Plan 2035* (Agnew Beck Consulting 2011) lists the following actions as land use goals:

- Identify and map critical anticipated community needs
- Work with existing landowners in priority growth areas to reach agreements that would allow needed growth to occur (e.g., purchase land, land trade, secure easements); priority varies with use; a new or alternative treatment option for the sewer lagoon is currently of highest priority
- Develop a city-wide, Geographic Information System land records system; update as lands are subdivided or developed, and make data available for the use by City of Bethel staff and the general public

Land use within Bethel is shaped by the western Alaska landscape and land availability. Few areas exist where soils make building feasible. Additionally, given Bethel is surrounded by the Yukon Delta National Wildlife Refuge and Native allotments, much of the surrounding landscapes either cannot be developed or have development restrictions. Much of the lands surrounding Bethel are undeveloped public property, which support subsistence activities (Agnew Beck Consulting 2011).

The *Quinhagak Community Development Plan* (DCCED 2010) notes improving internet connectivity within the community and providing public access to internet as an outstanding issue. Additionally, the plan lists the following challenges concerning land use:

- Allotments need to be surveyed.
- The old dumpsite land use needs to be determined for after it is covered.
- 14(C)3 Municipal Lands need to be resolved.
- All lots within the Quinhagak vicinity need to be identified for almost immediate construction.
- City, Qanirtuuq, Native allotments, and Native Village of Kwinhagak lands need to be identified.

Among the goals listed in the *Eek Community Comprehensive Plan* (DCCED 2004) is supporting the expansion of public utilities to provide essential services for future economic and population growth, with new facilities designed and located within environmentally compatible settings. Another goal encourages the development of a public school system through new construction and modernization of facilities, allowing the Board of Education to provide a high-quality public education system. Additionally, it lists the following objectives concerning land use:

- Preserve and enhance the quality of life in residential communities and protect them from encroachment
- Provide a balanced distribution of regional and community commercial as well as mixed-use office centers
- Coordinate land zoning for commercial and mixed-use office usage with residential and business growth patterns and trends
- Encourage appropriate office development
- Achieve industrial growth, where appropriate, that provides quality employment opportunities, makes effective use of Eek's resources and infrastructure, and protects natural resources
- Balance development of the Native Village of Eek to provide a less-dense, country-like environment with a mix of land uses that include parks; open space and recreation; business and commercial; and affordable, moderate- and higher-value homes for its residents
- As a part of the Native Village of Eek management, have an integrated and ongoing strategic comprehensive planning and development process that assesses its residents' desires and proposed development impacts, and assists in achieving Eek's orderly development and growth

While Dillingham would not be serviced by the Proposed Action, its comprehensive plan places an emphasis on upgrading internet infrastructure and access for community members, and specifically notes a desire to improve and expand access to internet for all private and commercial users, and use internet as an economic development tool (Agnew Beck Consulting 2010).

The remaining communities to be serviced by the Proposed Action do not have published comprehensive plans.

3.9 Infrastructure

3.9.1 Transportation

None of the communities serviced by the Proposed Action are accessible to the rest of the state by road. The existing road network is generally limited to intra-community travel, with water and air serving as the primary modes of inter-community transportation.

Marine waters within the Proposed Action area experience varying levels of marine-based vessel traffic. Marine vessels are typically associated with freight, fishing, transportation, and fuel delivery (USACE 2008). In particular, Nushagak Bay experiences very high vessel traffic from spring through fall during the commercial salmon fishing season. Due to a lack of interconnecting roads, the region's local communities rely on barges for local commerce and shipment of items not feasible to transport by air (USACE 2009).

During summer months, when the rivers are navigable, shallow-draft barges and landing craft are used to deliver cargo to villages within the YK Delta. Small populations and shallow waters make it difficult for large amounts of cargo to be transported at once. Goods are typically delivered to a central city or village (Bethel), then distributed to smaller, outlying communities. Marine infrastructure along the river systems is basic; in many locations, barges and landing craft pull directly onto the shore for offloading (Northern Economics 2011). The Port of Bethel handles an average of 9,000 tons of cargo annually. The port is owned and operated by the City of Bethel. Barges as large as 400 ft long can be accommodated on the primary dock face. The petroleum facility can berth a 380-ft barge, and it handles the bulk fuel throughout the region. The Kuskokwim area commercial salmon industry also relies on the port for most of its infrastructure and processing requirement (DOT&PF 2018).

Each community within the Proposed Action area, except Oscarville, has an Alaska Department of Transportation and Public Facilities or other government-controlled public airport, as well as numerous additional Federal Aviation Administration-registered public and private runways (DOT&PF 2022). Oscarville relies on the Napaskiak airport for passenger, mail, and cargo air services.

Additionally, much of the YK Delta has rivers, lakes, and other waterways that can be used by float planes. Bethel, Dillingham, and Napaskiak have registered seaplane landing areas (FAA 2023).

The Alaska Marine Highway System does not serve the communities within or near the Proposed Action area.

3.9.2 Public Services/Utilities

Bethel, Oscarville, Eek, Quinhagak, Nunapitchuk, and Kasigluk get their electricity through the Alaska Village Electric Cooperative. Electricity in Dillingham is provided by Nushagak Electric and Telephone Cooperative. The remaining communities generate their own electricity using diesel generators, wind turbines, and other methods. The communities have a mix of piped and haul, water and wastewater systems. According to the ADEC Solid Waste Sites map, each community included in the Proposed Action area has an active landfill to dispose solid waste (ADEC 2023c).

Telephone and internet service is offered by several providers, including GCI. According to the ACCESS BROADBAND Dashboard, 74.4 percent of households in the Dillingham Census Area and 74.8 percent in the Bethel Census Area have a broadband subscription. However, none of the population in both areas has access to broadband services of at least 25/3 megabits per second (NTIA 2023).

3.10 Socioeconomic Resources and Environmental Justice

EO 12898 requires the consideration of environmental justice issues, regarding minority and low-income populations, during an agency’s environmental review process. Environmental justice is the fair treatment and meaningful involvement of all people of all races, color, origin, or income with respect to development, implementation, and enforcement of environmental laws.

EO 14096 requires additional analysis of environmental justice issues and expands the definition of indicators to include Tribal affiliation and disability. The focus of the order is that of a unified approach by agencies. Guidance on implementing this order has not yet been issued.

These EOs are intended to prevent disproportionate and adverse effects to low-income communities and minority communities. As detailed below, environmental justice populations are present within the communities.

Socioeconomic resources affected by the Proposed Action are primarily within the Bethel Census Area. The Bethel Census area includes all communities, approximately one-third of all communities within the Bethel Census Area, that would be serviced by the Proposed Action. The Dillingham Census Area includes Dillingham, the starting location for the Proposed Action FOC route. Table 3-7 summarizes selected socioeconomic indicators for the communities to be affected by the Proposed Action.

Table 3-7. Selected Socioeconomic Indictors, 2021

Community	Population	Number of Households	Low Income (%)	Per Capita Income	% American Indian or Alaska Native	Unempl-oyment Rate (%)	Limited English Speaking Households (%)	Under Age 5 (%)	Over Age 64 (%)
Platinum	69	26	73	$11,034	95	34	4	11	9
Quinhagak	978	176	73	$11,034	95	34	4	11	9
Tuntutuliak	526	102	69	$15,630	98	21	4	11	8
Eek	509	103	73	$11,034	95	34	4	11	9
Napaskiak	642	123	73	$11,034	95	34	4	11	9
Bethel	6,273	1,957	24	$34,322	62	9	2	6	6
Oscarville	88	27	73	11,034	95	34	4	11	9
Atmautluak	384	58	83	$9,462	97	31	3	12	8
Nunapitchuk	590	99	83	$9,462		31	3	12	8
Kasigluk	619	90	83	$9,462	97	31	3	12	8
Dillingham	2,113	689	25	$36,890	57	8	0	9	9

Source: USEPA 2023c

3.10.1 Population Characteristics

According to EJScreen (USEPA 2023c), the Bethel Census Area population was 18,514. Bethel is the largest community within the region, with a population of 6,273. The Dillingham Census Area includes 4,899 residents across the Proposed Action area communities, the largest of which is Dillingham, with a population of 2,113 residents. Population sizes for the remaining communities are shown in Table 3-7.

3.10.2 Demographics

Approximately 85 percent of the YK Delta population are American Indian and Alaska Native alone. According to the U.S. Census Bureau, in 2022, the Bethel Census Area is reported to be approximately 85 percent American Indian and Alaska Native, while the Dillingham Census Area was approximately 73 percent. Except for Bethel and Dillingham, the other Proposed Action area communities had a higher percentage of American Indian and Alaska Native residents. Residents 18 years and younger comprise a significant portion of the population in both the Bethel and Dillingham Census Areas (35.1 percent and 31.1 percent, respectively). Residents aged 5 and under comprise 10.4 percent and 8.7 percent in the Bethel and Dillingham Census Areas, respectively. This is similar to all communities within the area. Those above age 65 comprise 8.7 percent and 12.1 percent, respectively, of the population in the

Bethel and Dillingham Census Areas (U.S. Census Bureau 2023a, 2023b).This is similar to all communities within the Proposed Action area, except Bethel, which has approximately 6 percent of the population in this age range.

3.10.3 Housing

According to the U.S. Census Bureau, in 2022, 6,018 houses were within the Bethel Census Area, with 57.3 percent of them being owner occupied. The median value of the owner-occupied homes is reported to be $102,300, and the median gross rent was $1,402 (U.S. Census Bureau 2023a). Within the Dillingham Census area, 63.7 percent of the 2,402 housing units were owner occupied. The median value of these homes was $155,900, and the median gross rent was $1,049 (U.S. Census Bureau 2023b).

3.10.4 Employment

According to EJScreen (USEPA 2023c), unemployment within the Bethel Census Area is 18 percent and within the Dillingham Census Area is 13 percent. Except for Bethel and Dillingham, the communities within the Proposed Action area have unemployment rates that exceed 20 percent.

Aside from Bethel and Dillingham, the economies of the remaining communities are based on subsistence. The principal industry is local government jobs. However, other employment opportunities exist such as retail.

A majority of Bethel's economy originates from regional services such as government administration, transportation, freight, and social services. One of the few non-government sources of revenue for the region is commercial fisheries. The Coastal Villages Region Fund is a non-profit group that allocates revenue from fishing rights from the federal government to create jobs, build infrastructure, and fund education (Agnew Beck Consulting 2011).

Bristol Bay's economy is predominately seasonal employment and composed of local salmon fishery harvesting and processing. Bristol Bay has the largest wild sockeye salmon run in the world, supporting approximately 46 percent of the global supply of wild sockeye (USEPA 2022). In addition to fisheries, tourism plays a part in the local economy as Dillingham provides an entry point into Togiak National Wildlife Refuge and Wood-Tikchik State Park. Table 3-8 provides a summary of regional economic expenditures based on salmon ecosystem services, expressed in 2009 dollars. In total, the commercial, recreational, and subsistence fisheries provided employment for more than 14,000 full- and part-time workers (USEPA 2014).

Table 3-8. Summary of Regional Economic Expenditures Based on Salmon Ecosystem Services

Economic Sector	Estimated Direct Expenditure (sales per year, in $ millions [2009 dollars])
Commercial Fisheries, Wholesale Value	300.2
Sport Fisheries	60.5
Sport Hunting	8.2
Wildlife Viewing/Tourism	104.4
Subsistence Harvest	6.3
Total	**479.6**

Source: USEPA 2014

Vessel traffic within the Proposed Action area is closely linked to commercial fisheries. The average number of salmon permit holders fishing in District 4 within the KMA since 1980 is 223. Participation has ranged between 67 and 408 during this time. In 2021, participation was the lowest on record, with 74 individual permit holders. The only season with lower participation was 2020 (Smith and Gray 2022). A significant decrease in participation has been mirrored across all KMA districts. Permit registration within the BBMA has been more consistent and significantly exceeds that within the KMA. Table 3-9 shows participation in the salmon fisheries for both management areas.

Table 3-9. Permits Fished by District and Gear Type within KMA and BBMA, 2001–2021

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2001	412	159	32	1,566	834
2002	318	114	30	1,183	680
2003	359	114	34	1,389	714
2004	390	116	29	1,426	797
2005	403	145	29	1,526	829
2006	373	132	24	1,567	844
2007	366	125	28	1,621	836
2008	374	146	25	1,636	850
2009	342	179	39	1,642	855
2010	433	241	48	1,731	861
2011	413	219	48	1,747	878
2012	379	179	58	1,740	883
2013	378	197	71	1,709	854
2014	358	194	61	1,751	881
2015	283	189	61	1,744	885
2016	—[b]	—[b]	—[b]	1,715	858
2017	—[b]	—[b]	—[b]	1,728	881
2018	—[b]	—[b]	—[b]	1,735	879
2019	—[b]	—[b]	—[b]	1,767	893
2020	—[b]	67	17	1,724	841
2021	—[b]	74	13	1,753	870
2001–2011 Average	**380**	**153**	**33**	**1,529**	**82**
2011–2021 Average	**140**	**90**	**28**	**1,736**	**90**
Average	**265**	**123**	**31**	**1,632**	**86**

Sources: Smith and Gray 2021; Tiernan et al. 2022
[a] Two drift permit holders may concurrently fish from the same vessel.
[b] Confidential due to three or fewer permits fished, processors, or buyers. Included as 0 in averages.

The recreational tourism economy provides significant benefits for residents of the Bristol Bay region. In addition to being a source of employment, it helps support an economy that provides essential goods to Bristol Bay residents. Recreational tourism is responsible for 15 percent of jobs within the region (USEPA 2014). In addition to tourism related to the local salmon ecosystem, access to the Nushagak and Kvichak River watersheds as well as the Togiak National Wildlife Refuge and Cape Newenham State Park via air, boat, snowmachine, and foot are largely regulated by the local tourism industry (USFWS 2009).

Tourism within the YK Delta is limited. This is partially due to high costs associated with transportation as well as limited accommodations, tourism-centric infrastructure, and inconsistent and unreported weather that can restrict air travel. Despite this, the region offers many forms of recreation and ecotourism, including access to the Yukon Delta National Wildlife Refuge, the largest wildlife refuge in the United States; fishing; and events such as the Kuskokwim 300 sled dog race (Agnew Beck Consulting 2011).

3.10.5 Income

According to the U.S. Census Bureau, the median household income in 2021 dollars for the Bethel Census area was $57,460, with the per capita income (2017–2021) being $22,295 (U.S. Census Bureau 2023a). Except for the City of Bethel, the per capita income in the other nine communities in the census area was lower. According to EJScreen (USEPA 2023c), 55 percent of population in the Bethel Census Area is considered low income. The other communities within the Proposed Action area have a much higher percentage of low-income residents. In the Dillingham Census Area, the median household income in 2021 dollars was $62,115, and the per capita income (2017–2021) was $27,890, with 21.8 percent of the population living in poverty (U.S. Census Bureau 2023b). According to EJScreen (USEPA 2023c), Dillingham is similar to the census area, with approximately 25 percent low-income residents and a per capita income of $36,890.

3.10.6 Schools

The Lower Kuskokwim School District services the majority of the Proposed Action area and maintains at least 1 public school in each of the 10 communities serviced by the Proposed Action (DEED 2023). Public schools in Dillingham are operated by the Dillingham City School District.

3.11 Human Health and Safety

3.11.1 Hazardous Sites

ADEC manages the Contaminated Sites Program, which is responsible for protecting human health and the environment by overseeing and conducting timely, science-based, and defensible characterization, cleanup, redevelopment, and management of contaminated sites in Alaska (ADEC 2023d). As part of the Contaminated Sites Program, ADEC tracks known contaminated sites. The contaminated sites database shows ten contaminated sites are within 1,500 ft of Phase 1 trenched components, and four contaminated sites are within 1,500 ft of Phase 2 trenched components (ADEC 2023e). The contaminated sites are within Dillingham, Napaskiak, Eek, Bethel, Tuntutuliak, and Nunapitchuk (Table 3-10). ADEC has been consulted regarding Proposed Action activities such as what to do if contaminated media are found during construction activities and appropriate reporting measures. Contaminated sites consultation with ADEC is ongoing.

Table 3-10. Active Contaminated Sites within 1,500 ft of the FOC Route

ADEC File #	Site Name	Approximate Distance from FOC Route (ft)	Description
2540.38.024	Kanakanak Radio Relay Station	70	The Kanakanak Radio Relay Station was demolished in 2017. A ground-penetrating radar survey indicated a potential for buried drums and debris in four locations on site. Additionally, it is suspected that a half-buried tank on site may have may have been compromised, resulting in soil contamination. In June 2019, samples taken from the site tested positive for DRO, benzo[a]anthracene, benzo[a]pyrene, naphthalene, and arsenic above cleanup levels (ADEC 2019a).
2540.38.005	IHS Kanakanak Hospital – Area 4 & Sitewide Record	275	The site contains fuel oil contamination from several large historical ASTs. Benzene, DRO, GRO, and RRO exceeding groundwater cleanup levels have been detected within adjacent monitoring wells. Limited PCE was encountered in an adjacent monitoring well. Soil borings yielded DRO contamination exceeding alternate cleanup levels (ADEC 2023f).
2540.38.005	IHS Kanakanak Hospital – Area 9	430	The site contains fuel oil contamination from several bulk fuel ASTs. PCE exceeding cleanup levels has been detected within the groundwater. Monitoring wells on site found benzene, GRO, DRO, and RRO exceeding groundwater cleanup levels. PCE exceeding the groundwater cleanup level was detected at one well (ADEC 2023g).
2540.38.001	FAA Dillingham Utility Building 300	445	The building on site contains two floor drains that discharge directly into the soil. The soil drains were decommissioned in 2011, but samples taken 1 ft below the bottom of each drain showed arsenic PAHs above ADEC cleanup levels (ADEC 2023h).
2540.38.005	IHS Kanakanak Hospital – Area 8	680	Petroleum-contaminated soil was encountered during the installation of a buried high-voltage electrical line and conduit on site. At the time, soil samples indicated DRO contamination at levels exceeding the alternative cleanup level. Additional boring samples occurred in June 2006. Most samples detected DRO above the DRO alternative cleanup level. One soil boring exceeded maximum allowable concentrations for direct contact (ADEC 2023i).
2540.38.005	IHS Kanakanak Hospital – Area 5	860	Area 5 is the discharge area for a foundation footer drain that was installed during hospital construction. The hospital was built at the site of a former vehicle maintenance garage and bulk fuel storage tank farm. During construction, free phase petroleum product in the drainage water was discovered. A small oil-water separator and retention pond were installed to treat the effluent from the footer drain. In 1989, flow from the drainpipe overwhelmed the oil water separator, and free product was discharged into the Nushagak River. Consequently, a containment pond was constructed, and a larger commercially constructed oil-water separator was installed. In 1991, gasoline was inadvertently dumped into the oil-water separator and potentially contaminated soil (ADEC 2023j).
2540.38.021	Residence – 5455 Kanakanak Road	1,010	In March 2008, 398 gallons of heating oil spilled on site. The contaminated soil was excavated to a depth of 15 ft bgs and stockpiled. The site was last sampled in 2014. The sample analysis detected DRO and GRO in the groundwater on site (ADEC 2021a).

ADEC File #	Site Name	Approximate Distance from FOC Route (ft)	Description
2433.38.004	Napaskiak Former BIA School Day Tanks	315	Prior to 1994, numerous historical petroleum spills and leaks from tanks and pipelines occurred on site. BIA historically buried 55-gallon drums at the site, which appear to contain holes and bungs removed prior to burial (ADEC 2017).
2407.26.016	DHSS Bethel Youth Facility UST #1	1,075	During closure of a diesel UST with a 2,000-gallon capacity in 2015, contamination was detected. Sampling identified DRO, GRO, benzene, ethylbenzene, toluene, and 2-methylnaphthalene above ADEC cleanup levels (ADEC 2022b).
2436.38.001	Nunapitchuk Federal Scout Readiness Center	670	A 1992 compliance inspection noted two fuel releases on site. The quantity and extent of fuel released is unknown. In January 1993, 200 to 300 gallons of heating oil was released from the piping of the 3,000-gallon AST on site. A recovery effort removed approximately 100 gallons of heating oil from the snow on site. In the winter of 1996–1997, a spill of 80 to 150 gallons of heating oil from the same AST took place. The location and extent of the release are unknown. In July 2015, a total of 23.92 tons of contaminated soil was removed from the site. Results for confirmation soil samples collected from the final limits of the excavations indicated that all soil with DRO, RRO, GRO, benzene, toluene, 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene concentrations greater than the ADEC-approved site-specific cleanup levels was removed. The site is currently in a groundwater and surface water long-term monitoring program (ADEC 2023k).
2452.38.002	Tuntutuliak Electric Plant	160	This site is located on the western side of the western-most generator at the Electric Plant site. An overfill of a 300-gallon AST occurred at this site in spring during the mid-1980s, and several thousand gallons of fuel were spilled. The ground was reportedly frozen at the time, and the village cleaned up the spill as much as possible. The AST at the site has no secondary containment. Soil staining was observed within the area underneath the tank. The nearest drinking water well is the Village Safe Water Plant (Washeteria) well, which is located approximately 30 ft west of this 300-gallon tank (ADEC 2020a).
2452.38.005	Tuntutuliak Washeteria	250	This is the location of the former tank farm that serviced the Washeteria. Two ASTs are located at this site. One horizontal 500-gallon capacity AST is located within a diked, lined tank farm and is on a wooden, elevated stand. A new horizontal 2,000-gallon capacity AST is located outside and adjacent to the tank farm, to the west. This tank rests on a metal stand. Soil staining was observed to the north and east of the 2,000-gallon AST, as well as on the northwestern side of the tank farm. Sheen on the surface water surrounding the area has been observed. The Washeteria drinking water well is located approximately 100 ft east. A soil sample taken near the 500-gallon AST had a DRO level of up to 2,600 milligrams per kilogram (ADEC 2020b).

ADEC File #	Site Name	Approximate Distance from FOC Route (ft)	Description
2452.38.006	Tuntutuliak Former BIA School Site	1,172	A 2008 site investigation identified lead paint and asbestos issues, PCBs at concentrations below cleanup levels beneath the building, and petroleum contamination at low levels in soil at the site. In 2019, four areas of concern were identified during a subsequent site investigation. The area east of the site's generator building has been affected by historical fuel releases. DRO levels at the site did not exceed cleanup levels. The site's used oil ash box area had staining in the subsurface soils, and arsenic and chromium concentrations in the soil exceeding migration to groundwater cleanup levels. Groundwater within the area is within 2 to 3 ft bgs. It was estimated the volume of stained soil above the groundwater is approximately 5 yd^3. The site's former day tank area has surface soil estimated at a volume of 40 yd^3 of DRO-contaminated soil, with concentrations greater than migration to groundwater cleanup levels. Soil samples were collected and did not exceed ADEC cleanup levels. All the groundwater and surface water samples met cleanup levels. Samples collected from the siding of the former school building and generator building contained asbestos, and the interior of the generator building was covered with lead-based paint. Demolition of the former BIA school is planned (FKA File No. 2452.57.001; ADEC 2019b).

Notes: AST = aboveground storage tank; bgs = below ground surface; BIA = Bureau of Indian Affairs; DHSS = Alaska Department of Health and Social Services; DRO = diesel range organics; GRO = gasoline range organics; IHS = Indian Health Services; PCB = polychlorinated biphenyls; PCE = perchloroethylene; RRO = residual range organics; UST = underground storage tank; yd^3 = cubic yard(s)

3.11.2 Public Health and Safety Facilities

The Yukon-Kuskokwim Health Corporation operates an outpatient facility out of Bethel, with the remaining Proposed Action communities being included in their sub-regional clinic service areas (YKHC 2023). The Yukon-Kuskokwim Health Corporation operates village clinics in nine communities within their service area, except Platinum. These clinics are staffed by Office Assistants and Community Health Aids (YKHC 2023). The Bristol Bay Area Health Corporation operates the Kanakanak Hospital in Dillingham.

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 Alaska State Troopers, volunteer fire departments, and other organizations.

3.11.3 Electromagnetic Fields and Radiation

Unicom operates limited cellular and microwave facilities within the Proposed Action area. Research into the potential human health effects with regard to electromagnetic radiation from cell towers and microwave towers is inconclusive (Zamian and Hardiman 2005).

4 Analysis of Environmental Impacts

This section describes the environmental consequences, beneficial or adverse, of the Proposed Action Alternative (see Section 2.1) and No Action Alternative (see Section 2.2) on resources described in Section 3. The categories of impacts have been defined as significant, less than significant with mitigation incorporated, less than significant, or no impact. NEPA) requires agencies to assess the potential direct and indirect impacts each alternative could have on the existing environment (as characterized in Section 3). Direct impacts are those impacts that are caused by the Proposed Action and occur at the same time and place, such as soil disturbance. Indirect impacts are those impacts related to the Proposed Action but that result from an intermediate step or process, such as changes in surface water quality because of soil erosion. For each resource, the potential impact is assessed in terms of context of the action and the intensity of the potential impact, per Council on Environmental Quality regulations (40 CFR 1508.27). Context refers to the timing, duration, and where the impact could potentially occur (i.e., local versus national, pristine versus disturbed, common versus protected species). In terms of duration of potential impact, context is described as short or long term. Intensity refers to the magnitude or severity of the effect as either beneficial or adverse. Section 4.13 summarizes avoidance and minimization measures incorporated as part of obtaining state and federal authorizations for the Proposed Action.

4.1 Noise

4.1.1 Proposed Action Alternative

4.1.1.1 TERRESTRIAL

The Proposed Action would not create nor cause adverse noise impacts during its use and operation. No perceptible changes would occur for any human or wildlife noise-sensitive receptors.

Temporary noise impacts would occur during the construction of the network from the use of mechanized construction equipment, including but not limited to trucks, back hoes, excavators, rock saws, chain trenchers, and other heavy equipment that generate 80 to 120 dB (Spencer 2023). No blasting, pile driving, or other percussive construction equipment usage is anticipated.

Construction activities within each community may take approximately 3 weeks. Noise impacts would be limited to the area immediately surrounding active construction. While daylight hours are long in northern communities during summer, activities would be restricted between 11 p.m. and 7 a.m. in all communities.

Upon completion of construction, noise levels would return to previous levels. Diesel-powered generators (approximately 70 to 85 dB) housed in CLS facilities would only operate during power outages (USEPA 1971b). These impacts would also be short term and localized.

The Proposed Action Alternative would not have a substantial or long-term impact on sensitive sound receptors. No significant terrestrial noise impacts are anticipated.

4.1.1.2 MARINE

The Proposed Action would not generate or propagate noise in the marine environment during its operations. No significant marine noise impacts are anticipated as a result of the Proposed Action.

Temporary noise impacts would occur during construction activities. Vessels used for construction would generate underwater noise from their main drive propellers and/or dynamic positioning thrusters to maintain position or move slowly during cable-laying or trenching operations. During these activities, non-impulse sounds are generated by the collapse of air bubbles (cavitation) created when propeller blades move rapidly through the water. Cable laying ships are expected to produce underwater noise at 120 dB re 1 μPa root mean square (Level B harassment for marine mammals) up to 1.1 mi away from the vessel, while the cable-laying tug and barge is anticipated to produce the same noise levels up to 1.7 mi. NMFS analyzed the effects of the Proposed Action on the acoustic environment and determined the Proposed Action may affect, but is not likely to adversely affect, marine mammals (Section 4.5.1.1). These impacts would be temporary and limited to the duration of vessel transit and cable lay associated with the Proposed Action. Vessel traffic is common throughout the Proposed Action area. Protocols for limiting noise disruption to sensitive marine mammal receptors are outlined in Section 4.5. Upon completion of construction, noise levels would return to previous levels.

4.1.2 No Action Alternative

Under the No Action Alternative, no additional noise generating activities nor additional impacts on noise-sensitive receptors would occur.

4.2 Air Quality

4.2.1 Proposed Action Alternative

The Proposed Action would have minimal impact on air quality. Emissions from the exhaust of diesel-powered generators used at CLS facilities would only be used during power outages, and would be temporary and local in nature. Incremental emissions from the power generators would be considered negligible.

Temporary impacts on air quality would occur during construction activities. Exhaust emissions from heavy machinery and vehicles used during construction for both the aerial and underground portions of the Proposed Action would typically include particulates, hydrocarbons, sulfur oxides, NO_x, and CO. Reductions in air quality resulting from these impacts, however, would be minor, relatively localized, and temporary in nature.

The use of construction vehicles and equipment over unpaved surfaces may generate fugitive dust. Additionally, excavation and earth-moving activities can cause re-entrainment of dust particulates and possibly other pollutants into the atmosphere during underground installation. However, these effects would be temporary and primarily local in nature.

The installation and construction of the Proposed Action would not affect existing GHG levels; minor increases in overall air pollutants may occur temporarily during construction due to the use and movement of equipment as well as from the activities of construction personnel.

Carbon dioxide emissions resulting from construction vehicles would be a fraction of the total emissions generated by vehicular traffic already present within the existing communities and roadways where the Proposed Action would occur.

Less than significant air quality impacts are anticipated.

4.2.2 No Action Alternative

The No Action Alternative would not require construction and would not affect air quality above existing conditions.

4.3 Geology and Soils

4.3.1 Proposed Action Alternative

Impacts from the Proposed Action may include localized soil compaction as well as alteration in surface water drainage and infiltration from the transiting of construction equipment and the infilling of trenches and excavations. Surface impacts may destabilize soils and make them more susceptible to erosion. Terrestrial trenching would be conducted using a rock saw, chain trencher, or excavator. All trenching would be limited to areas above permafrost to minimize erosion impacts. Mitigation measures for stabilizing soils, backfilling disturbed areas, and limiting heavy equipment would reduce the potential for erosion. All temporarily disturbed areas would be returned to pre-construction contours. A Construction General Permit (CGP) and SWPPP would be needed from ADEC for construction; it would include best management practices for preventing and controlling erosion and stormwater.

Surface lay of cable on top of soils would have negligible effects on soils. Permanent impacts would be limited to the areas where BMH, CV, and CLS facilities are located. These impacts would be localized and minor in nature.

Overhead components of the Proposed Action would use existing structures. Any impacts resulting from installation of overhead components would be temporary, limited to during construction.

Impacts of the Proposed Action on marine sediments from PLGR, surface lay, cable plow, and jet trench are discussed in Section 4.4.1.2.

The Proposed Action would have a less than significant impact on geology and soils.

4.3.2 No Action Alternative

The No Action Alternative would not result in geology and soil impacts because no deployment activity would occur.

4.4 Water Resources

4.4.1 Proposed Action Alternative

4.4.1.1 SURFACE WATER

Surface water impacts from the Proposed Action would be temporary and associated with construction activities. FOC installation in lakes, ponds, rivers, and streams would typically occur perpendicular to the waterbody, except where the FOC would be installed along the riverbed of the Kuskokwim, Eek, and Kinak Rivers.

Installation within the Kuskokwim, Eek, and Kinak Rivers would typically be surface laid along the thalweg of the river or may be jet trenched. Surface laying within the thalweg of the river would allow the cable to self-bury over time through the natural dynamic process of river movement. Studies have shown that the impacts from laying cable directly on the substrate and the amount of time necessary for cables to self-bury in aquatic environments is dependent on factors such as local bed conditions, wave action, tides, and turbulence induced from the cable (Unsworth et al. 2023). Riverbed response and burial time can be drastically different, even in locations with similar conditions. While the duration of time for self-burial of different segments would vary, it is expected to happen rapidly as high-discharge rivers create areas of high sediment deposition that enhance cable burial (Carter et al. 2014). Surface laying on the riverbed is anticipated to have negligible impact to surface waters. Jet trenching FOC would create localized turbidity as the jet sled moves slowly along the river floor (0.84 ft/second). Divers would be accompanying jet sled trenching operations to monitor trenching performance and ensure turbidity and disturbance is minimized, as discussed further in Section 4.4.1.2. These impacts are anticipated to be localized, short-term, and minor.

Installation of river and stream crossings would occur in winter to minimize impacts on surface water from ground disturbance and turbidity. For larger streams, the cable would be trenched into stable streambanks using an excavator. The FOC would then be directed through the ice and laid on the stream bed. Streambanks would be recontoured to pre-construction contours, and mitigation measures for stabilizing soils and backfilling disturbed areas would reduce the potential for erosion. For installation on smaller streams, ponds, and lakes, the FOC would be laid on the frozen waterbody surface with adequate slack to allow the cable to passively drop to the streambed at spring break-up. The route would be inspected at spring break-up to ensure the cable is not suspended but instead conforms to the waterbody contours. No short- or long-term impacts on stream flow are anticipated.

Construction within communities, both overhead and underground, may result in minor indirect impacts to surface waters through erosion and stormwater runoff into water resources. This may cause a localized and short-term impact on water quality and increase turbidity that would be mitigated through mitigation measures included in the CGP and SWPPP.

No significant impacts on surface waters are anticipated as a result of the Proposed Action.

4.4.1.2 MARINE, COASTAL ZONE, ESTUARY, AND INTERTIDAL AREAS

Marine water direct and indirect impacts from construction would be temporary and localized. Primary impacts are disturbance and turbidity, although much of the marine water (e.g., Nushagak and Kuskokwim Bays) are naturally turbid. Impacts would occur during construction for the PLGR, cable plow, jet trench, surface lay, and landfall locations.

Prior to FOC installation, a PLGR would be conducted along the route according to industry standards. PLGR generally consists of dragging a hook along the seafloor at slow speeds (0.84 ft/second) to clear any seabed debris (e.g., wires, hawsers, fishing gear) that may be deposited along the route. Impacts from the PLGR include alteration of marine sediments and localized turbidity.

A cable plow would be used to bury FOC in waters 40 ft or deeper, and a jet sled would be used in marine water shallower than 40 ft. Both operations occur at slow speeds (approximately 0.84 ft/second), and would create localized turbidity and disturb marine sediments previously disturbed by the PLGR.

Turbidity impacts associated with PLGR, cable plowing, and jet trenching in the marine environment are highly dependent upon factors such as the amount of sediment displaced, type of excavation or activity, tides, and particulate size. Studies on the duration of increased turbidity and the amount of sediments to suspend from sediment-disturbing activities are wide ranging. Resettlement of disturbed sediments may occur in less than a few minutes or exist for up to 4 days. Additionally, between 10 and 30 percent of excavated materials may become suspended. Turbidity is a function of range, with the impacts of turbidity significantly decreasing within short distances away from the excavation area; however, they are highly susceptible to currents and wave action that have the potential to carry suspended sediments far distances (Meißner et al. 2006).

Many areas along the route are heavily impacted by commercial fisheries. Trawl fisheries exist within Nushagak Bay in the BSAI that have the potential to result in significant interactions with the benthic environment, including biological resources and physical components such as sediments. With the exception of potential emergency orders, the BSAI trawl fishery operates year round and targets more than 25 species (NPFMC 2023). In 2023 alone, 1,655,817 metric tons were harvested as part of the BSAI trawl fisheries. This is up from 1,478,240 metric tons in 2022 (NOAA 2023b). Because cable laying within Nushagak Bay is constrained by physical features, its footprint overlaps with trawl fisheries in the BSAI. Trawling behavior is of high risk to cables. As such, the FOC must be buried within this area and others where trawl fisheries exist to avoid interactions with trawling equipment (Benthic Geoscience 2023).

Surface lay of FOC may temporarily disturb sediments as the cable settles onto the seafloor; however, the area will return to normal conditions immediately after settlement. Surface lay impacts are expected to be negligible.

Excavations and backfilling of trenches at intertidal landfall locations would occur completely “in the dry” during a low-tide cycle. Localized turbidity would occur at the excavation site as water floods the area during an incoming tide. If the shoreline is composed of soft sediments that have the potential to slump or erode, heavy equipment would be operated on mats. Additional best management practices minimizing temporary construction impacts to the shoreline are outlined in Section 4.13.

Impacts on marine fisheries and EFH are discussed in Section 4.5.1.3.

Impacts on the marine and intertidal environment are anticipated to be less than significant.

4.4.1.3 GROUNDWATER

The Proposed Action would not have permanent impacts on groundwater. The Proposed Action would not include the creation of wastewater discharge or use of potable or industrial water. Table 4-1 provides the distance of FOC proposed to be trenched within each DWPA. Trenching for the Proposed Action is limited to a maximum depth of 3 ft within DWPAs and is expected to have no impact on groundwater. All hazardous material, primarily oil and gas, required for the operation of heavy machinery would be handled in accordance with the CGP.

Table 4-1. Alignment Trenched in DWPAs

Community	FOC Trenched in Zone A (ft)	FOC Trenched in Zone B (ft)
Atmautluak	168	168
Eek	904	3,056
Napaskiak	14	14
Platinum	1,050	1,050
Nunapitchuk	11	11

4.4.1.4 WETLANDS

The Proposed Action would have permanent impacts on wetlands and would require a Nationwide Permit (NWP) verification from the USACE for unavoidable permanent and temporary impacts to WOTUS under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. NWPs are used by USACE when the project would have no more than minimal adverse environmental effects. The Proposed Action would permanently fill 0.28 acre of WOTUS with 2,240 cubic yards (yd^3) of fill material. An additional 930 yd^3 of excavation would occur in WOTUS. Table 4-2 summarizes the permanent impacts to WOTUS, and Table 4-3 summarizes the temporary impacts to WOTUS. Permanent and temporary impacts to WOTUS are anticipated to be minimal and localized. The application package for authorization under USACE NWP 57 – Electric Utility Line and Telecommunications Activities is provided in Appendix B along with a description of all temporary and permanent impacts on wetlands and other WOTUS. Consultation with USACE is ongoing. No permanent impacts in Section 10 waters would occur.

Table 4-2. Permanent Impacts to Wetlands

Proposed Action Element	Location (coordinates, WGS84)	Permanent WOTUS Fill Area (acres)	Fill Volume (yd^3)	Volume Excavated in WOTUS (yd^3)
CLS	—	—	—	—
Nunapitchuk	60.897441°, -162.456919°	0.07	556	222
Tuntutuliak	60.339824°, -162.666557°	0.07	556	222
CLS Total	**—**	**0.28**	**2,222**	**889**

Proposed Action Element	Location (coordinates, WGS84)	Permanent WOTUS Fill Area (acres)	Fill Volume (yd^3)	Volume Excavated in WOTUS (yd^3)
BMH/CV[a]	—	—	—	—
Apogak BMH	60.148781°, -162.175582°	<0.01	2	5
Eek South CV	60.212762°, -162.012925°	<0.01	2	5
Eek North CV	60.216803°, -162.011294°	<0.01	2	5
Tuntutuliak BMH	60.337980°, -162.663123°	<0.01	2	5
Oscarville CV	60.720960°, -161.771455°	<0.01	2	5
Atmautluak CV	60.858050°, -162.281393°	<0.01	2	5
Nunapitchuk CV	60.896319°, -162.455318°	<0.01	2	5
Quinhagak BMH	59.742160°, -161.927619°	<0.01	2	5
Quinhagak CV	59.742777°, -161.914919°	<0.01	2	5
BMH/CV Total	**—**	**<0.01**	**16**	**41**
Proposed Action Total	**—**	**0.28**	**2,238**	**930**

Notes: WGS84 = World Geodetic System Datum 1984. The area surrounding the BMH/CV (<0.01 acre) would be backfilled with native substrate. Total values may not add up due to rounding.
[a] Requires 5- by 5-ft area to be excavated prior to placement. Each BMH/CV (3- by 4- by 4-ft area) is permanent fill.

Table 4-3. Surface Laying and Temporary Impacts within WOTUS

Proposed Action Activity	Length (linear mi)	Trench Area (acres)	Side Cast Surface Area (acres)	Trench Volume (yd^3)
Below MHW	—	—	—	—
Cable Plow[a]	196.8	23.9	—	192,427
Jet Sled[b]	1.8	0.1	—	—
Standard Trench[c]	0.3	0.1	0.2	458
Surface Laid[d]	208.7	—	—	—
Below MHW Total	**407.6**	**24.0**	**0.2**	**192,885**
Between MHW and HTL	—	—	—	—
Standard Trenching[c]	<0.1	<0.1	<0.1	87
Between MHW and HTL Total	**<0.1**	**<0.1**	**<0.1**	**87**
Above HTL	—	—	—	—
Standard Trenching[c,]	1.1	0.4	0.7	1,982
Trenching (Rock Saw)[e]	2.3	0.2	0.3	150
Surface Laid[d]	68.1	—	—	—
Above HTL Total	**71.5**	**0.6**	**1.0**	**2,132**
Proposed Action Total[f]	**479.1**	**24.6**	**1.2**	**195,104**

Notes: total values may not add up due to rounding
[a] Cable plow trench dimensions would be 1 ft wide by 5 ft deep. No side cast would be created from this trenching method.
[b] The jet sled would disturb an area 8 inches wide and approximately 1 ft deep. No side cast would be created from this method.
[c] Standard trenching dimensions would be 3 ft wide and 3 ft deep with a side cast area of 5 ft.
[d] Trenching would not be involved; no associated impacts.
[e] Rock saw trenching dimensions would be 8 inches wide and 6 inches deep with a side cast of approximately 12 inches.
[f] Does not include FOC attached to existing utility poles.

Construction of the Proposed Action would occur in accordance with NWP General Conditions and Alaska Regional Conditions. Permit conditions are included in Section 4.13.

No significant impacts on wetlands and other WOTUS are anticipated as a result of the Proposed Action.

4.4.1.5 FLOODPLAINS

Proposed Action infrastructure is limited to surface laid and buried components, except for new CLS shelter pads and aerial-hung FOC. The surface laid and buried components would be installed within floodplains of marine and freshwater environments. Surface laid and buried components do not extend above the ground surface, would have no impact on floodplains, and are constructed to withstand flooding.

CLS facilities and aerial-hung FOC are constructed within communities outside floodplains and are not anticipated to flood. CLS facilities in Bethel and Dillingham are located outside the Federal Emergency Management Agency-designated flood zones.

Impacts on floodplains are not anticipated as a result of the Proposed Action.

4.4.1.6 WILD AND SCENIC RIVERS

The Proposed Action area would not impact any Wild and Scenic Rivers.

4.4.2 No Action Alternative

The No Action Alternative would not result in impacts on water resources above existing conditions.

4.5 Biological Resources

4.5.1 Proposed Action Alternative

4.5.1.1 THREATENED AND ENDANGERED SPECIES

The potential effects of the Proposed Action on listed species and critical habitat include acoustic disturbance generated by Proposed Action-related vessels and cable-laying equipment, vessel strikes, effects to prey species, habitat alteration, and pollution.

Based on consultation with NMFS and USFWS, the Proposed Action would have a less than significant impact on threatened and endangered species. A list of conservation measures included with the determination to minimize the Proposed Action’s impacts are included in Section 4.13.

NMFS analyzed effects of the acoustic disturbance from the Proposed Action and found that it would not result in immediate or long-term effects to marine mammals because of the transitory nature of the activity and the ability of marine mammals to move away from approaching vessels. Similarly, with respect to the potential for vessels strikes, effects on prey species of listed marine mammals, habitat alteration, and pollution, NMFS found that these effects are discountable. NMFS determined that the Proposed Action may affect, but is not likely to adversely affect, Beringia DPS bearded seals, Arctic ringed seals, Mexico DPS humpback whales, Western North Pacific DPS humpback whales, Western North DPS gray whales, North Pacific right whale, sperm whales, fin whales, or Western DPS Steller sea lions.

The proposed cable route is located within the 20-nm aquatic zones of Steller sea lion critical habitat around Cape Newenham National Wildlife Refuge and Round Island. However, vessel operations would be transitory and short term. In its Letter of Concurrence (LOC; Appendix D), NMFS determined that acoustic disturbance from Proposed Action vessels within Steller sea lion critical habitat would be too small to detect. Additionally, NMFS determined that due to the expected effectiveness of conservation measures (Section 4.13), such as the use of Protected Species Observers (PSOs), and the ability of listed pinnipeds to avoid vessels due to their maneuverability, adverse impacts from Proposed Action activities would be insignificant.

USFWS determined that the Proposed Action would have no effect on short-tailed albatross, Southwestern DPS northern sea otter, and spectacled eiders since construction activities would not overlap with these species' ranges. USFWS also determined that the Proposed Action may affect, but is not likely to adversely affect, Steller's eiders. Construction activities could disturb eiders if any are present and nesting during terrestrial activities, but this is unlikely because construction within terrestrial habitats is scheduled to occur during winter. Similarly, marine-based activities are unlikely to disturb molting or wintering eiders because cable laying is scheduled to occur between May and September. The potential for spills to injure or kill eiders would be minimal because spill prevention and response measures would be in place at all vessels.

The biological assessment and LOCs detailing NMFS and USFWS's conclusions, including consultations and mitigation measures, are in Appendices D and E, respectively.

The Proposed Action is anticipated to have less than significant impacts on threatened and endangered species.

4.5.1.2 WILDLIFE

Terrestrial Mammals

The amount of habitat subject to both temporary and permanent impacts would be minimal. Since the cable would be buried, it is not expected to disrupt the movement of any terrestrial mammals. Terrestrial mammals present during construction may be temporarily disturbed by activities. Ongoing maintenance of the Proposed Action is expected to be minimal. As such, periodic disturbance from human presence is expected to be minimal.

No significant impacts on wildlife are anticipated as a result of the Proposed Action.

Marine Mammals

As described in Section 4.5.1.1, USFWS and NMFS determined that noise levels associated with the marine cable-laying operations are unlikely to harass marine mammals and would not rise to Level B take harassment under the MMPA. Additionally, takes from vessel strikes are not expected to occur as part of Proposed Action activities. Vessels used for the Proposed Action will employ PSOs to look for marine mammals prior to and during cable-laying operations. Additionally, vessel speeds for the Proposed Action have been intentionally limited to reduce the chance of marine mammal strikes and are not to exceed 9 knots. Correspondence with NOAA's Office of Protected Resources and USFWS Marine Mammal Management Program, indicating that there is no need for an Incidental Harassment Authorization for the Proposed Action, is included in Appendices D and E.

While cable laying was historically known to occasionally cause entanglement, practices introduced in the 1980s such as torsionally balanced cable laying to reduce self-coiling, laying cables under tension, laying over known seabed topography, re-laying repaired cables without slack, and burying cables in high-risk areas have nearly eliminated the risk of entanglement (Carter et al. 2014). As such, the Proposed Action is not anticipated to adversely affect marine mammals.

Bald and Golden Eagles

Bald eagle nests have not been recorded within 2,500 ft of the Proposed Action area. While both bald and golden eagles may be present within the Proposed Action area, construction is not anticipated to disturb nests, and any noise impacts are anticipated to be minimal.

No significant impacts on bald and golden eagles are anticipated as a result of the Proposed Action.

Migratory Birds

The majority of vegetation clearing would be to areas with grasses and small shrubs. Clearing would occur outside the bird nesting window for the YK Delta (May 1 to July 25) (USFWS 2023), when migratory birds are not present within the Proposed Action area. Similarly, terrestrial construction would occur during winter when migratory birds are not present. Migratory birds found offshore while molting and wintering could be disturbed during cable-laying activities; however, these activities are scheduled to occur between May and September. Very few birds would be present offshore during this time, which should minimize the potential for disturbance. FTTP construction would occur year-round. However, any vegetation clearing that would happen from FTTP construction would likely occur along existing roads within the serviced communities and is anticipated to be limited.

No significant impacts on migratory birds are anticipated as a result of the Proposed Action.

Invasive Species

Trenching activities would result in the replacement of in-situ soils and would not require importation of non-native fills. Clean gravel would be used to construct shelter pads. Re-vegetation of disturbed areas with local and native species would occur as soon as practicable. Therefore, the Proposed Action is unlikely to contribute to the spread of invasive species.

No significant impacts from invasive species are anticipated as a result of the Proposed Action.

4.5.1.3 FISHERIES AND ESSENTIAL FISH HABITAT

An EFH assessment was prepared to describe the Proposed Action, existing conditions within the Proposed Action area, designated EFH within the Proposed Action corridor, potential effects on EFH from the Proposed Action, and potential mitigation or conservation measures. Impacts are defined within the EFH assessment and NMFS correspondence (Appendix F). Additionally, an ADF&G Fish Habitat Permit (FH23-II-0071) was obtained for the Proposed Action detailing components that would require work in or near fish habitat. The Fish Habitat Permit and corresponding consultation details construction within and adjacent to anadromous waterbodies intersected by the Proposed Action.

Habitat disturbance from laying the 1-inch-diameter submarine cable onto the seafloor would be relatively minimal and temporary. Once placed, this surface-laid submarine cable is not anticipated to adversely affect FMP-managed fish species nor the habitats' ability to support managed species.

PLGR, cable plowing, and jet trenching would physically alter habitat, resulting in a reduction of habitat quality and a temporary increase in turbidity. Habitat reduction and modification would be limited spatially and temporally. Cable plowing has limited impacts on water quality as the substrate is lifted and placed back in its trench whole as the cable is buried. Jet trenching fluidizes the substrate, creating a small plume that has potential to mix in the water column and move long distances by underwater currents (OSPAR Commission 2012). The length of time particles remain suspended is highly dependent upon local conditions such as substrate particulate size and currents. Conditions will often return to their normal state in less than a few hours. However, when jetting in fine, muddy substrates, the influences on turbidity may be visible for several days (Meißner et al. 2006). The slow speed of the marine-disturbing activities would allow most fish to move away from the active construction; however, small or juvenile benthic species or lifestages (e.g., larval, egg) may be vulnerable to injury or potential burial and unable to move away quickly. These marine sediment-disturbing activities would not result in population-level effects.

While elevated turbidity levels may harm fish or temporary alter behavior, the turbidity produced by the Proposed Action is expected to be minor and localized. Large plumes of turbidity would not be created. Kuskokwim and Nushagak Bays are also naturally turbid environments.

Trenching/excavation at landfall locations within intertidal areas (between MLW and HTL) would be done at low tide and therefore would not affect fish.

The Proposed Action would not block juvenile nor adult fish migration during or after the completion of cable-laying or trenching activities. Post-construction conditions are anticipated to remain suitable to support FMP-managed fish species that rely on these habitats.

Installing cable during winter conditions for the overland portions of the Proposed Action would largely avoid impacts on fish and EFH. Additionally, this Proposed Action is designed to avoid conflict with commercial and subsistence fisheries. NMFS concurred with the EFH assessment prepared for the Proposed Action, specifically that the Proposed Action may adversely affect EFH (Appendix F), but those impacts would be minimal and short term. Additionally, best management practices would avoid and minimize potential construction-related impacts on habitat, and are outlined in Section 4.13. Documentation related to EFH consultation can be found in Appendix F.

Impacts on fisheries and EFH are expected to be less than significant.

4.5.1.4 VEGETATION AND HABITAT

Construction of the Proposed Action other than FTTP would occur during winter to minimize impacts on vegetation and habitat. Surface-laid cable is anticipated to self-bury over time, and have a negligible effect on the overall habitat and vegetation characteristics of the area. 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. Permanent impacts from CLSs, BMHs, and CVs would be minimal and would typically be concentrated on previously disturbed areas within and around communities (see Section 4.4.1.4). Impacts on vegetation and habitat would be minor and short term.

No significant impacts on vegetation and habitat are anticipated.

4.5.2 No Action Alternative

The No Action Alternative would not affect biological resources above the existing condition.

4.6 Historic and Cultural Resources

4.6.1 Proposed Action Alternative

Based on the cultural resources identification efforts (background research on previously recorded sites, terrestrial archaeological field survey, marine archaeology assessment, consultation with Tribes and other interested parties), no known historic properties are within the APE. NTIA has made a finding of No Historic Properties Affected for the Proposed Action. On October 20, 2023, NTIA sent letters with a notification of this finding and the terrestrial cultural resources survey report to SHPO and the parties that expressed an interest in consulting (Calista Corporation and City of Dillingham). On February 13, 2024, SHPO issued a finding of no historic properties affected for the Proposed Action. Calista Corporation reviewed the Section 106 analysis for the Proposed Action and concurred with the Alaska SHPO finding in their letter dated February 20, 2024. The SHPO findings letter and Calista Corporation concurrence letter are included in Appendix G. Although no known historic properties are within the APE, Proposed Action ground-disturbing activities (primarily cable trenching) may affect unknown/buried archaeological resources. These potential impacts would be addressed through implementation of archaeological monitoring in certain locations of planned trenching, and inadvertent discovery protocols, as outlined in a Cultural Resources Management Plan that will be developed by Unicom and approved by SHPO. Few visual effects are expected because most of the FOC would be underwater, buried, or laid directly on the ground surface, minimizing the range from which these segments would be visible. Field efforts were carried out during summer 2023 to identify cultural resources within areas not previously subject to cultural resources surveys. No paleontological resources were identified within the Proposed Action area.

The Proposed Action is not anticipated to affect historic and cultural resources.

4.6.2 No Action Alternative

Under the No Action Alternative, no ground-disturbing activities would occur, resulting in no impacts on historic and cultural resources. This alternative would preserve existing historical and cultural resources as they are under the existing condition.

4.7 Aesthetic and Visual Resources

4.7.1 Proposed Action Alternative

The FOC would not be visible between communities as it would be underground or expected to sink into the ground surface within the first year of placement. The structures and facilities proposed would be relatively small and located within communities, considering the broad landscapes within the region, and would not change the overall aesthetics of the Proposed Action area. The Proposed Action is not anticipated to significantly alter the visual characteristics of the existing natural environment.

4.7.2 No Action Alternative

The No Action Alternative would not affect aesthetics and visual resources beyond existing conditions.

4.8 Land Use

4.8.1 Proposed Action Alternative

4.8.1.1 COUNTY AND MUNICIPAL ORDINANCES AND ZONING

Bethel is the only community proposed to be serviced by the Proposed Action that has listed ordinances and zoning. Dillingham also has published ordinances and zoning. The Proposed Action would comply with existing zoning regulations, and would not require a re-zoning or a conditional use permit.

4.8.1.2 EXISTING LAND USE WITHIN THE PROPOSED ACTION AND SURROUNDING AREA

The Proposed Action Alternative crosses large areas of relatively undeveloped and undisturbed land. Local communities within the region use the Proposed Action area for gathering food and traveling throughout the region. The Proposed Action is expected to convert a small amount of land from its existing use to a 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.

Additionally, USFWS has concurred that the Proposed Action would not enter nor affect refuge-managed or owned lands (Appendix H). As such, the Proposed Action is not anticipated to adversely affect existing land use within the Proposed Action area.

Significant impacts are not anticipated to occur on existing land use within the Proposed Action area.

4.8.1.3 COUNTY AND LOCAL COMPREHENSIVE PLANS

The Proposed Action is consistent with land use goals defined in Dillingham, Bethel, Eek, and Quinhagak's comprehensive plans, and does not exacerbate any pre-existing issues. The Proposed Action does aid in promoting economic development, public health, and educational opportunities within each community that is proposed to be serviced by the Proposed Action. It would aid in Bethel's 2035 vision statement by assisting the community in developing a "healthy, more diverse economy, capitalizing on Bethel's current role as a regional hub for transportation, healthcare, education, government services and trade, but also building a stronger base of enduring, locally based economic activities" (Agnew Beck Consulting 2011). Additionally, it would aid in improving and expanding access to internet for all private and commercial users as listed in the *City of Dillingham Comprehensive Plan Update and Waterfront Plan* (Agnew Beck Consulting 2010). Therefore, the Proposed Action is not anticipated to adversely affect land use goals.

The Proposed Action is anticipated to be consistent with county and local comprehensive plans.

4.8.2 No Action Alternative

Under the No Action Alternative, no impacts on land use are anticipated.

4.9 Infrastructure

4.9.1 Proposed Action Alternative

The Proposed Action would have minor impacts on travel patterns during construction due 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 foot traffic around construction areas. Work may occur near an airport but is not expected to have an impact on air traffic. A minor impact to marine transportation is anticipated during cable-laying activities as boats may have to detour around the cable-laying ship. Upon implementation of new broadband services within each community, a minor decrease in regional air travel demand is expected as individuals rely more on the internet for services.

The Proposed Action would make high-speed broadband service available to 10 communities.

The Proposed Action 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 the demand for electricity. However, this increase is expected to be minimal and within capacity of each community's power plant. This 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.

Permanent adverse impacts on infrastructure are not anticipated to occur as a result of the Proposed Action. Less than significant adverse impacts on infrastructure are anticipated from the Proposed Action.

4.9.2 No Action Alternative

The No Action Alternative is not expected to adversely affect the transportation system or public services/utilities beyond existing conditions. If a continued increase in population growth continues for these communities, existing infrastructure may not be able to sustain usage demands without adequate internet alternatives.

4.10 Socioeconomic Resources

4.10.1 Proposed Action Alternative

The Proposed Action would have a beneficial impact on socioeconomic resources as it would improve the function of the services provided to residents. Therefore, the Proposed Action would not have a disproportionate adverse impact on minority or low-income populations and therefore would not have any environmental justice impacts. The Proposed Action would increase communities' access to reliable and fast broadband service, which would positively affect many socioeconomic aspects of each community, including the accessibility of health and educational services for all residents.

Increasing access to broadband internet is anticipated to provide new economic opportunities as more people are able to engage in remote work. It will also improve the ability of existing individuals and organizations to participate in online meetings, reducing cost and improving efficiency. The Proposed Action is anticipated to create 248 jobs, with 29 jobs being for Alaska Natives. These jobs would be in network construction, network operations, and community customer services. The Proposed Action would also provide workforce development opportunities through a partnership with Yuut Elitnaurviat, a non-profit organization (NTIA n.d.).

The Proposed Action would have a beneficial impact on educational services as it would provide an updated means through which students could participate in their education. Faster and more reliable internet services would provide more education opportunities and benefit schools. It would also promote online learning. Adverse impacts on schools are not anticipated from the Proposed Action.

Improved internet would also result in quality of life improvements as people would be able to have access to improved phone and video calls, better access to online goods and services, and increased participation in social media. Additionally, if the new internet service is less expensive than the existing service, that would allow residents to spend more money on other needed goods and services.

Construction activities would require workers to live within each community for several weeks while construction is ongoing. This is expected to have a positive economic impact on the community as workers would pay for lodging and food.

Permanent adverse impacts on socioeconomic resources are not anticipated to occur as a result of the Proposed Action. It would have a short- and long-term beneficial impacts by improving services to residents.

4.10.2 No Action Alternative

Under the No Action Alternative, schools and public health and safety facilities would continue to be underserviced and not meet statewide broadband standards. The No Action Alternative would continue to delay economic development as use of the existing system would continue to operate with high latency, low bandwidth, and the limited capacity of satellite systems. Additionally, satellite systems remain the highest cost alternative over time. The No Action Alternative would continue the disparity in socioeconomic resources for this region, and would negatively affect all Tribal communities within the area as it would not address the lack of internet access, access to health care, education, and economic opportunities.

4.11 Human Health and Safety

4.11.1 Proposed Action Alternative

4.11.1.1 HAZARDOUS SITES

Thirteen contaminated sites are within 1,500 ft of Proposed Action trenched FOC or excavated components. The closest sites are the Kanakanak Radio Relay Station at 70 ft, Tuntutuliak Electric Plant at 160 ft, and Tuntutuliak Washeteria at 250 ft from the Proposed Action. Given the proximity of the Dillingham CLS to the Kanakanak Radio Relay Station contaminated site, ADEC was consulted for additional information, and it was determined construction of the CLS pad would likely not encounter any contamination from the site. A Contaminated Sites Management Plan outlining appropriate procedures for handling contaminated soil if encountered during construction will be created and approved by ADEC prior to construction. Given minimal ground disturbance, the Contaminated Sites Management Plan, and the location of the Proposed Action away from known documented contaminated sites, no significant impacts on or from hazardous sites are anticipated.

All hazardous material generated from construction would be disposed in accordance with state and federal regulations as outlined in the CGP. The CGP also outlines what to do in the event of a spill and details handling procedures. CGP permittees are prohibited from discharging hazardous substances or oil from a spill or other release. In the event of an oil or hazardous substance release, Alaska state law (18 Alaska Administrative Code 75.300) requires the event be reported to the ADEC Spill Prevention and Response Program. The permittee will then be responsible for reviewing and revising the selection, design, installation, and implementation of their control measures (ADEC 2021b). No additional hazardous sites would be created as a result of the Proposed Action.

4.11.1.2 PUBLIC HEALTH AND SAFETY

The Proposed Action would not adversely affect public health and safety. It would have a beneficial impact on public health and safety as it would provide updated services to these facilities. 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 to health care providers and patients while increasing service. 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 as a result of the Proposed Action. Short- and long-term beneficial impacts are anticipated.

4.11.1.3 ELECTROMAGNETIC INTERFERENCE AND RADIATION

The Proposed Action would not construct any new cellular or microwave towers; therefore, this was not evaluated further.

4.11.2 No Action Alternative

No direct impacts on human health and safety are anticipated under the No Action Alternative because conditions would stay the same as existing conditions. Under the No Action Alternative, public health and safety facilities (including telemedicine) would continue to be underserviced and not meet statewide broadband standards. If an increase in population growth continues for these communities, human health and safety services may experience strain as local populations inundate their current capacity without adequate internet alternatives.

4.12 Cumulative Impacts

The cumulative impacts assessment considers the effects of the Proposed Action in combination with the effects of past, present, and reasonably foreseeable future actions. While the direct or indirect impacts of each individual project may be minor, the cumulative impacts of all projects may be substantially larger when combined. A reasonably foreseeable future action is defined as a project for which there is an existing proposal, a project currently in the NEPA process, or a project to which a commitment of resources (such as funding) has been made. The geographic scope of the cumulative impacts analysis for most resources is the area in which direct and indirect effects of each resource would occur (i.e., where there would be project effects that could overlap with past, present, or reasonably foreseeable future actions). Table 4-4 provides reasonably foreseeable future actions within the Proposed Action area vicinity.

Table 4-4. Reasonably Foreseeable Future Actions within the Proposed Action Area that May Contribute to Cumulative Impacts

Project Name	Community	Description	Status
Alaska FiberOptic Project – Lower Kuskokwim Segment	Upper Kalskag, Lower Kalskag, Tuluksak, Akiak, Akiachak, Kwethluk, Napakiak	This is part of the Alaska FiberOptic Project, connecting Lower Kuskokwim communities with broadband services within the Yukon Delta region	Funded
Bethel Tundra Ridge Road	Bethel	This would improve the structure and the road with crushed aggregate surface course, replace culverts, install guardrail, and widen embankment	Funded
Chief Eddie Hoffman Highway Milepost 0–4.4 Pavement Preservation	Bethel	This would resurface the highway; replace the guardrail; provide guardrail end treatments; recondition and resurface severely damaged portions of the highway; and improve drainage, signing, and striping	Funded
Dillingham Harbor Expansion	Dillingham	This would provide updates to infrastructure in the Dillingham harbor	Funded
Airraq Network Phase 3	Toksook Bay, Emmonak, Tununak	Phase 3 would bring connectivity to 1,800 more Alaskans and serve as a foundation for future fiber projects within the region	Funded

4.12.1 Water Resources

The Proposed Action would result in a total of 0.28 acre of permanent fill within wetlands. Projects listed in Table 4-4 have the potential to cross waterbodies and DWPAs, and occupy wetlands. However, the extent of these is small enough to be negligible relative to the amount of wetlands and waters within the region. Additionally, it is likely that no components of the Proposed Action that would be trenched or constitute permanent impacts to WOTUS overlap with the projects listed in Table 4-4. As such, the Proposed Action would negligibly increase cumulative impacts on wetlands and other WOTUS.

4.12.2 Biological Resources

The projects listed in Table 4-4 have the potential to interact with marine and freshwater habitats. The Proposed Action would contribute to the cumulative effects of these projects through an incremental increase in habitat alteration for fish (minor and temporary increase in turbidity, and disturbance of marine sediments) and an incremental increase in potential mortality and injury associated with entrainment of small and juvenile benthic species or lifestages (e.g., larval, egg). However, the amount of benthic habitat alteration from past, present, and reasonably foreseeable future actions in combination with the Proposed Action would be relatively small and limited to their construction period. As such, the Proposed Action would negligibly increase cumulative impacts on fish, benthic species, and their habitat.

4.12.3 All Other Resources

Adverse impacts on all other resources from the Proposed Action are limited to construction duration and each project's footprint. Given the projects listed in Table 4-4, these would occur both outside the Proposed Action's construction timeframe and occupy a different footprint; therefore, the cumulative adverse 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.

4.13 Summary of Best Management Practices and Impact Avoidance or Minimization Measures

The Proposed Action would have no significant impacts; therefore, mitigation measures to lessen significant impacts are not required. Unicom will incorporate the following avoidance and minimization measures and best management practices into the construction and operation of the Proposed Action through permit conditions and stipulations.

4.13.1 Wetlands

As part of the NWP 57 authorization, Unicom will implement the following permit conditions for wetlands:

- Trenches may not be constructed or backfilled in such a manner as to drain WOTUS (e.g., backfilling with extensive gravel layers, creating a French drain effect). Ditch plugs or other methods will be used to prevent this situation.
- Except for material placed as minor trench over-fill or surcharge necessary to offset subsidence or compaction, all excess materials will be removed to a non-WOTUS location. The backfilled trench will achieve the pre-construction elevation within 1 year of disturbance unless climatic conditions warrant additional time. USACE must approve this additional time.
- Excavated material temporarily sidecast into wetlands will be underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable.
- Prior to commencement of construction activities within WOTUS, the permittee will clearly identify the permitted limits of disturbance at the Proposed Action site with highly visible markers (e.g., construction fencing, flagging, silt barriers). The permittee will properly maintain such identification until construction is complete and soils have been stabilized. The permittee will be prohibited from conducting any unauthorized USACE-regulated activity outside the permitted limits of disturbance (as shown on the permit drawings).
- Natural drainage patterns will be maintained using appropriate methods. Excessive ponding or drying adjacent to fill areas will indicate non-compliance with this condition.

4.13.2 Biological Resources

USFWS issued a LOC (Appendix E) for the Proposed Action with the following stipulations that Unicom will implement:

- Vessels will travel at speeds less than 5 knots during cable-laying operations, PLGR, post-lay inspection, and burial.
- Cable routing has been selected to avoid concentration areas where eiders and albatross occur to reduce behavioral and disturbance effects.
- Overland cable routes will be laid or trenched during winter, when protected bird species are not expected to be present onshore.

- Artificial lighting will be reduced or shielded, so it is not projected skyward, to reduce attracting birds.
- Cable-laying vessels will not discharge materials into the ocean that may attract seabirds.
- Marine cable-laying activities will occur during May to September, when long daylight occurs, which should make bird strikes with vessels unlikely.
- All fuel and hazardous substances used will be handled and stored on site in compliance with state and federal regulatory guidance. All fuels and chemicals will be stored in appropriate primary containment areas. Secondary containment areas will be designed in compliance with all applicable permits and regulations.
- Fuels and other products will be transported to the Proposed Action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.

NMFS issued a LOC (Appendix D) for the Proposed Action with the following stipulations that Unicom will implement:

- Unicom will inform NMFS of impending in-water activities a minimum of 1 week prior to the onset of those activities.
- If construction activities will occur outside the time window specified in these measures, the applicant will notify NMFS of the situation at least 60 days prior to the end of the specified time window to allow for re-initiation of consultation.
- Proposed Action-associated staff will cut all materials that form closed loops (e.g., plastic packing bands, rubber bands, all other loops) prior to proper disposal in a closed and secured trash bin. Trash bins will be properly secured with locked or secured lids that cannot blow open, preventing trash from entering the environment, thus reducing the risk of marine mammal entanglement should waste enter marine waters.
- Proposed Action-associated staff will properly secure all ropes, nets, and other marine mammal entanglement hazards to ensure they do not blow or wash overboard.
- To the extent it is practicable and safe, vessel operators will operate their vessel thrusters (both main drive and dynamic positioning) at the minimum power necessary to accomplish the work.
- Two PSOs will perform PSO duties on site throughout cable-laying activities.
- When travel speeds are greater than 5 knots (5.8 miles per hour [mph]), two PSOs will monitor all marine waters within 6,234 ft of the vessel during all daylight hours, and report sightings to NMFS (cable-laying activities will take place 24 hours/day).
- PSOs will be positioned such that they will collectively be able to monitor the entirety of each activity's mitigation zone. The action agency will coordinate with NMFS on the placement of PSOs prior to commencing in-water work.
- Prior to commencing cable-laying activities, PSOs will scan waters within the cable-laying operations mitigation zone and confirm no listed marine mammal species are within the mitigation zone for at least 30 minutes immediately prior to initiation of in-water activity.
- If one or more listed marine mammal species are observed within the mitigation zone, the in-water activity will not begin until the listed marine mammal species exit the mitigation zone of their own accord. Alternately, if the PSO has continuously scanned these waters and has

not observed listed marine mammals within the zone for 30 minutes, then cable laying may commence.

- If a listed marine mammal species is observed within a mitigation zone or is otherwise harassed, harmed, injured, or disturbed, PSOs will immediately report that occurrence to NMFS.
- PSOs must be independent (i.e., not vessel or cable crew) and have no other assigned tasks during monitoring periods.
- The action agency or its designated non-federal representative will provide resumes or qualifications of PSO candidates to NMFS for approval at least 1 week prior to in-water work. NMFS will provide a brief explanation of lack of approval in instances when an individual is not approved.
- At least one PSO will have prior experience performing the duties of a PSO during construction activity.
- At least one PSO will complete PSO training prior to deployment (contact NMFS Alaska Regional Office Protected Resources Division for a list of trained and experienced PSOs). The training will include:
    - Field identification of marine mammals and marine mammal behavior;
    - Ecological information on marine mammals, and specifics on the ecology and management concerns of those marine mammals;
    - ESA and MMPA regulations;
    - Proper equipment use;
    - Methodologies in marine mammal observation and data recording, and proper reporting protocols; and
    - Overview of PSO roles and responsibilities.
- PSOs will:
    - Have vision that allows for adequate monitoring of the entire mitigation zone;
    - Have the ability to effectively communicate orally, by radio and in person, with Proposed Action personnel;
    - Have the ability to collect field observations and record field data accurately and in accordance with Proposed Action protocols;
    - Have the ability to identify to species all marine mammals that occur within the Proposed Action area; and
    - Have writing skills sufficient to create understandable records of observations.
- PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break from monitoring duties between shifts.
- PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.
- PSOs will have the following equipment to address their duties:
    - Tools that enable them to accurately determine the position of a marine mammal in relationship to the mitigation zone;
    - Two-way radio communication, or equivalent, with on-site project manager;
    - Tide tables for the Proposed Action area;
    - Watch or chronometer;

  - Binoculars (7x50 or higher magnification) with built-in rangefinder or reticles (rangefinder may be provided separately);
  - Instruments that allow PSO to determine geographic coordinates of observed marine mammals;
  - Legible copy of the LOCs and all appendices; and
  - Legible and fillable observation record form, allowing for required PSO data entry.

- Prior to commencing in-water work or at changes in watch, PSOs will establish a point of contact with the crew. The PSO will brief the point of contact as to the mitigation procedures if listed species are observed to be likely to enter or within the mitigation zone, and will request that the point of contact instruct the crew to notify the PSO when a marine mammal is observed. If the point of contact goes "off shift" and delegates their duties, the PSO must be informed and brief the new point of contact.
- Vessel operators will:
  - Maintain a watch for marine mammals at all times while underway;
  - Stay at least 100 yards from listed marine mammals; exception is that they will remain at least 500 yards from endangered North Pacific right whales;
  - Travel at less than 5 knots (5.8 mph) when within 300 yards of a whale;
  - Avoid changes in direction and speed when within 300 yards of a whale, unless doing so is necessary for maritime safety;
  - Not position vessel(s) in the path of a whale, and 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);
  - Check the waters immediately adjacent to the vessel(s) to ensure no whales will be injured when the vessel gets underway;
  - Reduce vessel speed to 10 knots (11.5 mph) or less when weather conditions reduce visibility to 1 mi or less; and
  - Adhere to the Alaska Humpback Whale Approach Regulations when vessels are transiting to and from the Proposed Action area (see 50 CFR 216.18, 223.214, and 224.103(b); note: these regulations apply to all humpback whales). Specifically, the pilot and crew will not:
    - 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;
    - Cause a vessel or other object to approach within 100 yards of a humpback whale; or
    - Disrupt the normal behavior or prior activity of a whale by any other act or omission.

- 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 100 yards of the vessel or 500 yards for North Pacific right whales, and if maritime conditions safely allow, the engine will be put in neutral, and the whale will be allowed to pass beyond the vessel.
- Vessels will not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear. No materials capable of becoming entangled around marine mammals will be discarded into marine waters.

- Vessels will not approach within 3 nm of rookery sites listed in 50 CFR 224.103(d).
- Vessels will not approach within 3,000 ft of any Steller sea lion haulout or rookery that is not listed in 50 CFR 224.103(d).
- PSOs will record observations on data forms or into electronic data sheets.
- The action agency 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).
- PSOs will record the following:
    - Date, shift start time, shift stop time, and PSO identifier;
    - Date and time of each reportable event (e.g., a marine mammal observation, operation shutdown, reason for operation shutdown, change in weather);
    - 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[4];
    - Species; numbers; and, if possible, sex and age class of observed marine mammals, and observation date, time, and location;
    - Predominant anthropogenic sound-producing activities occurring during each marine mammal observation;
    - Observations of marine mammal behaviors and reactions to anthropogenic sounds and human presence;
    - Initial, closest, and last-known location of marine mammals, including distance from PSO to the marine mammal, and minimum distance from the predominant sound-producing activity or activities to marine mammals;
    - Whether the presence of marine mammals necessitated the implementation of mitigation measures to avoid acoustic impact, and the duration of time that normal operations were affected by the presence of marine mammals; and
    - Geographic coordinates for the observed animals (or location noted on a chart), with the position recorded using the most precise coordinates practicable (coordinates will be recorded in decimal degrees, or similar standard, and defined coordinate system).
- Observations of humpback whales will be transmitted to AKR.section7@noaa.gov by the end of the calendar year, including information specified in General Data Collection and Reporting (above) as well as photographs and videos obtained of humpback whales, most notably those of the whale’s flukes.
- 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(s) is observed entering a shutdown zone before operations can be shut down, or is injured or killed as a direct or indirect result of the Proposed Action), the PSO will report the incident to NMFS within 1 business day, with information submitted to akr.section7@noaa.gov. These PSO records will include:
    - All information to be provided in the final report (see Mitigation Measures under the Final Report heading below);
    - Number of animals of each threatened and endangered species affected;
    - Date, time, and location of each event (provide geographic coordinates);

[4] https://www.weather.gov/mfl/beaufort

  - Description of the event;
  - Time the animal(s) was first observed or entered the shutdown 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;
  - Whether a vessel struck a marine mammal, the contact information for the PSO on duty, or the contact information for the individual piloting the vessel if no PSO was on duty; and
  - Photographs or video footage of the animal(s) (if available).

- If PSOs observe an injured, sick, or dead marine mammal (i.e., stranded marine mammal), they will notify the Alaska Marine Mammal Stranding Hotline at 887-925-7773. 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 the stranded marine mammal(s);
  - Species and number of the stranded marine mammal(s);
  - Description of the stranded marine mammal's condition;
  - Event type (entanglement, dead, floating); and
  - Behavior of live-stranded marine mammals.

- If PSOs observe marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding, unauthorized harassment), these activities will be reported to NMFS Alaska Region Office of Law Enforcement at 800-853-1964.
- Data submitted to NMFS will include:

  - Date/time;
  - Location;
  - Description of the event; and
  - Any photos or videos taken.

- A draft of the final report will be submitted to NMFS within 90 calendar days of the completion of the Proposed Action summarizing the data recorded and submitted to AKR.section7@noaa.gov. A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of receipt of the draft report, the report may be considered final. The report will summarize all in-water activities associated with the Proposed Action and results of PSO monitoring conducted during in-water activities. The final report will include:

  - Summaries of monitoring efforts, including dates and times of construction; dates and times of monitoring; and dates, times, and duration of shutdowns due to marine mammal presence;
  - Date and time of marine mammal observations; geographic coordinates of marine mammals at their closest approach to the Proposed Action area; and marine mammal species, numbers, age/size/sex categories (if determinable), and group sizes; and

  - Digital, queryable documents containing PSO observations and records; and digital, queryable reports.

Through EFH consultation with NMFS for the Proposed Action (Appendix F), Unicom will implement the following best management practices:

- Existing rights-of-way will be used whenever possible to lessen overall encroachment and disturbance of wetlands.
- Excavated material will be stored and contained on uplands. If storage in wetlands or waters cannot be avoided, alternate stockpiles will be used to allow the continuation of sheet flow. Stockpiled materials will be used on construction cloth rather than bare marsh surfaces, eelgrass, macroalgae, or other submerged aquatic vegetation.
- All fuels and hazardous substances used by the Proposed Action will be handled and stored on site in compliance with state and federal regulatory guidance. All fuels and chemicals will be stored in appropriate primary containment areas. Secondary containment areas will be designed in compliance with all applicable permits and regulations.
- Fuels and other products will be transported to the Proposed Action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.
- Excavated wetlands will be backfilled with either the same or comparable material capable of supporting similar wetland vegetation. Original marsh elevations will be restored. Topsoil or organic surface material, such as root mats, will be stockpiled separately and returned to the surface of the restored site. Adequate material will be used to ensure the pre-Proposed Action elevation is attained following the settling and compaction of material. After backfilling, erosion protection measures will be implemented where needed.
- Native vegetation and topsoil removed for Proposed Action construction will be stockpiled separately and used for site rehabilitation. Species to be used for seeding and planting will follow this order of preference:
  - Species native to the site
  - Species native to the area
  - Species native to the state
- Trenches will not be constructed or backfilled in such a manner as to drain wetlands or other WOTUS (e.g., backfilling with extensive gravel layers, creating a French drain effect). Ditch plugs or other methods will be used to prevent this situation.
- Any excess material will be removed to an upland (non-wetland) location.
- Except within areas of topsoil excavation, excavated soils will be sorted into mineral subsoils and topsoil (i.e., the upper, outermost layer of soil; usually the top 2 to 8 inches).
- Equipment access will be limited to the immediate Proposed Action area. Tracked vehicles are preferred over wheeled vehicles.
- Heavy equipment working within wetlands or mudflats will be placed on mats, or other measures will be taken to minimize soil disturbance.
- All exposed soil and other fills, as well as any work below OHW, will be permanently stabilized at the earliest practicable date. When possible, work within waters will be performed during periods of no or low flow, or during low tides.

- Equipment operators will be cautioned to avoid sensitive areas. Sensitive areas will be clearly marked to ensure equipment operators do not traverse them.
- Nearshore segments of the marine route will be identified, avoiding developed shorelines and high-energy landfalls that are subject to erosion. Geophysical reviews will be conducted for the route, and areas prone to sediment slumping, turbid currents, and other hazards will be avoided.
- Construction equipment will be limited to the minimum size necessary to complete the work. Shallow-draft equipment will be used to minimize ground effects and eliminate the necessity for temporary access channels.
- Crossings will be aligned to avoid rock reefs and shoals to the extent possible.
- Construction of permanent access channels will be avoided to prevent disrupting natural drainage patterns and destroying wetlands through excavation, fill, and bank erosion.
- Trench/excavation activities will be conducted within intertidal areas (between MLW and HTL) at low tide to minimize impacts on fish and EFH.
- Cable will be buried within areas where scouring or wave activity would eventually expose them.
- Damaging high-relief bottom habitat and crossing live bottom habitats such as corals and sponges will be avoided to the extent possible.
- Geophysical investigations will be conducted in 2023 to assess bathymetric conditions along the route and identify areas necessary for trenching.
- High-impact fishing grounds will be avoided where possible. The cable will be buried where ground-fishing areas cannot be avoided.
- Intersecting or otherwise affecting mapped eelgrass beds will be avoided.
- The route will be located to minimize damage to marine and estuarine habitat to the extent feasible.
- Overland cable routes will be laid or trenched during winter to avoid or minimize impacts.
- Winter landfall and overland construction will limit ground disturbance and protect vegetation from heavy equipment and temporary side cast.
- Temporary fills will be removed in their entirety, and the affected areas will be returned to pre-construction elevations. The affected areas will be revegetated, as and when appropriate. Proper seeding of all areas under threat of erosion or unstable soil post-Proposed Action will be seeded with appropriate grass seed to maintain solid soil stability. Any areas of vegetation will be revegetated to the greater standard among the permit: SWPPP or Environmental Assessment standards.
- Permit stipulations (e.g., fish habitat permits; Section 404/10) will be followed.
- When possible, in-water work will be conducted in fish-bearing waters during the time of year that will have the least impact on sensitive habitats and species, as determined through coordination with NMFS and/or ADF&G.
- Stream crossings will be positioned on stable banks for erosion protection. When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface so it can passively drop into the waterbody during spring break-up and self-bury within aquatic bed sediments.
- The overland route will be inspected after break-up to ensure the cable is not suspended within water crossings but instead conforms to waterbody contours.

- The post-lay inspection will be conducted within marine waters using an ROV at select areas where difficulties were identified during the initial cable install and, where needed, when burying the cable using jet burial.

ADF&G issued a Fish Habitat Permit for the Proposed Action with the following stipulations that Unicom will implement:

- Disturbed shoreline and streambank areas attributable to this Proposed Action will be restored to pre-construction contours, and stabilized to prevent erosion and sedimentation.
- Equipment will not be fueled or serviced, and fuel will not be stored below OHW of the waterbodies referenced in the permit. Vehicles leaking fuel, hydraulic fluids, or other pollutants will not be operated below the OHW of the following waterbodies: Unnamed Stream (325-30-10100-2013), Kuskokwim River (335-10-1600), Kinak River (335-10-16600-2151), Eek River (335-10-16700), Eenayarak River (335-10-16695), Pikmiktalik River (335-10-16600-2197-3115), Nunacakanukakslak Lake (335-10-16600-2197-0040), and Johnson River (335-10-16600-2197).
- Structures or material will not be placed into a stream to facilitate crossings. Construction of bridges is not authorized by this permit.
- Winter crossings will only be completed if ice thickness is sufficient to support the equipment. Open-water crossings with equipment and vehicles during winter are not authorized by this permit.

5 Applicable Environmental Permits and Regulatory Requirements

Table 5-1 lists applicable environmental permits and regulatory requirements for the Proposed Action.

Table 5-1. Applicable Environmental Permits and Regulatory Requirements

Agency/Department	Permit/Approval/ Consultation/ Coordination	Activity	Status
Federal	—	—	—
USACE	CWA, Section 404/ Rivers and Harbors Act, Section 10	Discharge of dredge or fill to WOTUS, including wetlands	Application (POA-2023-00207) under NWP 57 submitted April 13, 2023 (Appendix B); ongoing
USACE	ESA Section 7 Consultation	Listed species consultation	LOC received June 1, 2023 (Appendix E)
NMFS	ESA Section 7 Consultation	Listed species consultation	LOC received August 22, 2023 (Appendix D)
NMFS	Magnuson-Stevens Act EFH Consultation	Consultation conducted when actions may result in harm to designated EFH	LOC received May 8, 2023 (Appendix F)
State	—	—	—
Alaska Department of Natural Resources, SHPO	Section 106 of the National Historic Preservation Act Consultation	Consultation conducted to consider the effects of actions on historical or archaeological resources	Consultation initiated on May 18, 2023 (Appendix G); NTIA sent No Historic Properties Affected finding to consulting parties on October 20, 2023; February 13, 2024, SHPO concurrence
ADF&G	Fish Habitat Permit	Required for work, structures, or water withdrawal below OHW within waterbodies containing fish	Fish Habitat Permit (FH23-II-0071) received on July 13, 2023; ADF&G amended on February 7, 2024
Alaska Department of Natural Resources, Division of Mining, Land and Water	Utility Easement	Required to install FOC on state lands	Application submitted April 28, 2023; ongoing
ADEC	CWA, Section 401 Water Quality Certification	Certification from the state that discharge complies with state water quality standards	Concurrent with NWP verification process; ongoing
Local	—	—	—
City of Dillingham Village of Tuntutuliak	Easement	Installation of FOC on public lands	Ongoing
Private	—	—	—
Bethel Native Corporation Iqfijouaq Company Qinarmiut Corporation Napaskiak Incorporated Atmautluak Limited Nunapitchuk Limited Moravian Church	Easement	Installation of FOC on private lands	Ongoing

6 Public Outreach

NTIA and RUS held a public comment period for the Draft EA between January 23 and February 25, 2024. Public notices were advertised in the *Bristol Bay Times* and *Delta Discovery* in print and online. Flash drives containing the EA and printed fact sheets about the preferred alternative and NEPA process were made publicly available within Dillingham, Bethel, Platinum, Eek, Napaskiak, Quinhagak, Tuntutuliak, Atmautluak, Nunapitchuk, Kasigluk, and Oscarville. Flyers with information about the project, location of the flash drives, and the public comment process were posted in each community. NTIA also posted a notice on its website for availability of the EA with directions for how to comment. One comment, from Calista Corporation, was received during the comment period. The comment was in support of the Proposed Action, and did not result in changes to the analysis or conclusions of the Draft EA.

7 List of Preparers and Agency Consultations

Unicom and its contractor (HDR) prepared this EA under the direction of NTIA, in cooperation with USDA RUS. Table 7-1 lists the individuals who were responsible for managing the development of this EA, providing information and technical assistance, or contributing to the preparation of this document.

Table 7-1. List of Preparers

Individual	Agency	Role
Amanda Pereira	NTIA	Environmental Program Officer
Andrew Bielakowski	NTIA	Director of Environmental Compliance and Federal Preservation Officer
Theron Rutyna	NTIA	Tribal Federal Program Officer
Natalie Kovach	RUS	General Field Representative – Alaska
Glenn Stelter	RUS	Archaeologist, Policy and Outreach Division
Anthony High	RUS	Environmental Protection Specialist
Valerie Haragan	Unicom	Permitting and Compliance Specialist
Rebecca Markley	Unicom	Principal, Program Manager
Cecile Davis	Unicom	Specialist, Permitting and Compliance
Amy Ostman, QEP	HDR	Project Manager MAEST BS Applied Physics Years of Experience: 25
Nora Hotch	HDR	Deputy Project Manager BA Environmental, Population, and Organismic Biology Years of Experience: 19
Josh Buza	HDR	Environmental Impact Analyst MS Natural Resource Management BS Ecology Years of Experience: 9
Kaitlyn Hosken, RPA	HDR	Cultural Resources Specialist MS Anthropology Years of Experience: 10
Malcolm Salway, PWS	HDR	Biological Sciences Lead MS Environmental Science and Engineering BS Biological Sciences Years of Experience: 22
Linda Smith	HDR	NEPA Writer MS Civil Engineering Years of Experience: 20

Individual	Agency	Role
Laurie Cummings, AICP CTP, ENV SP	HDR	Socioeconomic Impact Analyst MA Urban Planning BA Geography Years of Experience: 26
Elizabeth Grover	HDR	Technical Editor MA Anthropology BA Anthropology Years of Experience: 23
Simon Wigren, PWS, AWB	HDR	Quality Control Reviewer BS Wildlife Biology Years of Experience: 16
Anna Kohl, CEP	HDR	Quality Control Reviewer BA Geology Years of Experience: 22

Notes: AICP = American Institute of Certified Planners; AWB = Associate Wildlife Biologist; BA = Bachelor of Arts; BS = Bachelor of Science; CEP = Certified Environmental Professional; CTP = Certified Transportation Planner; ENV SP = Envision Sustainability Professional; MA = Master of Arts; MAEST = Masters of Applied Environmental Science and Technology; MS = Master of Science; PWS = Professional Wetland Scientist; QEP = Qualified Environmental Professional; RPA = Registered Professional Archaeologist

Table 7-2 lists agencies and personnel consulted for the Proposed Action. Consultation correspondences are included in the applicable appendices.

Table 7-2. Agencies and Personnel Consulted

Agency	Individuals Consulted	Response
NOAA/NMFS	Angela Tallman, Marine Scientist; Graham Shaw, Marine Scientist	Review of Biological Assessment and issue of LOC (Appendix E)
NOAA/NMFS	Cherlene Felkley, EFH Coordinator	Review of EFH Assessment and concurrence (Appendix F)
SHPO	McKenzie Herring, Deputy SHPO	Section 106 Coordination (Appendix G)
USACE	Tyler Marye, Regulatory Specialist	Review of NWP 57 application (Appendix B)
USFWS	April Dent, Alaska District USFWS Realty Lead; Kenton Moos, Deputy Togiak National Wildlife Refuge Manager; Laurie Boeck, Yukon Delta National Wildlife Refuge Manager; Douglass Cooper, Northern Field Office Branch Chief; Kaitlyn Howell, Northern Field Office Ecological Services Staff; Sierra Franks, Alaska Marine Mammals Management Office Ecological Services Regulatory Lead – Marine Mammals	Review for need of USFWS Compatibility Determination (Appendix H)
USFWS	Heather Patterson, Marine Mammals Regulatory Program Coordinator	MMPA Coordination (Appendix E)
Alaska Moravian Church	Reverend Clifford Jimmie, Alaska Provincial Board President	No concerns
Arviq, Incorporated	—	None
Association of Village Council Presidents	Vivian Korthuis, CEO	None
Atmautluak Limited	—	No concerns
Bethel Native Corporation	Ana Hoffman, President/CEO	Proposed Action proponent
Bristol Bay Native Association	Garvin Federenko, President/CEO	No concerns
Bristol Bay Native Corporation	Jason Metrokin, President/CEO	Concerns related to walrus; requested explanation regarding coordination process with USFWS for threatened and endangered species and the MMPA

Agency	Individuals Consulted	Response
Calista Corporation	Andrew Guy, President	Requested to be Consulting Party for the Section 106 consultation
Choggiung Limited	Cameron Poindexter, President/CEO	Proposed Action proponent
City of Bethel	Rose Henderson, Mayor; Peter A. Williams, City Manager	None
City of Dillingham	Alice Ruby, Mayor; Patty Buholm, Director of Planning and Grants Management	Requested a copy of the Cultural Resources Field Survey Report
City of Eek	Carlie Beebe, Mayor	None
City of Napaskiak	Alexie Williams, Mayor	None
City of Nunapitchuk	James Berlin, Sr., Mayor	None
City of Platinum	Mark Moyle, Mayor	None
City of Quinhagak	Jerilyn Kelly, Mayor	None
Curyung Tribal Council	Jonathan Larson, First Chief; Courtnay Carty, Tribal Administrator	None
Iqfijouaq Company	—	No concerns; Proposed Action proponent
Kasigluk Traditional Elders Council	Ruthie Beaver, President	No concerns
Kasigluk, Incorporated	—	None
Napaskiak, Incorporated	—	None
Native Village of Eek	—	None
Native Village of Kwinhagak	Matthew Friendly, President	None
Native Village of Napaskiak	—	None
Native Village of Nunapitchuk	Eli Wassillie, Tribal Administrator	None
Native Village of Tuntutuliak	—	None
Nunapitchuk, Limited	—	None
Orutsararmiut Traditional Native Council	Mark Springer, Executive Director	None
Oscarville Native Corporation	—	None
Oscarville Traditional Village	—	None
Platinum Traditional Village	—	None
Qanirtuuq, Incorporated	Grace Hill, President	None
Tuntutuliak Land, Limited/Qinarmiut Corporation	Frank W.	None
Village of Atmautluak	—	None

Note: CEO = Chief Executive Officer

8 References

ADEC (Alaska Department of Environmental Conservation)

2017 *Site Report: Napaskiak Former BIA School Day Tanks*. Accessed at https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/25241 on June 7, 2023.

2019a *Site Report: Kanakanak RRS NALEMP*. Accessed at https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/27118 on August 28, 2023.

2019b *Site Report: Tuntutuliak Former BIA School Site*. Accessed at https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/4546 on June 6, 2023.

2020a *Site Report: Tuntutuliak Electric Plant*. Accessed at https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/3378 on June 6, 2023.

2020b *Site Report: Tuntutuliak Washeteria*. Accessed at https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/3377 on June 6, 2023.

2021a *Site Report: Residence – 5455 Kanakanak Road*. Accessed at https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/26239 on August 28, 2023.

2021b Alaska Pollutant Discharge Elimination System General Permit for Discharge from Large and Small Construction Activities (Construction General Permit) - Final. Accessed at https://dec.alaska.gov/water/wastewater/stormwater/permits-approvals/construction/ on December 5, 2023.

2022a *2022 Annual Air Quality Monitoring Network Plan*. Division of Air Quality. Accessed at https://dec.alaska.gov/air/air-monitoring/guidance/monitoring-plans/ on April 12, 2022.

2022b *Site Report: DHSS Bethel Youth Facility UST #1*. Accessed at https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/26456 on June 7, 2023.

2023a Air Pollution in Alaska Communities. Accessed at https://dec.alaska.gov/air/anpms/communities/ on December 5, 2023.

2023b Regulatory Alaska Air Quality Data. Accessed at https://dec.alaska.gov/air/air-monitoring/alaska-concerns/community-data/ / on March 4, 2024.

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Appendix A. Construction Schedule

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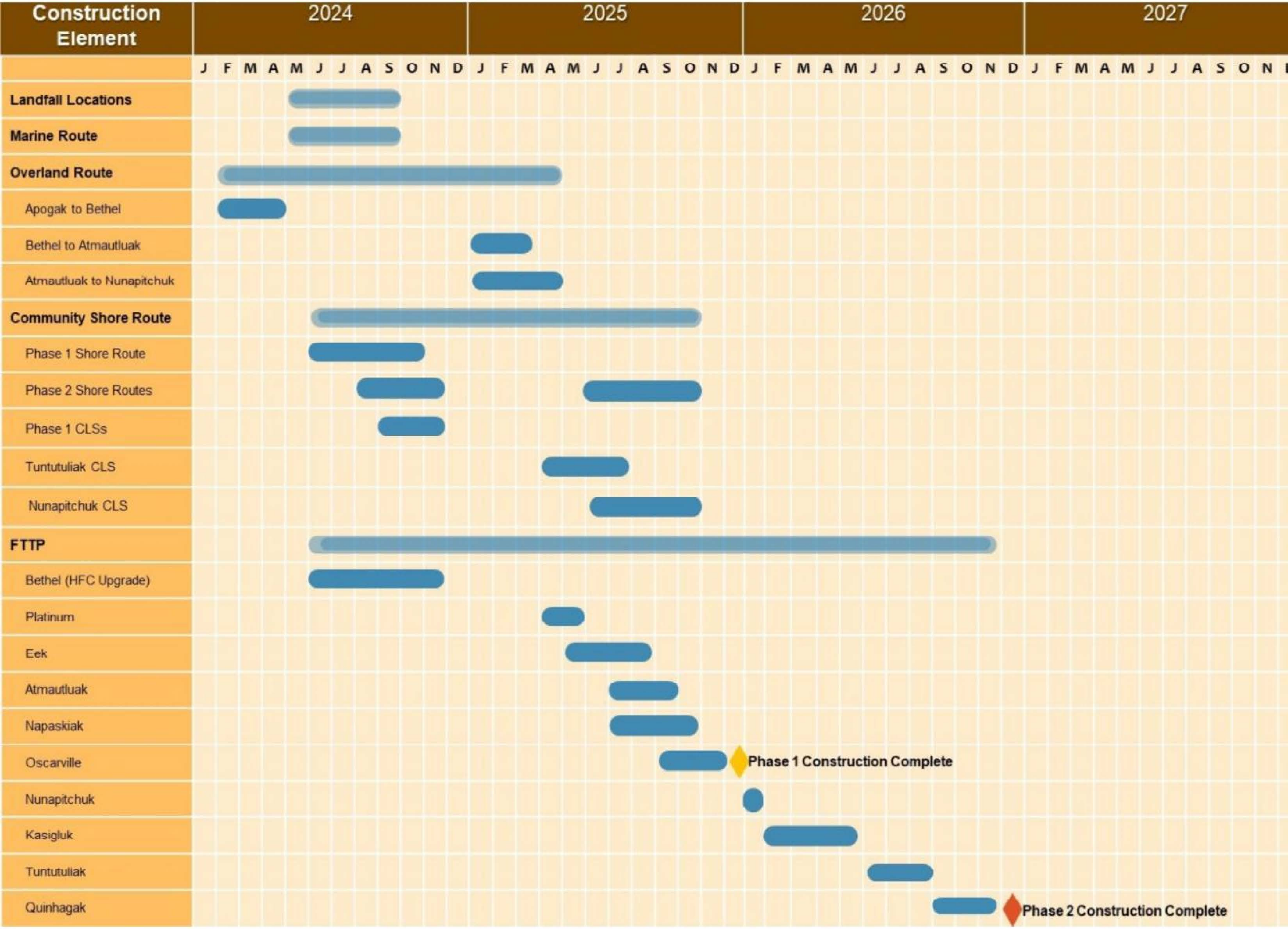

Construction Element
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Overland Route
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Bethel to Atmautluak
Atmautluak to Nunapitchuk
Community Shore Route
Phase 1 Shore Route
Phase 2 Shore Routes
Phase 1 CLSs
Tuntutuliak CLS
Nunapitchuk CLS
FTTP
Bethel (HFC Upgrade)
Platinum
Eek
Atmautluak
Napaskiak
Oscarville
Phase 1 Construction Complete
Nunapitchuk
Kasigluk
Tuntutuliak
Quinhagak
Phase 2 Construction Complete

Appendix B. USACE Nationwide Permit Application

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Airraq Network

PHASES 1 AND 2

Project Description to Support Nationwide Permit Pre-Construction Notification

Unicom, Inc

October 2023

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Acronyms and Abbreviations

BMH	beach manhole
BU	branching unit
CLS	Cable Landing Station
CV	Connection Vault
DPS	Distinct Population Segment
ESA	Endangered Species Act
FOC	fiber-optic cable
ft	foot/feet
ft^3	cubic foot/feet
FTTP	Fiber to the Premise
HTL	high tide line
mi	mile(s)
MLW	mean low water
N	North
NMFS	National Marine Fisheries Service
NTIA	National Telecommunications and Information Administration
NWI	National Wetland Inventory
OHW	ordinary high water
PCN	Pre-Construction Notification
PLGR	pre-lay grapnel run
Project	Airraq Network
ROV	remotely operated vehicle
S	South
Unicom	Unicom, Inc.
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VOO	Vessel of Opportunity
W	West
WGS84	World Geodetic System 1984
WOTUS	Waters of the United States
yd^3	cubic yard(s)
YK	Yukon-Kuskokwim

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1 Introduction

Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim (YK) Delta as part of Airraq Network (Project). In doing so, Unicom will extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 Western Alaska communities with highspeed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

The YK Delta is among the world's largest river deltas, with Bethel being its most populous community. The town of Bethel has a population of 6,500 individuals and lies approximately 68 river miles (mi) up the Kuskokwim River from Kuskokwim Bay on its northern bank. The other nine communities are geographically isolated throughout the region. No roads connect the towns within the Lower YK Delta or with the rest of the state, and they are only accessible by boat or plane. All 10 communities that the Project proposes to service are home to the Yup'ik, with at least 74 percent of these communities' populations being Alaska Native.

At its southern extent, the Project will supply broadband to the community of Platinum (population 55). Platinum rests on South Spit, bridging the gap between Goodnews Bay and the Bering Sea. Quinhagak (population 776) lies 55 miles (mi) north along the Alaska coastline and within Kuskokwim Bay. These are the only two coastal communities serviced by the Project, with the remainder lying inland and adjacent to the Kuskokwim River. Tuntutuliak (population 469) is located on the banks of the Kinak River, 6 mi upstream of the Kinak River's confluence with the Kuskokwim River at river mi 24. Eek (population 404) is 26.5 mi upstream from the Eek River's confluence with the Kuskokwim River at river mi 7.5. Farther north, Napaskiak (population 509) and Oscarville (population 70) share opposite banks of the Kuskokwim River at river mi 63. Bethel is an additional 5 mi upstream on the northern bank of the Kuskokwim River. The remaining three communities are northeast of Bethel on tributaries of the Kuskokwim River. Atmautluak (population 386) is located on the Pikmiktalik River, 18 mi from Bethel. Nunapitchuk (population 594) and Kasigluk (population 623) share branches of the Johnson River, 6.5 and 8.5 mi farther from Atmautluak, respectively.

The Project will provide a long-term solution, connecting these 10 underserviced communities within western Alaska with high-speed broadband connectivity. The Project is designed to overcome the region's harsh elements while creating a more efficient and modern way for western Alaska to connect with the rest of the world.

1.1 Summary of Project Description

The Project will consist of two phases. Phase 1 will combine a 437-mi FOC build and Fiber to the Premise (FTTP) last mile network[1] upgrades within five communities: Platinum, Eek,

[1] Last mile network refers to any broadband infrastructure that connects directly to an end-user location.

Napaskiak, Oscarville, and Bethel. Using a middle mile network[2], the Project will interconnect with an existing FOC and microwave network within Dillingham.

Phase 1 has an extensive marine component, extending FOC along the ocean floor from existing Unicom facilities in Dillingham to Kuskokwim Bay, where a cable branching unit (BU) will direct FOC to Platinum. The main FOC segment will extend beyond the Platinum BU and continue the marine route, paralleling the Kuskokwim Bay shoreline until it reaches a landfall location within the Eek River immediately upstream of its confluence with the Kuskokwim River. This will begin the overland route to Eek. From Eek, the FOC route will continue the overland route to Napaskiak, where it will cross the Kuskokwim River to Oscarville and end within Bethel. The Project will also establish a second FOC delivery technology, FTTP, within most connected communities. FTTP local network access will provide high-speed broadband access to residences and businesses in the communities of Platinum, Eek, Napaskiak, and Oscarville. The existing hybrid fiber-coaxial access networks within Bethel will be upgraded to help facilitate broadband distribution within the community.

Phase 2 will include installation of 119-mi of FOC, which will be interconnected with Phase 1 by combining middle mile network transport segments and FTTP installation in five additional communities: Quinhagak, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

Phase 2 will build off the Phase 1 FOC route with both terrestrial and marine components. A BU originating from the Phase 1 FOC will connect the marine route within Kuskokwim Bay to Quinhagak. A separate marine route cable segment will route FOC from the Apogak landfall location back into the Kuskokwim River to Tuntutuliak. The overland route will connect FOC from Bethel to Atmautluak, Nunapitchuk, and Kasigluk. Phase 2 will also construct a FTTP network within each community.

Project activities include the following components (see Table 1-1 for a summary):

- **Marine Route:** This route involves installation of broadband submarine FOC within marine environments below mean low water (MLW). These segments are either trenched or laid on the seafloor.
- **Landfall Route:** This route involves installation of broadband submarine FOC between MLW and the beach manhole (BMH). BMHs are excavated manholes that provide connection points between submarine cable and either lightweight submarine or terrestrial cable. Landfall components between MLW and BMH would be trenched.
- **Overland Route:** This route involves installation of broadband FOC along terrestrial landscapes, including wetlands, inland lakes, and stream crossings. Lightweight submarine cables will be used where crossing wetlands, and armored submarine cable will be used where crossing rivers. Each overland route segment will begin and terminate within a BMH or a Connection Vault (CV).
- **Community Shore Route:** This route is the terrestrial FOC segment that connects BMHs or CVs with Cable Landing Stations (CLSs). CLSs house the infrastructure needed to convert incoming terrestrial cable to FTTP cable.

[2] Middle mile network refers to any broadband infrastructure that does not connect directly to an end-user location.

- **FTTP Route:** This route will bring cable from the CLSs, either trenched or attached to existing utility poles, to residential and commercial users. This segment will terminate the FOC route within each community.

Table 1-1 Project Summary

Project Component	Phase 1 Total Length (mi)	Phase 2 Total Length (mi)	Project Total Length (mi)	Phase 1 Associated Facilities	Phase 2 Associated Facilities
Marine (below MLW)	330.4	75.7	406.1	BU: 1	BU: 1
Landfall (MLW to BMH)	0.6	0.2	0.8	BMH: 3	BMH: 2
Overland	49.3	27.6	76.9	CV: 6	CV: 4
Community Shore Routes	1.2	0.6	1.8	CLS: 4	CLS: 2
FTTP	55.3[a]	15.2	70.5	None	None
Total	**436.8**	**119.3**	**556.1**	**—**	**—**

[a] Includes length of hybrid fiber-coaxial upgrades in Bethel

1.2 Purpose

The purpose of the proposed Project is to deliver fast, reliable broadband service to 10 rural Alaska Native villages. In doing so, the Project will help close the digital divide as well as promote economic development and social services within the YK Delta.

Servicing rural Alaska with broadband is a long-standing issue. Only 63 percent of rural Alaska residents have access to adequate internet speeds compared to 85.2 percent of all Alaska residents (State of Alaska 2021). The State of Alaska's Taskforce on Broadband has identified the communities to be serviced by the Project as being historically underserved. These communities are currently served by a combination of long-haul microwave and geostationary satellite earth stations for internet needs. While this form of internet has provided an important service, it is logistically challenging to maintain, and provides a slower and more expensive form of internet that has difficulties keeping up with data demands. As such, internet provided by microwave towers is only considered adequate where FOC is infeasible.

Upon completion, the Project will provide more than 10,000 residents of rural communities with upgraded internet connectivity. This will create opportunities transformational for historically underserviced areas of western Alaska, changing the way people across the YK Delta work, learn, and connect with each other and outside communities.

1.3 Proposed Action

The Project will extend broadband service from Dillingham to 10 western Alaska communities (Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk) by routing FOC along the ocean floor and submerged lands within the Kuskokwim River and its tributaries, and across terrestrial landscapes throughout the region (Figure 1).

Upon departing Dillingham, the FOC will be routed southward and westward along the ocean floor around Cape Newenham. The route will then travel northward, paralleling the Kuskokwim Bay shoreline. Within Kuskokwim Bay, a BU will extend the Phase 1 route to a landfall location at Platinum while the main marine route continues northward to the Kuskokwim River. Prior to entering the Kuskokwim River, a Phase 2 BU will bring FOC to Quinhagak.

The next Phase 1 landfall location will be approximately 13 miles up the Kuskokwim River on the western shore of the Eek River (Apogak landfall). From there, the Phase 1 route will connect to the communities of Eek, Oscarville, Napaskiak, and Bethel, running overland with creek, lake, and river crossings.. From Bethel, the Phase 2 FOC route will run northwestward over land and fresh waterbodies to bring broadband service to Atmautluak, Nunapitchuk, and Kasigluk. A separate marine route cable segment will take FOC from the Apogak landfall location back into the Kuskokwim River to Tuntutuliak

Cable installation will employ techniques to ensure reliable high-speed broadband internet can be sustained in the harsh conditions of the YK Delta. The cable will be trenched within the seafloor when necessary to protect it from outside aggression that could make the cable prone to fault. Terrestrial route components will take advantage of the unique wetland characteristics by laying the cable on the ground surface as much as possible, which will allow it to be overgrown by vegetation and eventually self-bury. Submarine splice cases will be used to protect the cable from wet conditions, alleviating the need for splice vaults within wetlands. Cable will be trenched across terrestrial landscapes in places where human, wildlife, and environmental interactions are likely. Additionally, the Project will use existing infrastructure, when possible, to deliver FOC to residential and commercial users.

2 Construction

The Project will consist of two phases. Project construction includes the following routes: marine, landfall, overland, community shore route, and FTTP. Figure 1 provides an overview of the Project. Unicom anticipates initiating marine and landfall construction during the ice-free months of 2024, overland and community shore route construction during winter 2024, and completing the Project in December 2026 (see Section 3 for further detail).

2.1 Marine Route

The marine route is defined as Project components taking place below MLW. Both phases of the Project have marine components. Phase 1 will construct the primary marine cable route and have one BU, while Phase 2 will build off Phase 1 with a second BU and a marine segment originating at the Apogak landfall.

The path chosen for the marine routes were identified through desktop studies and a marine route benthic survey. These engineering and field practices assist in selecting routes that provide considerations for environmental and anthropogenic forms of disturbance on the cable system that may lead to cable fault. The International Cable Protection Committee has identified fishing activities as the primary cause for submarine cable faults and repairs. As such, the proposed route avoids high-impact fishing grounds where possible. When ground fishing areas cannot be avoided, the cable will be buried. Nearshore 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 will rely on four or more vessels for construction operations. The vessel used for cable-laying operations will be dependent on local water depth, location, and cable-laying method. A cable ship (Inset 1) will be used for cable-laying operations within areas of the marine route with water depths exceeding 40 feet (ft) and will rely on dynamic positioning. Project elements in waters shallower than 40 ft will be conducted using either a tug and barge, a small landing craft stored on the cable ship, or a separate operation using an Alaska Vessel of Opportunity (VOO). Additionally, landfall locations will be assisted by a landing craft similar to the *Unalaq*. These vessels will have a shallow draft, making shallow waters and landings more accessible. Segments of the cable routed into the Kuskokwim River will be laid with a cable-laying barge and tug when they reach a depth of 40 ft within Kuskokwim Bay. Tug and barge operations will continue for these segments until they reach a landfall location within tributaries of the Kuskokwim River. The tug and barge will lay lightweight submarine cable while all other marine portions of the route will use either a single armor or double armor submarine cable. The submarine cable, measuring 1 inch in diameter, is constructed from benign materials and will not carry an electrical current.

Inset 1. *C.S. IT Intrepid*, Typical Cable Laying Ship

For marine components, the cable will either be laid on top of the seafloor or buried within a trench (i.e., trenching). Cable will be laid on the seafloor within areas identified as low risk to cable disturbance or when traversing seafloor substrates that do not allow for trenching. When placing cable on the seafloor, bathymetric conditions will 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, trenching will be used where there is significant risk of outside disturbance to the cable. Local reroutes or cable armoring will be implemented in high-risk areas where the substrate does not allow for trenching.

Prior to trenching operations on the seabed, a pre-lay grapnel run (PLGR) will be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation will 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 along the route over the seabed. Any debris recovered by the grapnel will be discharged ashore upon completion of the operations and disposed in accordance with local regulations. If debris cannot be recovered, then a local re-route will be planned to avoid the debris. The PLGR operation will be conducted to industry standards employing towed grapnels, and the type of grapnel will be determined by the nature of the seabed.

Trench burial within waters deeper than 40 ft will be conducted using a cable plow. Trenching within deep sea segments will protect the FOC against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow will be pulled along the seafloor by a tow wire connected to the cable ship. The cable will 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 will exit the lower aft end of the share blade, and the sediments will immediately collapse on top of the cable, behind the plow. This form of burial will eliminate side cast because the excavated substrate will be returned to the trench immediately after the cable is laid. As a result of the immediate burial, absence of side cast, and narrow excavation footprint, cable plow trenching incurs only minimal and temporary impacts.

In waters shallower than 40 feet, trenching will take place in areas where cable protection from additional environmental conditions, such as surf action and ice scour, are needed. At these depths, 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 water used for jetting is supplied from the surface by high pressure hoses. This system will allow for jetting pressure and flow rates to be manipulated based on local conditions. The pressurized water will be focused on the seafloor, liquifying the substrate. The cable will then sink within the trench without side cast. The elimination of side cast and narrow excavation footprint results in limited and temporary impacts. The jet sled will be accompanied by divers who will monitor trenching performance and assist in operations. Inset 2 shows a typical jet sled.

Inset 2. Typical Jet Sled

Upon completion of cable-laying operations, a post-lay inspection and burial will be conducted using a ROVJET 207, or similar remotely operated vehicle (ROV). The purpose of the post-lay inspection and burial is to inspect portions of the cable ship route where laying operations may have encountered difficulties. These difficulties include plow failure, unplanned cable repair, uncontrolled cable payout, or other unplanned events. Where burial corrections need to be made, the ROV will use jet burial, similar to that of the jet sled, and trench the cable. The ROV will be operated remotely from the cable laying ship; pulsed sounds will be generated from the ROV, and cameras will be used for positioning and orientation.

2.1.1 Phase 1

The Phase 1 marine route includes sections between Dillingham MLW and Apogak MLW, in addition to a segment between the Platinum BU in Kuskokwim Bay to Platinum MLW. To reach the Apogak landing site, the cable will be routed up the Kuskokwim River and into the Eek River. The cable will be surface laid across the riverine areas so natural sediment transport can passively bury the cable. Table 2-1 summarizes the cable laying impacts for the Project's marine portions during Phase 1.

Table 2-1. Marine Route Summary

FOC Route Segment	Cable Installed by Cable Ship (mi)[a]	Cable Installed by VOO, Tug and Barge, or Landing Craft (mi)[b]	Total Length (mi)
Phase 1	—	—	—
Dillingham MLW to Apogak MLW	234.8	73.6	308.4
Platinum BU to Platinum MLW	11.1	10.9	22.0
Phase 1 Total	**245.9**	**84.5**	**330.4**
Phase 2	—	—	—
Quinhagak BU to Quinhagak MLW	—	20.1	20.1
Apogak MLW to Kinak River OHW at Tuntutuliak	—	55.6	55.6
Phase 2 Total	**—**	**75.7**	**75.7**
Project Total	**245.9**	**160.2**	**406.1**

[a] In waters deeper than 40 ft, cable may be surface laid or trenched with a cable plow
[b] In waters shallower than 40 ft, cable may be surface laid or trenched with a jet sled

2.1.2 Phase 2

Marine elements of Phase 2 consist of a BU extending FOC from the Phase 1 marine route to Quinhagak, while an additional segment of submarine FOC will connect the Apogak landfall to Tuntutuliak. The cable will be surface laid in the Eek, Kuskokwim, and Kinak Rivers to reach Tuntutuliak. Sediment transport is expected to self-bury the cable within the substrate. The marine portion of the FOC route will terminate when it reaches Tuntutuliak above tidal influence at ordinary high water (OHW). Table 2-1 summarizes the cable laying impacts for the Project's marine portions during Phase 2.

2.2 Landfall Route

The landfall route (Inset 3) includes segments of the cable route between MLW and each landfall's co-located BMH. Landfall construction will occur concurrently with marine construction.

Inset 3. Typical Landfall Installation

At each landfall, the cable will 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 lightweight submarine or terrestrial cable that will connect to existing Unicom facilities. Each BMH will measure 3 ft by 4 ft by 4 ft, or 48 cubic feet (ft^3). Excavation dimensions may vary by shoreline, bank contours, and substrate but will not exceed 5 ft by 5 ft by 5 ft, or 125 ft^3. Inset 4 depicts a typical BMH. BMHs are positioned above the high tide line (HTL). Landfall trenching will be conducted with either a rock saw or backhoe. Rock saw trenches are typically 6 inches wide and 8 inches deep, while backhoe trenches are 3 ft wide and 3 ft deep (Figure 6). When the situation allows, chain trenchers will replace the backhoe for excavation. Chain trenchers excavate smaller trenches and have less associated side cast. When deemed necessary, additional protections may be provided to the cable at landfall locations with split pipe articulated armor. Two 4-inch (10.1-centimeter) conduits will be buried at no deeper than 36 inches (91 centimeters) and extend from the BMH to the beach area above MLW, allowing the bank to be disturbed only once. Conduit installation will be conducted in a controlled manner using best management practices prior to the arrival of the cable ship.

Inset 4. Typical BMH

Excavated material from trench construction as well as BMH or CV excavation will be side cast temporarily (i.e., less than 1 week). Landfall substrates are primarily composed of cobble or larger materials. In instances where landfall locations require excavation in soft substrates, such as mudflats or beaches composed primarily of other fine sediments, side cast material will be underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practical. Standard trenching techniques will be used to trench and re-grade trenched areas to pre-existing contours. Trench design and backfill methods have been created with the intention of preventing constructed areas from collecting excess water and acting as a drain.

For the cable trench in intertidal and terrestrial areas, the maximum side cast width will be 5 ft, for an overall disturbance width of 8 ft. Once the conduit and BMH or CV are installed, or cable has been laid, the side cast material will be used to bury the conduits or cable. Unicom does not intend to re-enter BMHs or CVs for 25 years unless required to address a service or maintenance issue. Cable-trenching work within wetlands and waterbodies under U.S. Army Corps of Engineers (USACE) jurisdiction is considered a temporary impact, and placement of BMHs and CVs is considered a permanent impact. Minimal excess material is anticipated after compaction of the trench post-construction. Any excess material still present will be disposed at an upland location.

While conducting landfall construction, care will be taken to protect shorelines from future erosion. Additionally, best practices will be employed to address stormwater runoff concerns. For all intertidal work (MLW to HTL), construction operations will occur only during low tide. When constructing on shorelines without firm sediments such as large boulders, heavy equipment will be placed on mats to protect the substrate from slumping and erosion. Alterations to shorelines will be temporary.

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
- Landing craft similar to the *Unalaq*

2.2.1 Phase 1

Phase 1 will include landfall locations at Dillingham, Platinum, and on the eastern side of the Eek River (i.e., Apogak Landfall) shown in Figure 2 Sheets 1, 2, and 5 respectively. Table 2-2 provides BMH locations and impacts for Phase 1. Table 2-3 provides landfall impacts.

Table 2-2. BMH Locations and Impacts

BMHs	Location (coordinates, WGS84)	Located in Wetlands and Waterbodies	Volume Excavated in Wetlands (yd³)
Phase 1	—	—	—
Dillingham BMH	59.003215°, -158.535947°	No	—
Platinum BMH	59.009890°, -161.821450°	No	—
Apogak BMH	60.148781°, -162.175582°	Yes	5
Phase 1 Total	—	—	**5**
Phase 2	—	—	—
Quinhagak BMH	59.742160°, -161.927619°	Yes	5
Tuntutuliak BMH	60.337980°, -162.663123°	Yes	5
Phase 2 Total	—	—	**9**
Project Total	—	—	**14**

Notes: WGS84 = World Geodetic System Datum 1984; yd^3 = cubic yards

Table 2-3. Landfall Impacts

FOC Landfall Segment	Cable Trenched in Intertidal Zone (MLW-HTL; ft)	Cable Trenched between HTL and BMH (ft)	Volume Trenched in Intertidal Zone (yd³)	Volume Trenched between HTL and BMH (yd³)
Phase 1	—	—	—	—
Dillingham Landfall	516	271	172	90
Platinum Landfall	523	152	174	51
Apogak Landfall	327	1,529	109	510
Phase 1 Total	**1,366**	**1,952**	**455**	**651**
Phase 2	—	—	—	—
Quinhagak Landfall	328	344	109	115
Tuntutuliak Landfall	24[a]	109	8[a]	36
Phase 2 Total	**352**	**453**	**117**	**151**
Project Total	**1,718**	**2,405**	**572**	**802**

Notes: yd^3 = cubic yards
[a] Below OHW

2.2.2 Phase 2

Phase 2 will have two landfall locations accompanied by BMHs: one in Quinhagak, and one in Tuntutuliak as shown in Figure 2 Sheets 3 and 4. The Tuntutuliak landfall location occurs on the banks of the Kinak River. However, typical landfall construction methods and best practices will still apply. Table 2-2 provides BMH locations and impacts for Phase 1. Table 2-3 provides landfall impacts.

2.3 Overland Route

The overland route is defined as segments of the FOC route that both begin and terminate within a BMH or CV. The overland route between Bethel and Oscarville will use pre-existing riser poles and other infrastructure; therefore, it will incur no additional surface impacts. The overland route between Nunapitchuk and Kasigluk will be conducted on existing infrastructure and will not result in surface impacts.

Inland communities not collocated with a marine landfall location will use a CV in lieu of a BMH. CVs house the splice between incoming lightweight submarine cable and outgoing terrestrial cable. Excavation dimensions and considerations for BMHs will be the same for CVs (Figure 4).

Overland route segments crossing extensive wetlands will be installed in the winter months, when the substrate is frozen, to minimize ground disturbances. The frozen ground helps protect vegetation while also being stable enough to support heavy equipment. Wetland segments will use a lightweight submarine cable provided in 20,000-ft (3.78-mi) segment spools that are towed by light tracked vehicles. Lightweight submarine cables will be coated in high-density polyethylene and measure approximately 0.5 inch in diameter. A splice joint case 10 inches in diameter and 6.5 feet long will be located approximately every 20,000 feet along the route, joining spool segments. Additional slack will 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 will either be laid across the ground surface or trenched. Placing the cable directly on the ground significantly reduces wetland impacts and is, therefore, the preferred installation method. The cable will be 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 riser poles, it will be buried within 0.6 mi of each receiving community. Trenching activities will be conducted with a backhoe along stream and riverbanks. All other trenching activities will be conducted by a rock saw.

The process of laying cable within wetlands will begin by removing deep snow from the cable route. Buried cable segments over wetlands will then be excavated and the cable laid directly within the trench. Side cast material will be temporarily placed (i.e., less than 1 week) adjacent to the trench on the ice surface and then replaced in the trench and recontoured to original pre-existing conditions. Trench depth will be targeted at 8 inches but will vary with the terrain. However, trench depth will always be contained within the organic vegetation mat, which balances allowing the trench to heal while providing sufficient protections for the cable.

When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface that will allow it to passively drop into the waterbody during spring break-up. When the cable sinks into the water body, the weight of the cable will allow it to self-bury within aquatic bed sediments. Submarine cable will be used to cross streams and rivers. The cable will be spliced with the overland route cable and buried into each stream bank below OHW. Best management practices will be used to avoid bank erosion and creating drainage paths. Side cast will be replaced after the cable is laid (i.e., less than 1 week). Split pipe articulated armor may be deployed in stream crossings for extra stabilization and protection.

Segments crossing major rivers (i.e., Pikmiktalik and Johnson Rivers) will use a landing craft to lay lightweight submarine cable across the river. Natural sediment transport will passively bury the cable. Additionally, the cable will be equipped with an outer plastic covering to avoid frazil ice buildup. Care will be taken to position the crossings on stable banks to provide erosion protection. Major river crossings will be conducted during ice free periods.

When constructing on soft and unstable sediments, heavy equipment will be placed on mats. The position of the laid cable will be recorded with a survey quality Global Positioning System. Post-lay inspection for terrestrial components will be conducted following snow and ice melt. Any cable left suspended after melt will be repositioned so as not to be hazardous for humans or animals. Cable repositioning will be done manually by moving the installed slack cable accordingly. If needed, the cable will be pinned to the ground using small duckbill anchors that will be installed using a hammer and drive pin. Cable left on the vegetation will sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Helicopter and walking inspections will be conducted on an annual basis to monitor erosion and bank failure.

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

2.3.1 Phase 1

Phase 1 overland routes will be composed of four different FOC segments: Apogak BMH to Eek South CV (Figure 2 Sheet 5), Eek North CV to Napaskiak CV (Figure 2 Sheets 5, 6, 7, and 8), Napaskiak CV to Oscarville CV (Figure 2 Sheet 8), and Oscarville CV to Bethel South CV (Figure 2 Sheets 8 and 9). Cable will be routed from Oscarville to Bethel on existing utility poles. The portion of the route between Eek and Napaskiak will be the longest overland segment in the Project and will cross extensive wetlands with lakes, ponds, and streams.

Bethel and Eek will have two collocated CVs, while Dillingham, Napaskiak, and Oscarville will have one CV in each community. Only one of Bethel's CVs are considered Phase 1. No CVs will be installed in Platinum. Table 2-4 provides CV locations and impacts and Table 2-5 provides the overland route impacts.

Table 2-4. CV Locations and Impacts

CVs	Location (coordinates, WGS84)	Located in Wetlands and Waterbodies	Volume Excavated in Wetlands (yd^3)	Incoming Cable Method	Outgoing Cable Method
Phase 1	—	—	—	—	—
Eek South CV	60.212762°, -162.012925°	Yes	5	Trenched	Trenched
Eek North CV	60.216803°, -162.011294°	Yes	5	Trenched	Trenched
Napaskiak CV	60.706784°, -161.769940°	No	—	Trenched	Riser Pole
Oscarville CV	60.720960°, -161.771455°	Yes	5	Trenched	Trenched
Bethel South CV	60.783900°, -161.785578°	No	—	Riser Pole	Existing Cable
Phase 1 Total	**—**	**—**	**14**	**—**	**—**
Phase 2	—	—	—	—	—
Bethel North CV	60.808306°, -161.825368°	No	—	Existing Cable	Trenched
Atmautluak CV	60.858050°, -162.281393°	Yes	5	Trenched	Trenched
Nunapitchuk CV	60.896319°, -162.455318°	Yes	5	Trenched	Riser Pole
Quinhagak CV	59.742777°, -161.914919°	Yes	5	Trenched	Existing Cable
Phase 2 Total	**—**	**—**	**14**	**—**	**—**
Project Total	**—**	**—**	**28**	**—**	**—**

Notes: WGS84 = World Geodetic System Datum 1984; yd^3 = cubic yards

Table 2-5. Overland Route Impacts

FOC Route Segment	Cable Surface Laid on Uplands (mi)	Cable Surface Laid on Wetlands and Waterbodies (mi)	Attached to Existing Aerials (mi)	Cable Trenched in Uplands (mi)	Cable Trenched in WOTUS (mi)	Volume Trenched in Uplands (yd^3)	Volume Trenched in WOTUS (yd^3)
Phase 1	—	—	—	—	—	—	—
Apogak BMH To Eek Village South CV	—	6.8	—	—	0.5	—	32
Eek Village North CV to Napaskiak CV	—	35.0	—	<0.1	1.3	1	200
Napaskiak CV to Oscarville CV	—	0.9	—	<0.1	<0.1	75	126
Oscarville CV to Bethel South CV	—	—	4.7	—	—	—	—
Phase 1 Total	**—**	**42.7**	**4.7**	**<0.1**	**1.8**	**76**	**358**
Phase 2	—	—	—	—	—	—	—
Bethel North CV to Atmautluak CV	—	19.6	—	<0.1	0.6	1	64
Atmautluak CV to Nunapitchuk CV	—	6.7	—	—	0.2	—	301
Nunapitchuk CV to Kasigluk CV	—	—	—	—	—	—	—
Quinhagak BMH to Quinhagak CV	—	—	—	—	0.5	—	793
Phase 2 Total	**—**	**26.3**	**—**	**<0.1**	**1.3**	**1**	**1,158**
Project Total	**—**	**69.0**	**4.7**	**<0.1**	**3.1**	**77**	**1,516**

Notes: WOTUS = Waters of the United States; yd^3 = cubic yards; total values may not add up due to rounding

2.3.2 Phase 2

The Phase 2 overland route will be composed of FOC segments from the Bethel North CV to Atmautluak CV (Figure 2 Sheets 10 and 11), Atmautluak CV to Nunapitchuk CV (Figure 2 Sheet 11 and 12), and Quinhagak BMH to Quinhagak CV (Figure 2 Sheet 3). The overland route between Nunapitchuk and Kasigluk will be conducted on existing infrastructure and will not incur any impacts from the Project. Additionally, overland route construction will be conducted with an excavator and use standard trenching within Quinhagak.

Each community in Phase 2, except Tuntutuliak, will require one new CV. Table 2-4 provides CV locations and impacts and Table 2-5 provides the overland route impacts.

2.4 Community Shore Route

Community shore routes include segments of the FOC between each community's BMH or CV and the CLS. The BMHs and CVs located adjacent to communities will house the splice between overland or marine route cable and terrestrial cable. The terrestrial cable will extend beyond these splicing houses to a CLS. Each CLS will be equipped with fully redundant heating, ventilation, and air conditioning as well as direct current power systems with 8-hour battery backup. The redundant power generators and transfer switching capability will provide additional resiliency and the quick provision of long-term back-up power in the event of a community power grid failure. All facilities will be designed for full-capacity power consumption at commissioning and will not require upgrades as the network carries more traffic. CLS construction and impacts are included in this section.

Cable segments within community shore routes will be trenched or attached to existing utility poles. Trenching will be excavated using backhoes using conventional trenching methods. When possible, the cable will be routed adjacent to existing roads. Excavated material will be temporarily side cast (i.e., less than 1 week) next to the trench and used to bury the cable. Backhoes and standard trenching techniques will be used to re-grade the BMH or CV footprint as well as all trenched areas to original pre-existing contours. Trenching components will employ best management practices to prevent erosion and water discharge.

Where possible, each CLS facility will be constructed adjacent to existing Unicom facilities. CLSs will be built on gravel pads that are 50 ft wide, 60 ft long, and 5 ft deep. Each CLS will require excavation of up to 2-ft (222 cubic yards [yd^3]) and placement of 555 yd^3 of fill. Inset 5 shows a typical CLS. A CLS cross section with gravel pad specifics is provided in Figure 5.

Inset 5. Typical CLS

In general, equipment used for community shore routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.4.1 Phase 1

Each Phase 1 community except for Bethel and Oscarville will have one collocated CLS. Table 2-6 provides the CLS locations and impacts and Table 2-7 provides community shore route cable laying impacts by community.

Table 2-6. CLS Facilities and their Impacts

CLS	Location (coordinates, WGS84)	Located in Wetlands and Waterbodies	Volume Excavated in Wetlands (yd^3)
Phase 1	—	—	—
Dillingham	58.999463°, -158.544930°	Yes	222
Platinum	59.013073°, -161.818662°	No	—
Eek	60.215998°, -162.011887°	Yes	222
Napaskiak	60.707111°, -161.764616°	No	—
Phase 1 Total	—	—	—

CLS	Location (coordinates, WGS84)	Located in Wetlands and Waterbodies	Volume Excavated in Wetlands (yd^3)
Phase 2	—	—	***444***
Tuntutuliak	60.339825°, -162.666535°	Yes	222
Nunapitchuk	60.897441°, -162.456898°	Yes	222
Phase 2 Total	—	—	**444**
Project Total	—	—	**889**

Notes: WGS = World Geodetic System Datum 1984; yd^3 = cubic yards; total values may not add up due to rounding
[a] CLS on existing gravel pad

Table 2-7. Community Shore Route Impacts

Community	Fiber trenched in Uplands (linear ft)	FOC trenched in Wetlands (linear ft)	Aerial Attachment (linear ft)	Volume Trenched in Uplands (yd^3)	Volume Trenched in Wetlands (yd^3)
Phase 1	—	—	—	—	—
Dillingham	839	—	—	280	—
Platinum	1,818	—	—	606	—
Eek	—	1,662	—	—	554
Napaskiak	975	—	1,226	325	—
Oscarville	—	27	—	—	9
Bethel	—	—	—	—	—
Phase 1 Total	**3,632**	**1,688**	**1,226**	**1,211**	**563**
Phase 2	—	—	—	—	—
Quinhagak	—	—	—	—	—
Tuntutuliak	—	—	1,095	—	—
Atmautluak	—	97	—	—	32
Nunapitchuk	—	—	1,831	—	—
Kasigluk	—	—	—	—	—
Phase 2 Total	**0**	**97**	**2,926**	**0**	**32**
Project Total	**3,632**	**1,785**	**4,153**	**1,211**	**595**

Notes: yd^3 = cubic yards; total values may not add up due to rounding

2.4.2 Phase 2

Table 2-6 provides the CLS locations and impacts and Table 2-7 provides community shore route cable laying impacts by community.

2.5 FTTP Routes

FTTP begins at the CLS, which houses the FTTP local access distribution equipment. FTTP is then routed throughout the community, connecting to local nodes where splitters enable branching into feeder lines that deliver connectivity to the premise locations.

FTTP will be distributed throughout communities by trenching or attaching cable to existing utility poles. No new utility poles will be constructed for the Project; it will instead use existing utility poles where they are present. When utility poles are not present, the FTTP route will be trenched.

When possible, this will occur along existing roads and rights-of-way. FTTP trenching will be conducted by a backhoe and employ standard trenching practices.

Upon construction completion, all trenched areas will be re-graded to original pre-existing contours. No excess material is anticipated to be produced that will require disposal.

In general, equipment used for FTTP routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.5.1 Phase 1

No FTTP installation will occur within Bethel. Instead, Bethel will rely on hybrid fiber-coaxial upgrades to their existing fiber network for broadband distribution. FTTP routes for the remaining communities are provided in Figure 2 Sheets 2, 5, 8, and 9. Table 2-8 provides FTTP cable impacts for Phase 1.

Table 2-8. FTTP Details

Community	FTTP Trenched in Wetlands (linear ft)	FTTP Trenched in Uplands (linear ft)	Aerial Hanging FTTP (linear ft)	Total FTTP (linear ft)
Phase 1	**—**	**—**	**—**	**—**
Platinum	4,519	1,060	—	5,579
Eek	—	—	15,540	15,540
Napaskiak	—	—	14,807	14,807
Oscarville	—	—	2,786	2,786
Bethel	—	—	—	—
Phase 1 Total	**5,579.3**	**1,060**	**33,133**	**38,712**
Phase 2	**—**	**—**	**—**	**—**
Quinhagak	—	—	20,356	20,356
Tuntutuliak	—	—	16,466	16,466
Nunapitchuk	—	—	12,823	12,823
Atmautluak	—	—	10,991	10,991
Kasigluk	—	—	19,785	19,785
Phase 2 Total	**—**	**—**	**80,422**	**80,421**
Project Total	**5,579.3**	**—**	**113,554**	**119,133**

2.5.2 Phase 2

Table 2-8 provides FTTP cable impacts for Phase 2. Phase 2 FTTP routes are shown in Figure 2 Sheets 3, 4, 11, and 12.

3 Construction Schedule

Project construction is anticipated to begin in 2024 and end in 2026. It is anticipated that Phase 1 construction will be completed in November 2025, and Phase 2 construction will be completed in December 2026 (Figure 1).

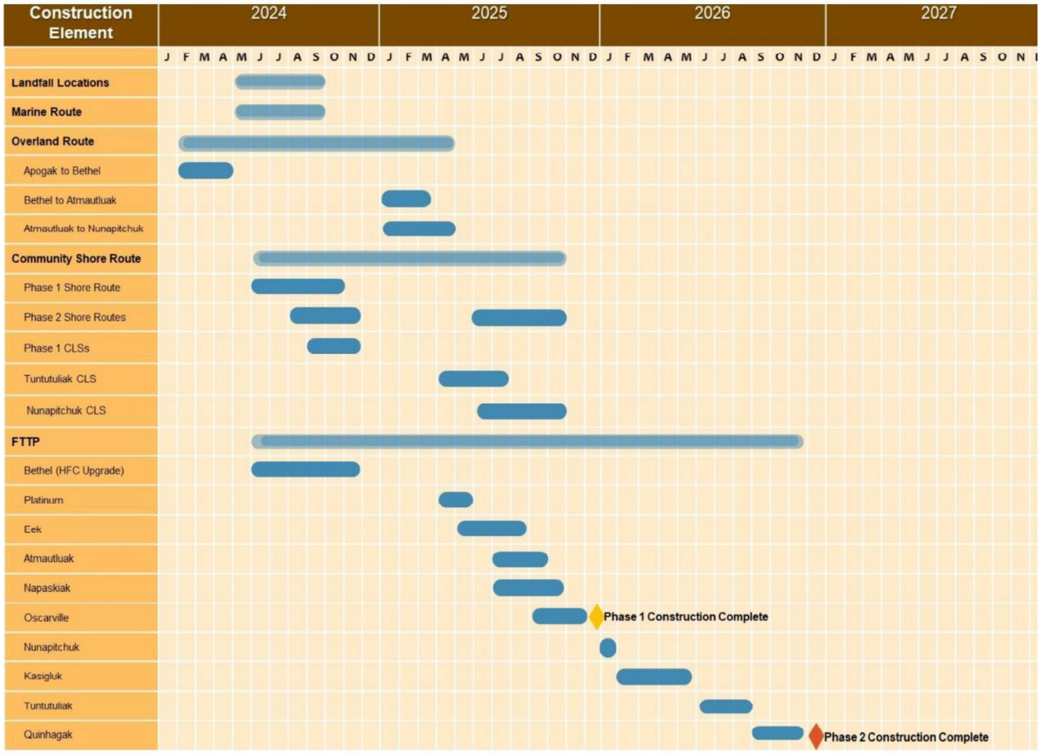

Figure 1 Airraq Network Schedule

4 Environmental Commitments

The following is a list of environmental commitments and mitigation measures included in the proposed action to ensure terrestrial wetlands retain their integrity post-construction:

- Heavy equipment working within wetlands or mudflats will be placed on mats, or other measures will be taken to minimize soil disturbance.
- All exposed soil and other fills, as well as any work below OHW, will be permanently stabilized at the earliest practicable date. When possible, work within Waters of the United States (WOTUS) will be performed during periods of no or low flow, or during low tides.
- Winter landfall and overland construction will limit ground disturbance and protect vegetation from heavy equipment and temporary side cast.
- Temporary fills will be removed in their entirety, and the affected areas will be returned to pre-construction elevations. The affected areas will be revegetated, as and when appropriate. Proper seeding of all areas under threat of erosion or unstable soil post-Project will be seeded with appropriate grass seed to maintain solid soil stability. Any affected areas of vegetation will be revegetated to the greater standard between the Storm Water Pollution Prevention Plan or Environmental Assessment standards.
- Native vegetation and topsoil removed for Project construction will be stockpiled separately and used for site rehabilitation. Species to be used for seeding and planting will follow this order of preference:
    - Species native to the site,
    - Species native to the area, and
    - Species native to the state.
- Trenches may not be constructed or backfilled in such a manner as to drain WOTUS (e.g., backfilling with extensive gravel layers, creating a French drain effect). Ditch plugs or other methods will be used where appropriate as preventative measures.
- Any excess material will be removed to an upland (non-wetland) location.
- Except in areas of topsoil excavation, excavated soils will be sorted into mineral subsoils and topsoil (i.e., the upper, outermost layer of soil; usually the top 2 to 8 inches).
- The permittee will provide the USACE a signed certification document upon completion of the authorized activity.

5 Summary of Impacts to Waters of the United States

The Project will involve work in aquatic resources and will impact WOTUS under USACE jurisdiction per Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. WOTUS impacted by the proposed Project include tidelands, wetlands, and navigable waters. The proposed Project does not extend beyond the continental shelf but does extend more than 3 miles offshore.

U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data are available for the majority of the Project area and were used to calculate impacts to WOTUS (USFWS 2023). Where NWI data are not present, all undisturbed, vegetated areas above HTL are assumed wetland. All wetlands and waterbodies within the Project area are assumed to be subject to USACE jurisdiction under Section 404 of the Clean Water Act.

Complete avoidance of impacts to WOTUS is not feasible; however, impacts will be minimized by siting Project features within developed/disturbed areas to the greatest extent practicable. Any trenching work conducted within vegetated areas will result in temporary impacts to jurisdictional resources, and all fill (for BMHs, CLSs, and CVs) will result in permanent impacts to jurisdictional resources. Figure 3 shows all temporary and permanent impacts to WOTUS in addition to surface laying and aerial-hung components of the FOC route.

The Project likely qualifies for Nationwide Permit 57 – Electric Utility Line and Telecommunications Activities. Permanent impacts to WOTUS are less than 0.5 acre, temporary fills will be removed in their entirety, and affected areas will be returned to pre-construction contours. The Project will comply with the Section 404 Nationwide Permit regional and general conditions.

5.1 Permanent Impacts to Waters of the United States

Permanent impacts will include installation of BMHs, CVs, and fill to create gravel foundations for CLS facilities. The estimated area of affected wetlands and fill volume constituting permanent impacts from the proposed Project footprint is 0.28 acre and 2,238.2 yd^3 of fill, as shown in Table 5-1. All permanent impacts will be to wetlands located above the HTL (Section 404). No permanent impacts will occur to Section 10 waters. Figure 4 shows a typical BMH, and Figure 5 shows a typical CLS.

Table 5-1. Permanent Impacts to Wetlands

Project Element	Location (coordinates, WGS84)	Permanent WOTUS Fill Area (acres)	Fill Volume (yd^3)	Volume Excavated in WOTUS (yd^3)
CLS	—	—	—	—
Dillingham	58.999463°, -158.544930°	0.07	555.5	222.2
Eek	60.215998°, -162.011887°	0.07	555.5	222.2
Nunapitchuk	60.897441°, -162.456919°	0.07	555.5	222.2
Tuntutuliak	60.339824°, -162.666557°	0.07	555.5	222.2
CLS Total	—	**0.28**	**2,222.0**	**888.8**

Project Element	Location (coordinates, WGS84)	Permanent WOTUS Fill Area (acres)	Fill Volume (yd³)	Volume Excavated in WOTUS (yd³)
BMH/CV[a]	—	—	—	—
Apogak BMH	60.148781°, -162.175582°	<0.01	1.8	4.6
Eek South CV	60.212762°, -162.012925°	<0.01	1.8	4.6
Eek North CV	60.216803°, -162.011294°	<0.01	1.8	4.6
Tuntutuliak BMH	60.337980°, -162.663123°	<0.01	1.8	4.6
Oscarville CV	60.720960°, -161.771455°	<0.01	1.8	4.6
Atmautluak CV	60.858050°, -162.281393°	<0.01	1.8	4.6
Nunapitchuk CV	60.896319°, -162.455318°	<0.01	1.8	4.6
Quinhagak BMH	59.742160°, -161.927619°	<0.01	1.8	4.6
Quinhagak CV	59.742777°, -161.914919°	<0.01	1.8	4.6
BMH/CV Total	**—**	**<0.01**	**16.2**	**41.4**
Project Total	**—**	**0.28**	**2,238.2**	**930.2**

Notes: WGS84 = World Geodetic System Datum 1984; yd³ = cubic yards
[a] Requires 5- by 5-ft area to be excavated prior to placement. Each BMH/CV (3- by 4- by 4-ft area) is permanent fill. The area surrounding the BMH/CV (<0.01 acre) will be backfilled with native substrate.

5.2 Temporary Impacts to Waters of the United States

Temporary impacts below MHW from trenching, jet sled, and plowing operations will total approximately 198.9 linear miles over an area of approximately 24.0 acres. The estimated area of temporarily affected WOTUS, between MHW and HTL from trenching is approximately <0.1 linear mile over an area of <0.01 acre. Temporary impacts from trenching in all other WOTUS above the HTL is approximately 3.4 linear miles over an area of 0.6 acre. In total, the Project will temporarily impact 202.3 linear miles over an area of 26.4 acres of WOTUS. Table 5-2 provides all temporary impacts. Figure 6 provides trenching dimensions.

Table 5-2. Surface Laying and Temporary Impacts within WOTUS

Project Activity	Length (linear mi)	Trench Area (acres)	Side Cast Surface Area (acres)	Trench Volume (yd³)
Below MHW	—	—	—	—
Cable Plow[a]	196.8	23.9	—	192,426.7
Jet Sled[b]	1.8	0.1	—	—
Standard Trench[c]	0.3	<0.1	0.2	458.3
Surface Laid[d]	208.7	—	—	—
Below MHW Total	**407.6**	**24.0**	**0.2**	**192,885.0**
Between MHW and HTL	—	—	—	—
Standard Trenching[c]	<0.1	<0.1	<0.1	87.2
Between MHW and HTL Total	**<0.1**	**<0.1**	**<0.1**	**87.2**
Above HTL	—	—	—	—
Standard Trenching[c, e]	1.1	0.4	0.7	1,982.2
Trenching (Rock Saw)[f]	2.3	0.2	0.3	150.0
Surface Laid[d]	68.1	—	—	—
Above HTL Total	**71.5**	**0.6**	**1.0**	**2,132.2**
Project Total[g]	**479.1**	**24.6**	**1.2**	**195,104.4**

Notes: yd³ = cubic yards; total values may not add up due to rounding
[a] Cable plow trench dimensions will be 1 ft wide by 5 ft deep. No side cast will be created from this trenching method.
[b] Jet sled will disturb an area 8 inches wide and approximately 1 ft deep. No side cast will be created from this method.
[c] Standard trenching dimensions will be 3 ft wide and 3 ft deep with a side cast area of 5 ft.
[d] Trenching will not be involved; no associated impacts.
[f] Rock saw trenching dimensions will be 8 inches wide and 6 inches deep with a side cast of approximately 12 inches.
[g] Does not include FOC attached to existing utility poles.

6 Additional Pre-Construction Notification Resources

Endangered Species and Critical Habitat: Two Biological Assessments were completed for the project. NMFS and USFWS concurred that the Project may affect, but is not likely to adversely affect, or result in adverse modification of, critical habitat for any federally listed species under the Endangered Species Act (ESA; Appendix A and B, respectively) for the species listed in Table 6-1.

Table 6-1. Consulted NMFS and USFWS managed ESA Species

Species	ESA Status	Critical Habitat within Action Area	Agency
Bearded Seal Beringia DPS (*Erignathus barbatus*)	Threatened	No	NMFS
Fin Whale (*Balaenoptera physalus*)	Threatened	No	NMFS
Gray Whale Western North Pacific DPS (*Eschrichtius robustus*)	Threatened	No	NMFS
Humpback Whale Mexico DPS (*Megaptera novaeangliae*)	Threatened	No	NMFS
Humpback Whale Western North Pacific DPS (*Megaptera novaeangliae*)	Threatened	No	NMFS
North Pacific Right Whale (*Eubalena japonica*)	Threatened	No	NMFS
Ringed Seal Arctic Subspecies (*Pusa hispida*)	Threatened	No	NMFS
Sperm Whale (*Physeter microephalus*)	Threatened	No	NMFS
Steller Sea Lion Western DPS (*Eumetopias jubatus*)	Endangered	Yes	NMFS
Steller's Eider (*Polysticta stelleri*)	Threatened	No	USFWS
Spectacled Eider (*Somateria fischeri*)	Threatened	No	USFWS
Short-tailed Albatross (*Phoebastria albatrus*)	Endangered	No	USFWS
Northern Sea Otter – Southwest Alaska DPS (*Enhydra lutris kenyoni*)	Threatened	No	USFWS

Notes: DPS = Distinct Population Segment

Cultural and Historic Resources: A desktop *Cultural Resources Data Gap Analysis Report* (Appendix C) has been completed for the Project. NTIA, as the lead federal agency, intends to initiate consultation under Section 106 of the National Historic Preservation Act in the near future.

7 Pre-Construction Notification Form Supplemental Information

7.1 Receiving Waters

Receiving waters include:

- Apogak Slough
- Bering Sea
- Bristol Bay
- Eek Channel
- Eek Lake
- Eek River
- Eenayarak River
- Johnson River
- Kanektok River
- Kinak River
- Kongeruk River
- Kukthluk River
- Kuskokwim Bay
- Kuskokwim River
- Lomavik River
- Nakee Creek
- Napaskiak Slough
- Nunavakanukakslak Lake
- Nushagak Bay
- Nushagak River
- Pikmiktalik River
- Portage Route
- Smalls River
- Tupuknuk Slough

7.2 Township, Range, and Section

The proposed Project will occur within the Seward Meridian within the Township, Range, and Sections listed in Table 7-1.

Table 7-1. Townships, Ranges, and Sections Intersected by the Project

Township	Range	Section
55W	13S	31
55W	14S	6
55W	19S	30, 31, 32
56W	13S	36
56W	14S	1, 12, 13, 23, 24, 26, 34, 35
56W	15S	3, 4, 9, 16, 17, 20, 29, 32
56W	16S	5, 8,17, 20, 28, 29, 33

Township	Range	Section
56W	17S	7, 18, 19, 20, 29, 32, 33
56W	18S	4, 9, 10, 15, 22, 27, 34, 35
56W	19S	2, 11, 13, 14, 24, 25
57W	17S	1, 12
57W	21S	36
61W	22S	31, 32, 33, 34
71W	6N	6,
71W	7N	5, 8, 9, 17, 20, 29, 30, 31
71W	8N	4, 5, 6, 7, 8, 9, 10, 16, 17, 18, 20, 29, 32
71W	9N	19, 20, 21, 22, 26, 27, 35
72W	5N	4, 8, 9, 17, 20, 29, 31, 32
72W	6N	1, 11, 12, 14, 22, 23, 27, 33, 34
72W	8N	1, 11, 12, 13, 14, 15, 23, 24
72W	9N	19, 20, 21, 22, 23, 24
73W	1N	6, 7
73W	2N	6, 7, 18, 19, 20, 29, 31, 32
73W	3N	4, 5, 8, 17, 18, 19, 30, 31
73W	4N	4, 9, 16, 17, 20, 21, 28, 33
73W	9N	17, 19, 20, 24, 25, 26, 27, 28, 29, 30
74W	1N	11, 12, 14, 15, 16, 20, 21, 29, 30, 31
74W	2N	36
74W	5S	8, 9, 16, 17, 18
74W	9N	4, 5, 6, 8, 9, 10, 11, 13, 14, 24
75W	1N	36
75W	1S	5, 6, 7, 18, 19, 30, 31
75W	2S	6, 7, 18, 19, 30, 31
75W	3S	6, 7
75W	5S	13, 14, 22, 23, 27, 34
75W	6S	3, 10, 15, 22, 27, 28, 32, 33
75W	7S	5, 6, 7
75W	9N	1, 2, 11, 12, 13, 14
75W	13S	29, 32
75W	14S	5, 6, 7
76W	1N	3, 4, 5, 10, 11, 14, 22, 23, 27, 34
76W	2N	4, 8, 9, 17, 19, 20, 30, 31, 32
76W	2S	7, 18, 19, 20, 28, 29, 33, 34, 35, 36
76W	3N	29, 30, 32, 33
76W	3S	12, 13, 24, 25, 36
76W	4S	1, 11, 12, 14, 22, 23, 27, 33, 34
76W	14S	12, 13, 14, 15, 20, 21, 22, 29, 30
77W	1S	2, 10, 11, 15, 22, 23, 26, 35
77W	2N	25
77W	2S	1, 2, 12
77W	3N	14, 15, 16, 17, 20, 21, 22, 23, 25, 26
77W	9S	6, 7
77W	11S	31
77W	12S	6, 7, 18, 19, 30, 31, 32
77W	19S	19, 28, 29, 30, 33, 34, 35, 36
78W	18S	31
79W	17S	1, 12, 13, 14, 23, 26, 35
79W	18S	2, 3, 10, 11, 14, 23, 25, 26, 36

Notes: N = North; S = South; W = West

7.3 Location of Proposed Activity

The latitudes and longitudes of the communities the proposed Project passes through are listed in Table 7-2. The Project will begin in Dillingham and have terminal ends in Quinhagak, Tuntutuliak, and Kasigluk as seen in Figure 1.

Table 7-2. Latitudes and Longitudes of Communities the Proposed Project Passes Through

Nearest City	Latitude (Decimal Degrees, WGS84)	Longitude (WGS84)
Dillingham	59.003510°	-158.535687°
Platinum	59.009210°	-161.822321°
Quinhagak	59.742125°	-161.929299°
Eek	60.215998°	-162.011909°
Tuntutuliak	60.339837°	-162.666179°
Napaskiak	60.706787°	-161.775304°
Oscarville	60.720960°	-161.771477°
Bethel	60.798292°	-161.854753°
Atmautluak	60.858068°	-162.281210°
Nunapitchuk	60.896319°	-162.455340°
Kasigluk	60.872722°	-162.511194°

Notes: WGS84 = World Geodetic System 1984

8 References

State of Alaska

2021 Governor's Task Force on Broadband.

USFWS (U.S. Fish and Wildlife Service)

2023 National Wetlands Inventory Mapping. Accessed at http://enterprise.nwi.fws.gov/shapedata/alaska/ on March 3, 2023.

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Figure Set

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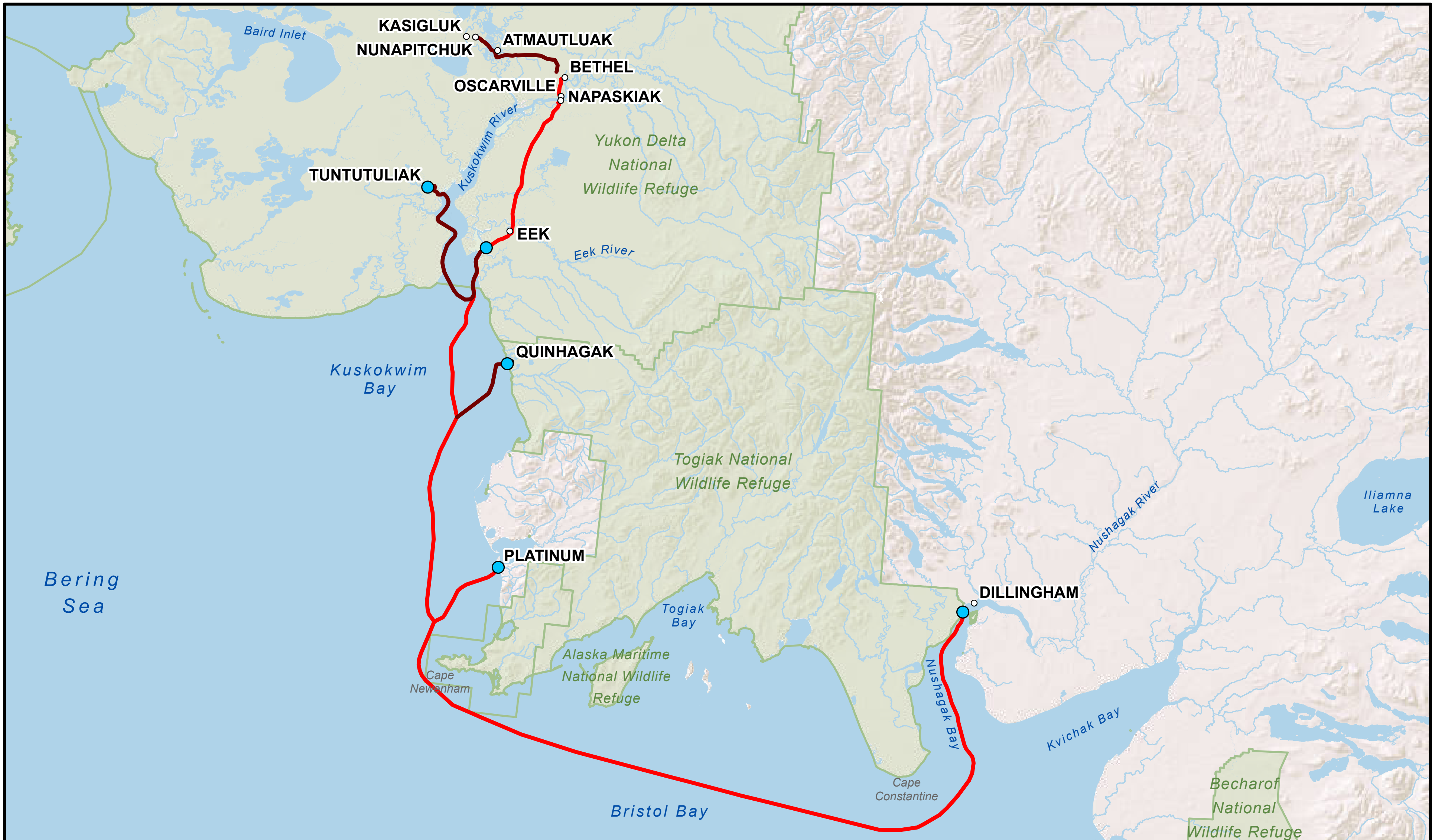


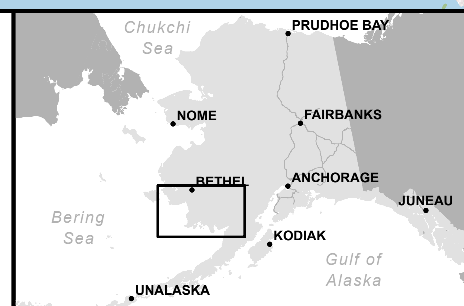
Airraq Network
Fiber Optic Cable Route

Vicinity Map

0 20 40 Miles

HORIZONTAL DATUM:
NAD83 Alaska Albers

Airraq FOC Route
- Phase 1
- Phase 2
- Landfall Location
- Community



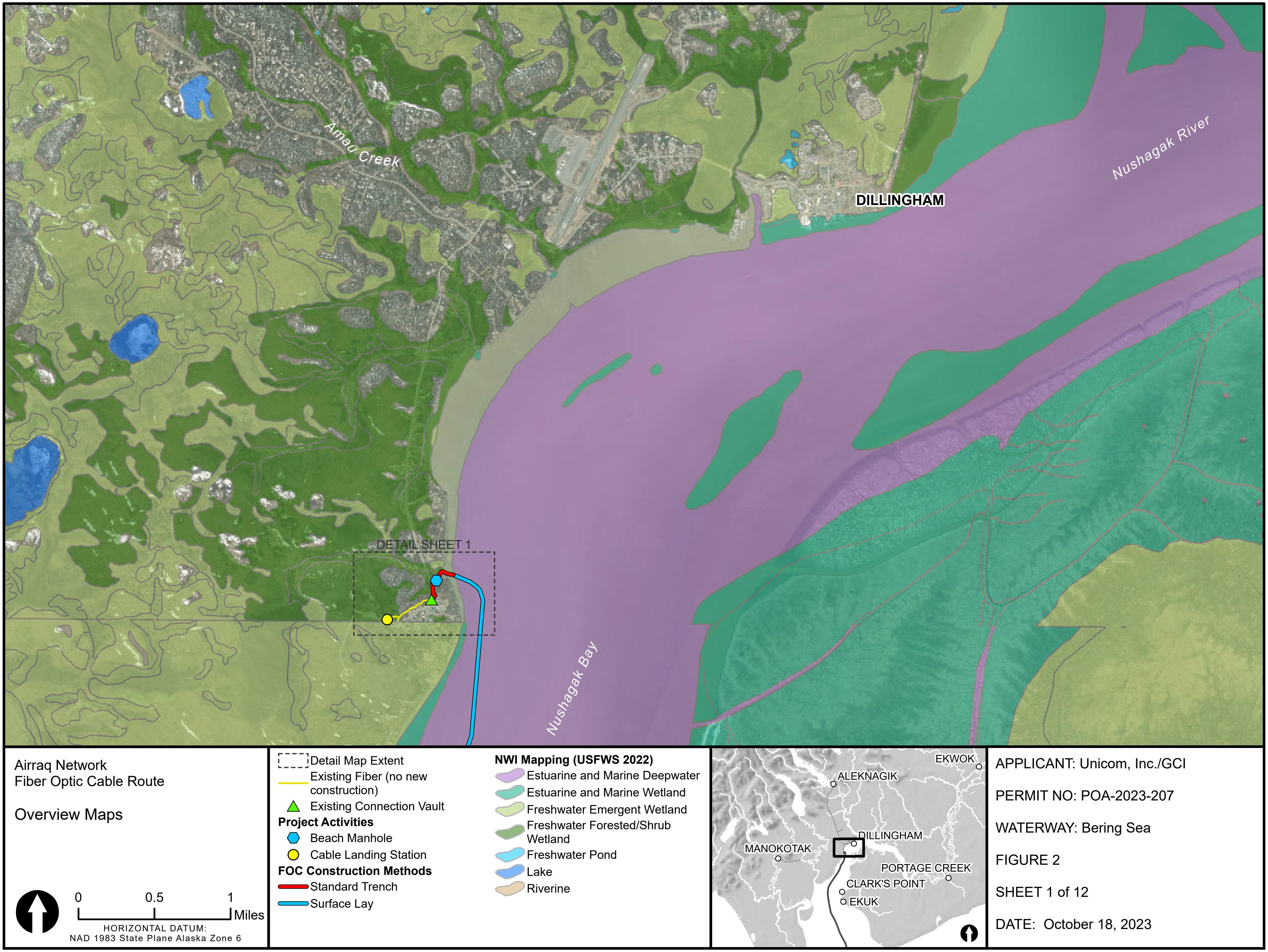
APPLICANT: Unicom, Inc./GCI

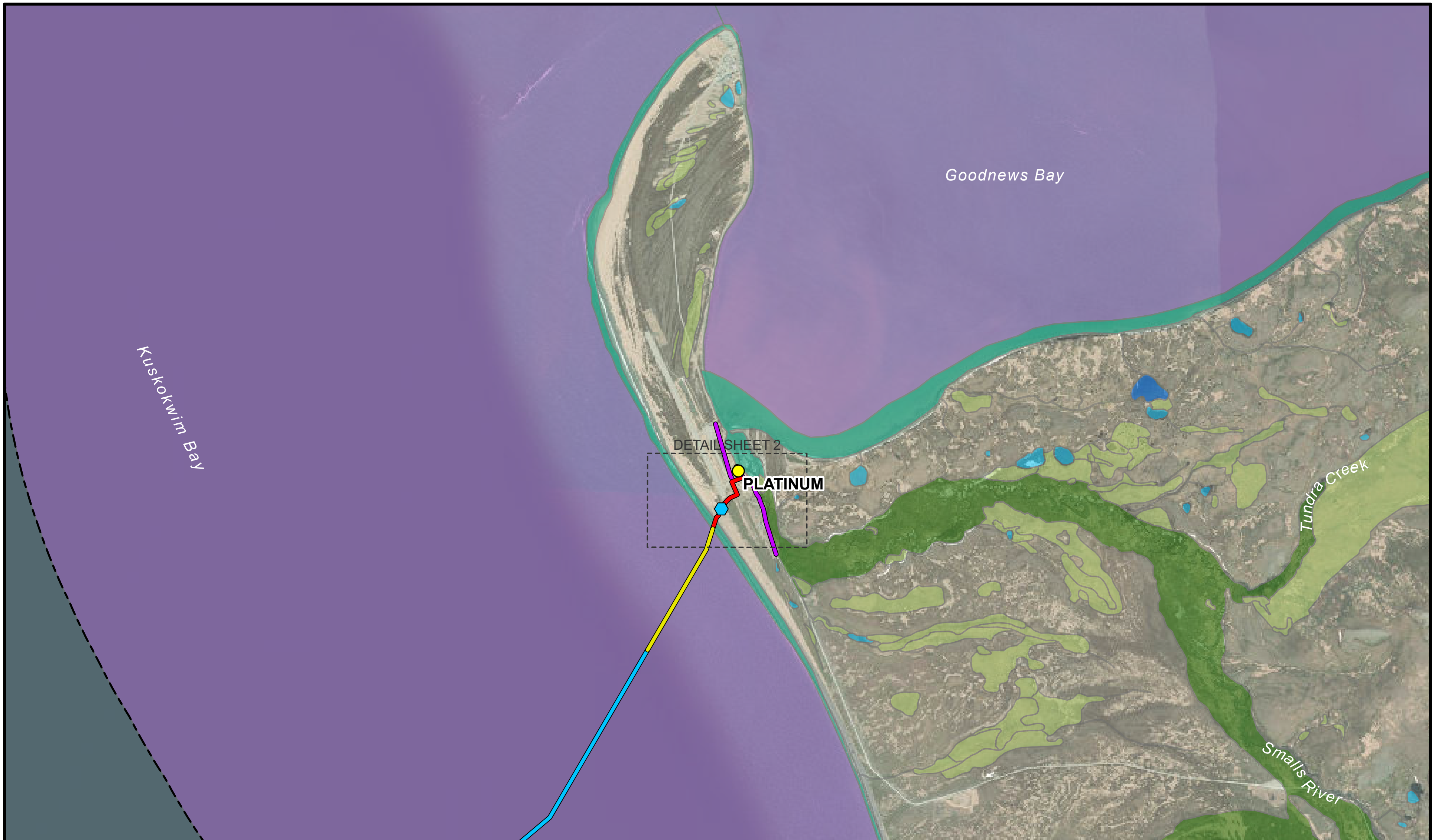
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 1

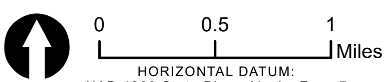
DATE: October 18, 2023


Amau Creek
DILLINGHAM
Nushagak River
DETAIL SHEET 1
Nushagak Bay
Airraq Network
Fiber Optic Cable Route
Overview Maps
0 0.5 1 Miles
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 6
Detail Map Extent
Existing Fiber (no new construction)
Existing Connection Vault
Project Activities
Beach Manhole
Cable Landing Station
FOC Construction Methods
Standard Trench
Surface Lay
NWI Mapping (USFWS 2022)
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Riverine
EKWOK
ALEKNAGIK
DILLINGHAM
MANOKOTAK
PORTAGE CREEK
CLARK'S POINT
EKUK
APPLICANT: Unicom, Inc./GCI
PERMIT NO: POA-2023-207
WATERWAY: Bering Sea
FIGURE 2
SHEET 1 of 12
DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Overview Maps



HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Detail Map Extent

Project Activities

- Beach Manhole
- Cable Landing Station

FOC Construction Methods

- Jet Trench
- Standard Trench
- Surface Lay
- FTTP (Buried Path)

NWI Mapping (USFWS 2022)

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- NWI Mapping Extent

APPLICANT: Unicom, Inc./GCI

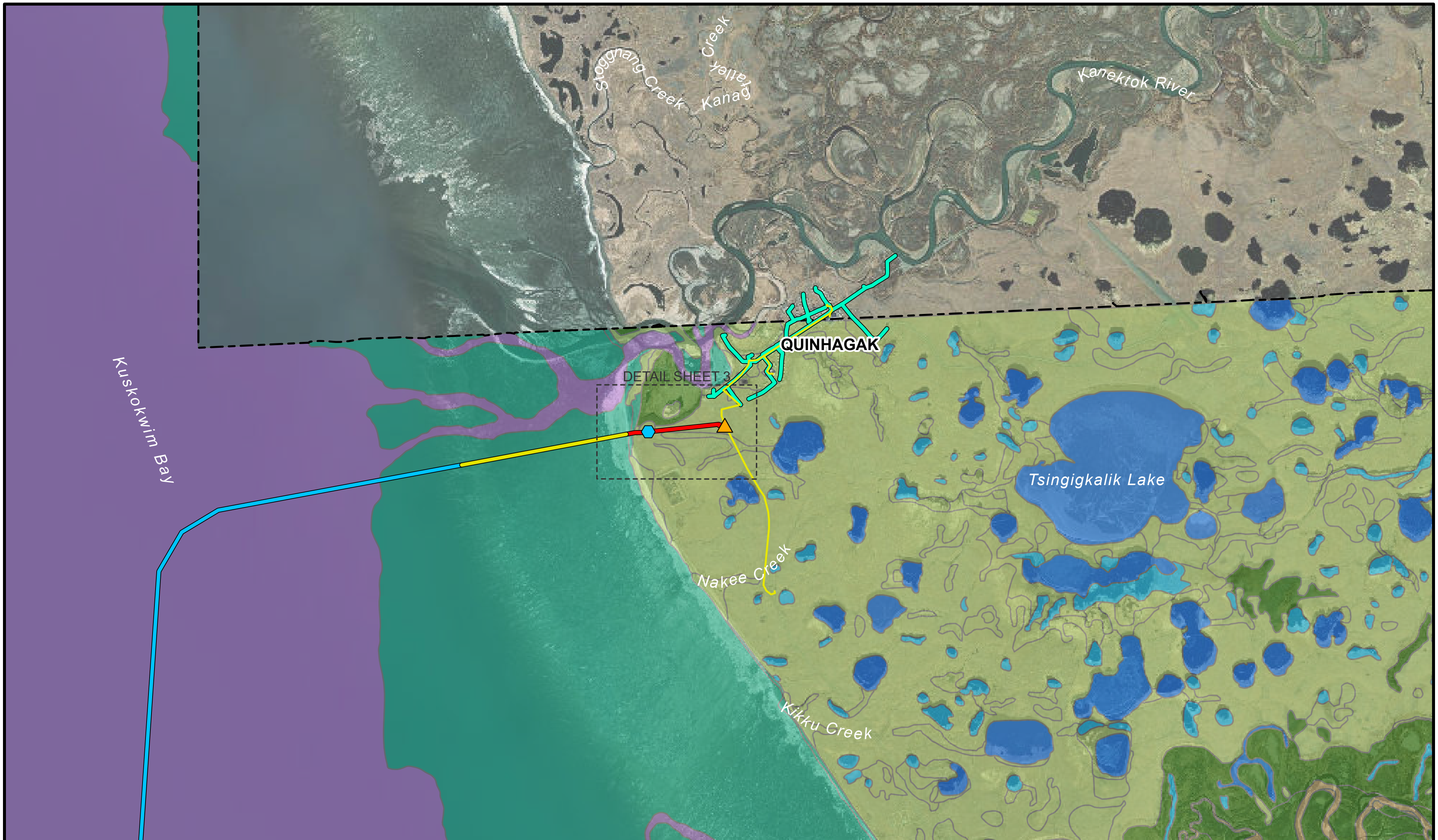
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 2 of 12

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles

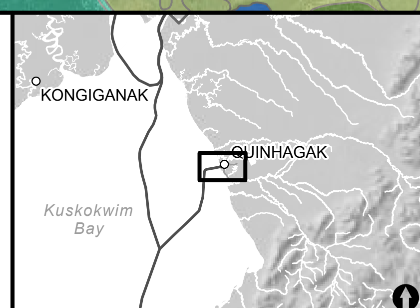
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Detail Map Extent
Existing Fiber (no new construction)

Project Activities
- Beach Manhole
- Connection Vault

FOC Construction Methods
- Jet Trench
- Standard Trench
- Surface Lay
- FTTP (Aerial Path)

NWI Mapping (USFWS 2022)
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- NWI Mapping Extent



APPLICANT: Unicom, Inc./GCI

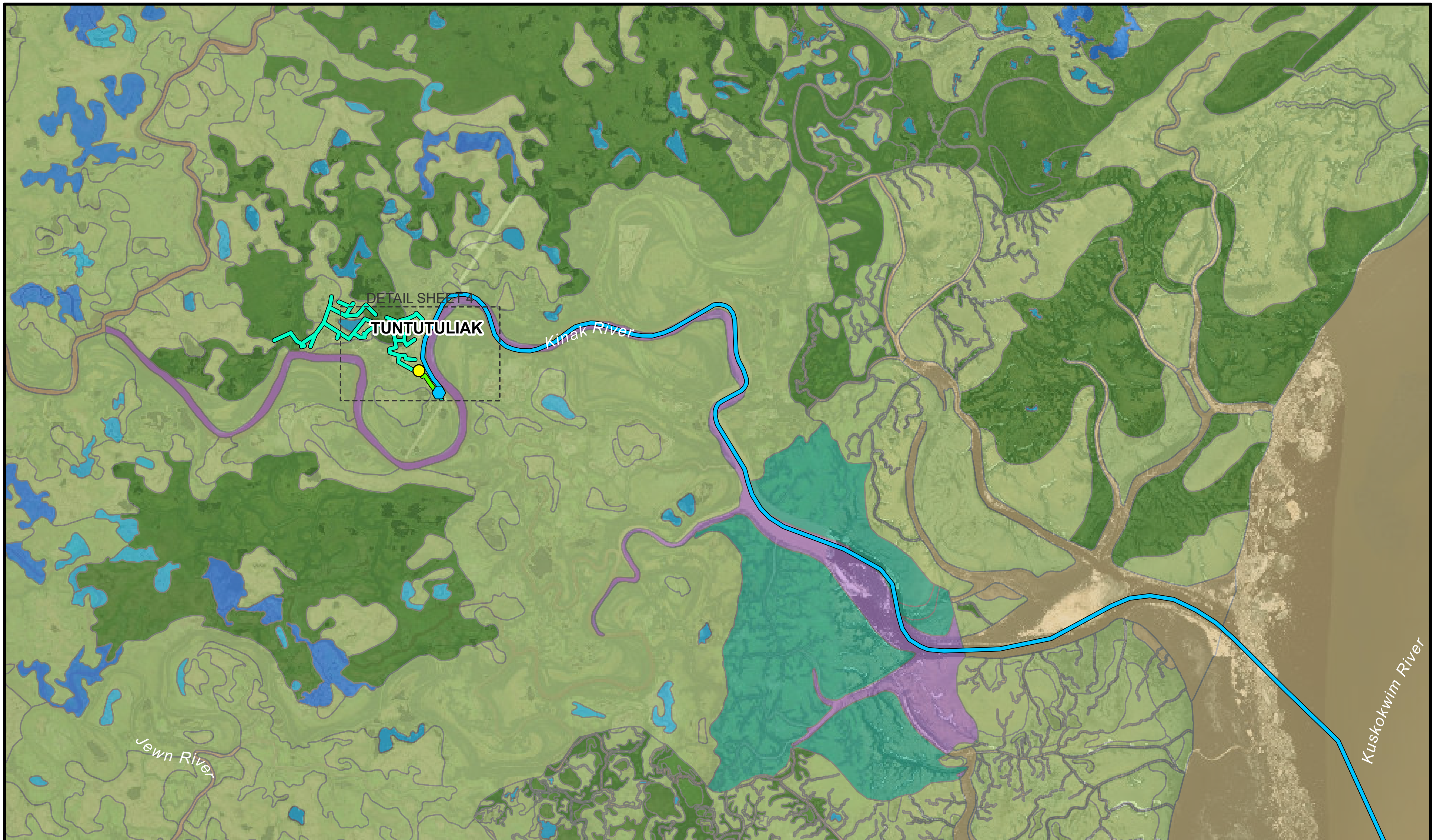
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 3 of 12

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Detail Map Extent

Project Activities

- Beach Manhole
- Cable Landing Station

FOC Construction Methods

- Attach to Existing Aerial Poles
- Standard Trench
- Surface Lay
- FTTP (Aerial Path)

NWI Mapping (USFWS 2022)

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

APPLICANT: Unicom, Inc./GCI

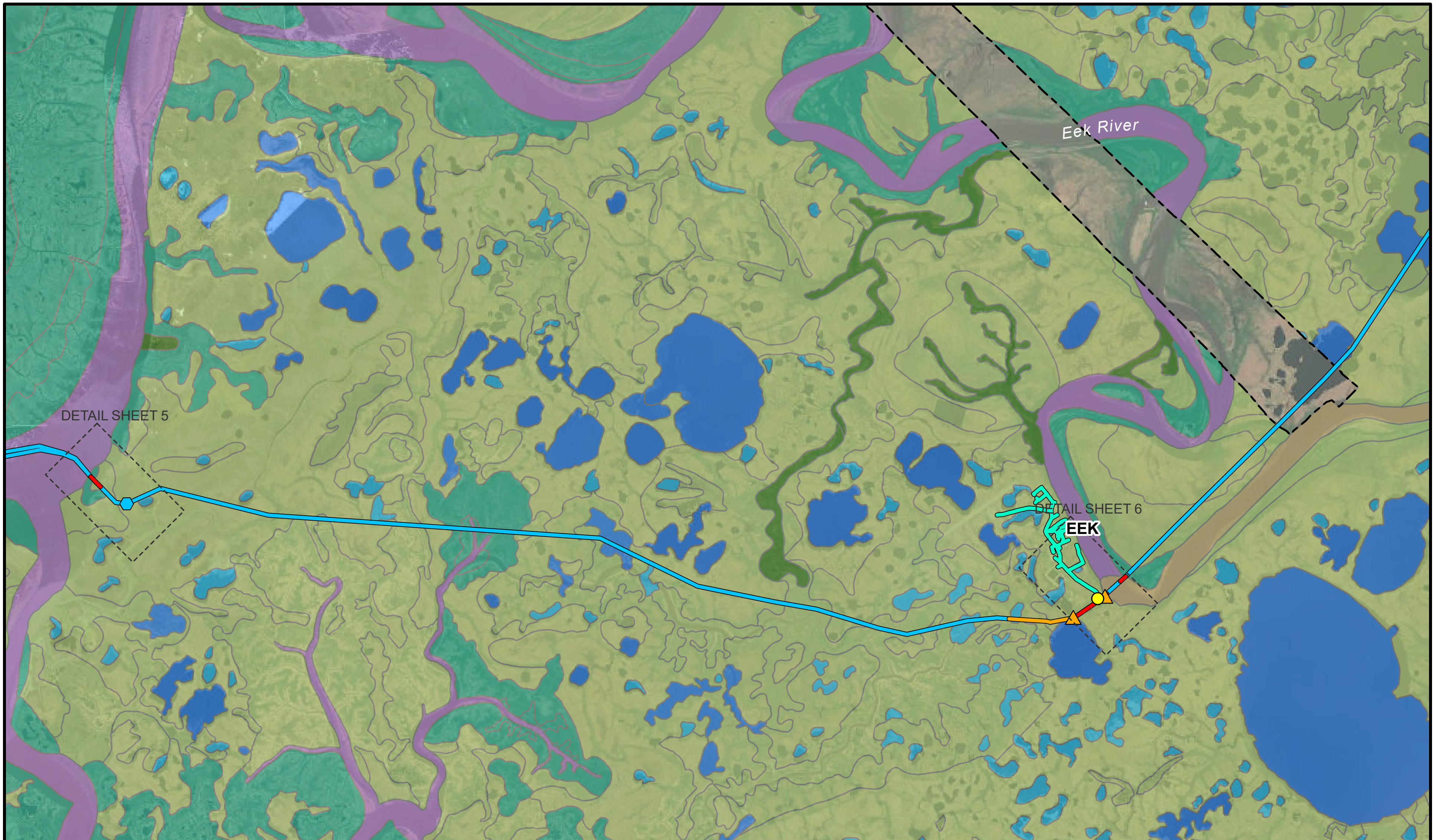
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 4 of 12

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Detail Map Extent

Project Activities

- Beach Manhole
- Cable Landing Station
- Connection Vault

FOC Construction Methods

- Standard Trench
- Trench - Rock saw
- Surface Lay
- FTTP (Aerial Path)

NWI Mapping (USFWS 2022)

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine
- NWI Mapping Extent

APPLICANT: Unicom, Inc./GCI

PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 5 of 12

DATE: October 18, 2023

Airraq Network
Fiber Optic Cable Route

Overview Maps

FOC Construction Methods

Surface Lay

NWI Mapping (USFWS 2022)

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

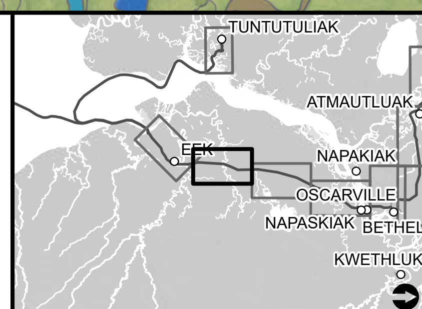
Freshwater Pond

Lake

Riverine

0 0.5 1 Miles

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7



APPLICANT: Unicom, Inc./GCI

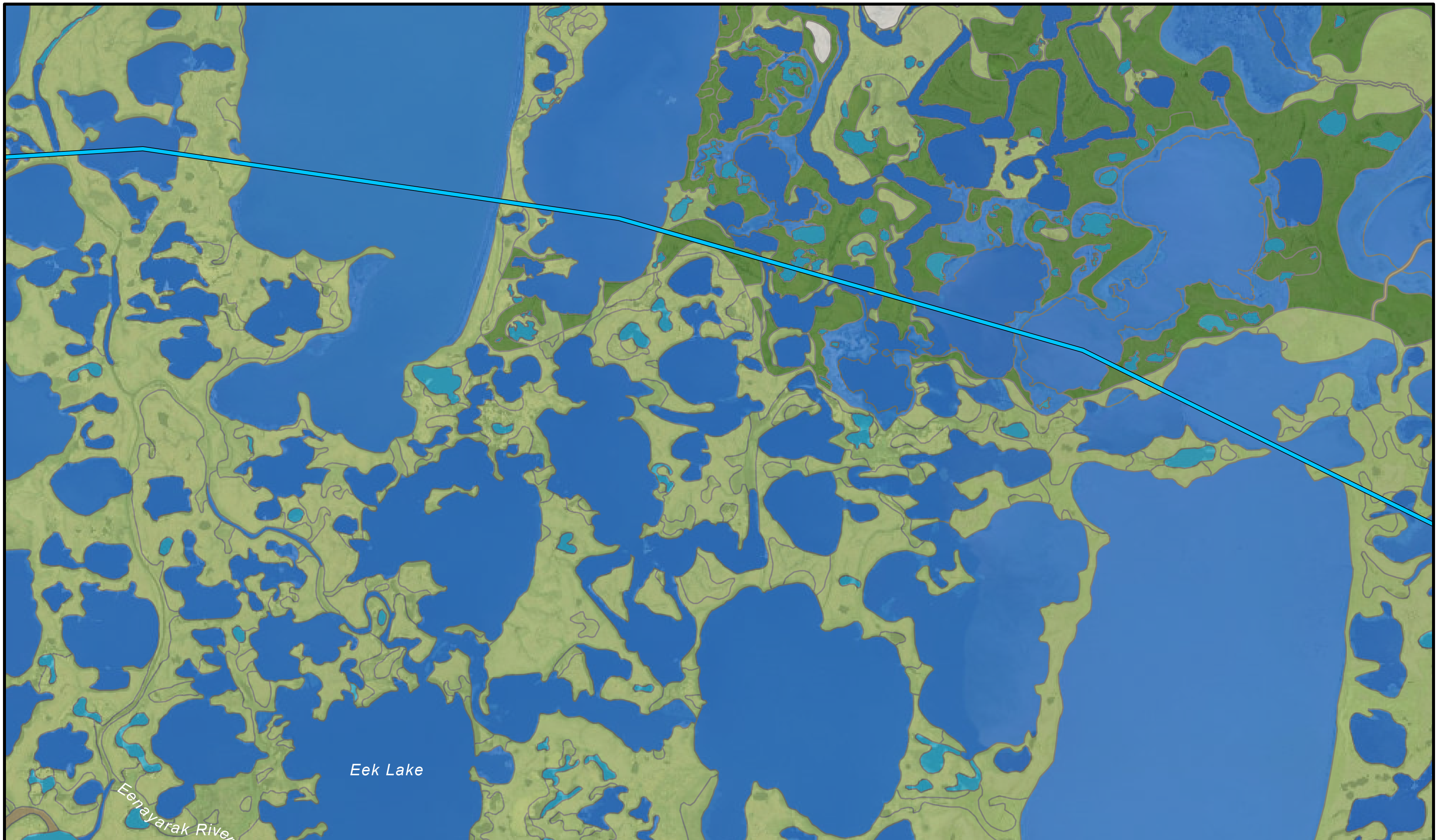
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 6 of 12

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

FOC Construction Methods

Surface Lay

NWI Mapping (USFWS 2022)

Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine

APPLICANT: Unicom, Inc./GCI

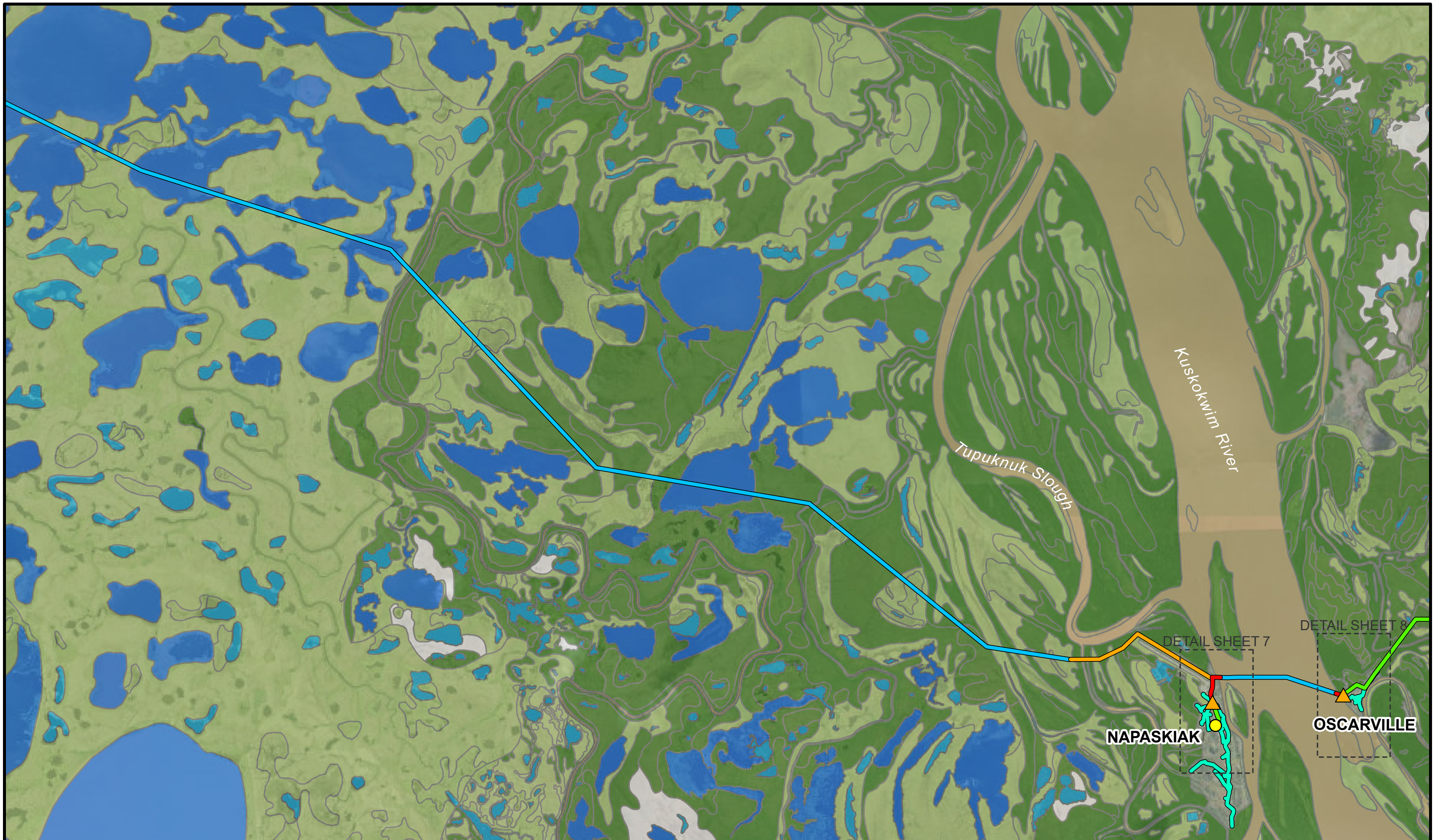
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 7 of 12

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

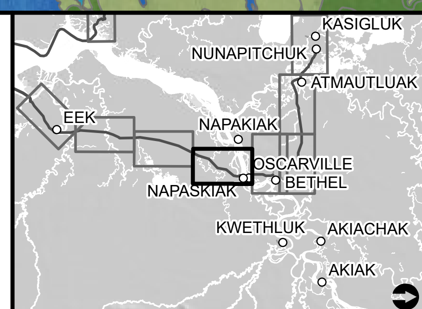
Detail Map Extent

Project Activities
- Cable Landing Station
- Connection Vault

FOC Construction Methods
- Attach to Existing Aerial Poles
- Standard Trench
- Trench - Rock saw
- Surface Lay

FTTP (Aerial Path)

NWI Mapping (USFWS 2022)
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine



APPLICANT: Unicom, Inc./GCI

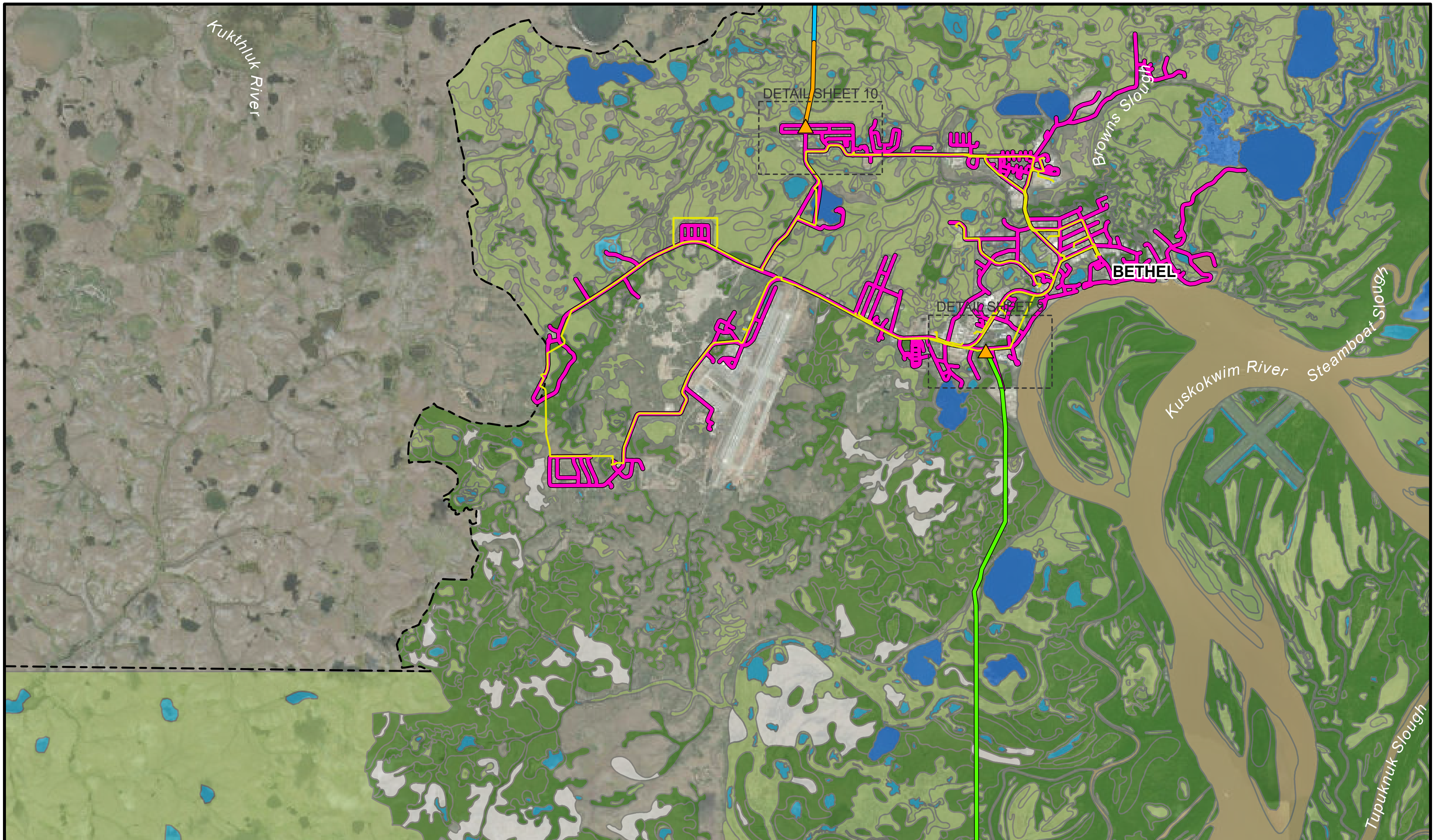
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 8 of 12

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Detail Map Extent
Existing Fiber (no new construction)

Project Activities

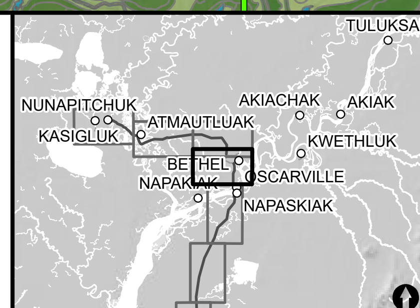
Connection Vault

FOC Construction Methods

Attach to Existing Aerial Poles
Trench - Rock saw
Surface Lay
Hybrid Fiber-coaxial Upgrades (attached to existing utility poles)

NWI Mapping (USFWS 2022)

Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
Riverine
NWI Mapping Extent



APPLICANT: Unicom, Inc./GCI

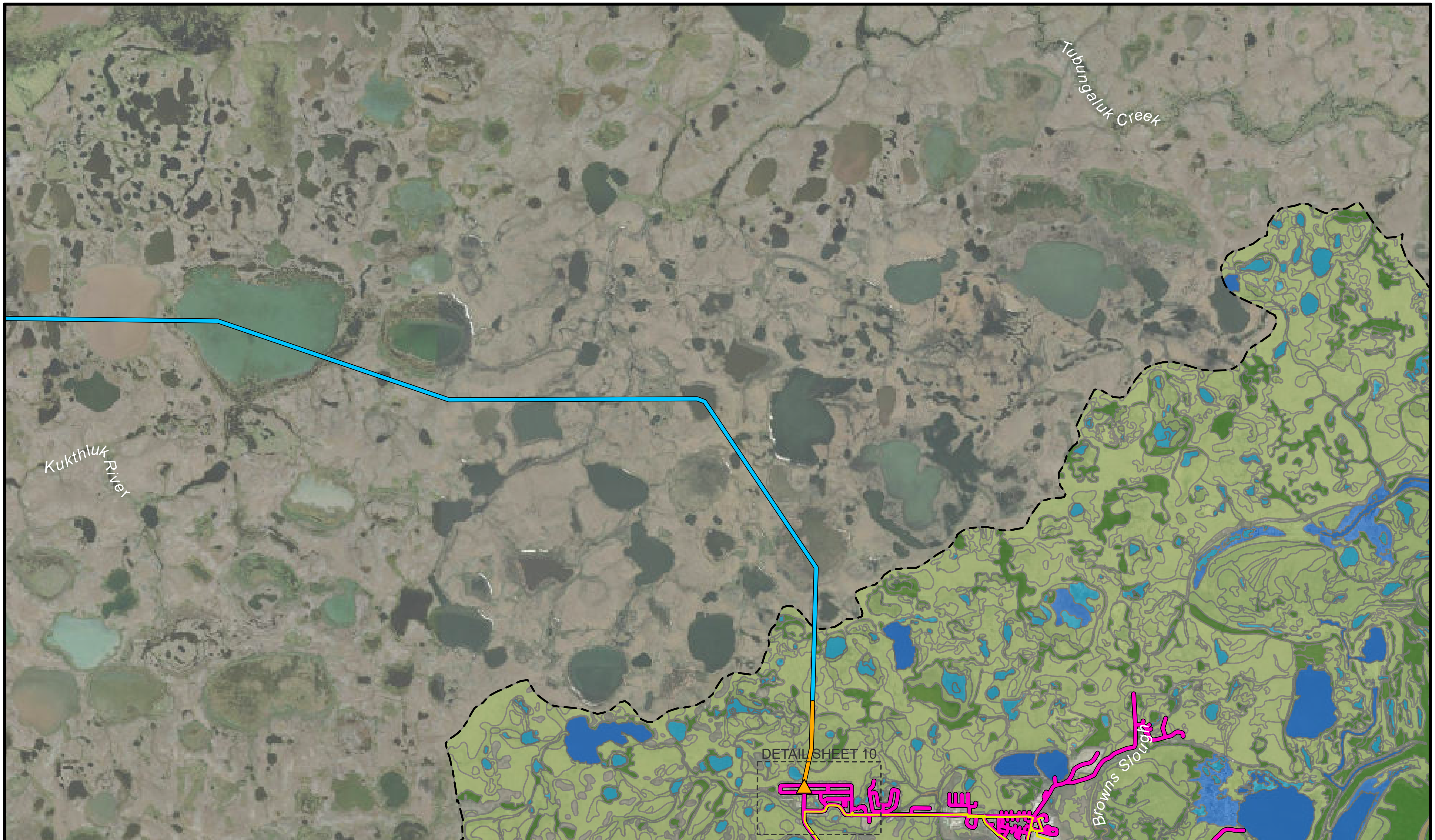
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 9 of 12

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Detail Map Extent
Existing Fiber (no new construction)
Project Activities
Connection Vault
FOC Construction Methods
Trench - Rock saw
Surface Lay
Hybrid Fiber-coaxial Upgrades (attached to existing utility poles)

NWI Mapping (USFWS 2022)
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Riverine
NWI Mapping Extent

APPLICANT: Unicom, Inc./GCI

PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 10 of 12

DATE: October 18, 2023

Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Detail Map Extent

Project Activities

Connection Vault

FOC Construction Methods

Standard Trench

Surface Lay

FTTP (Aerial Path)

APPLICANT: Unicom, Inc./GCI

PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 11 of 12

DATE: October 18, 2023

Airraq Network
Fiber Optic Cable Route

Overview Maps

0 0.5 1 Miles
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Detail Map Extent
Existing Fiber (no new construction)

Project Activities
- Cable Landing Station
- Connection Vault

FOC Construction Methods
- Attach to Existing Aerial Poles
- Standard Trench
- Surface Lay
- FTTP (Aerial Path)

APPLICANT: Unicom, Inc./GCI

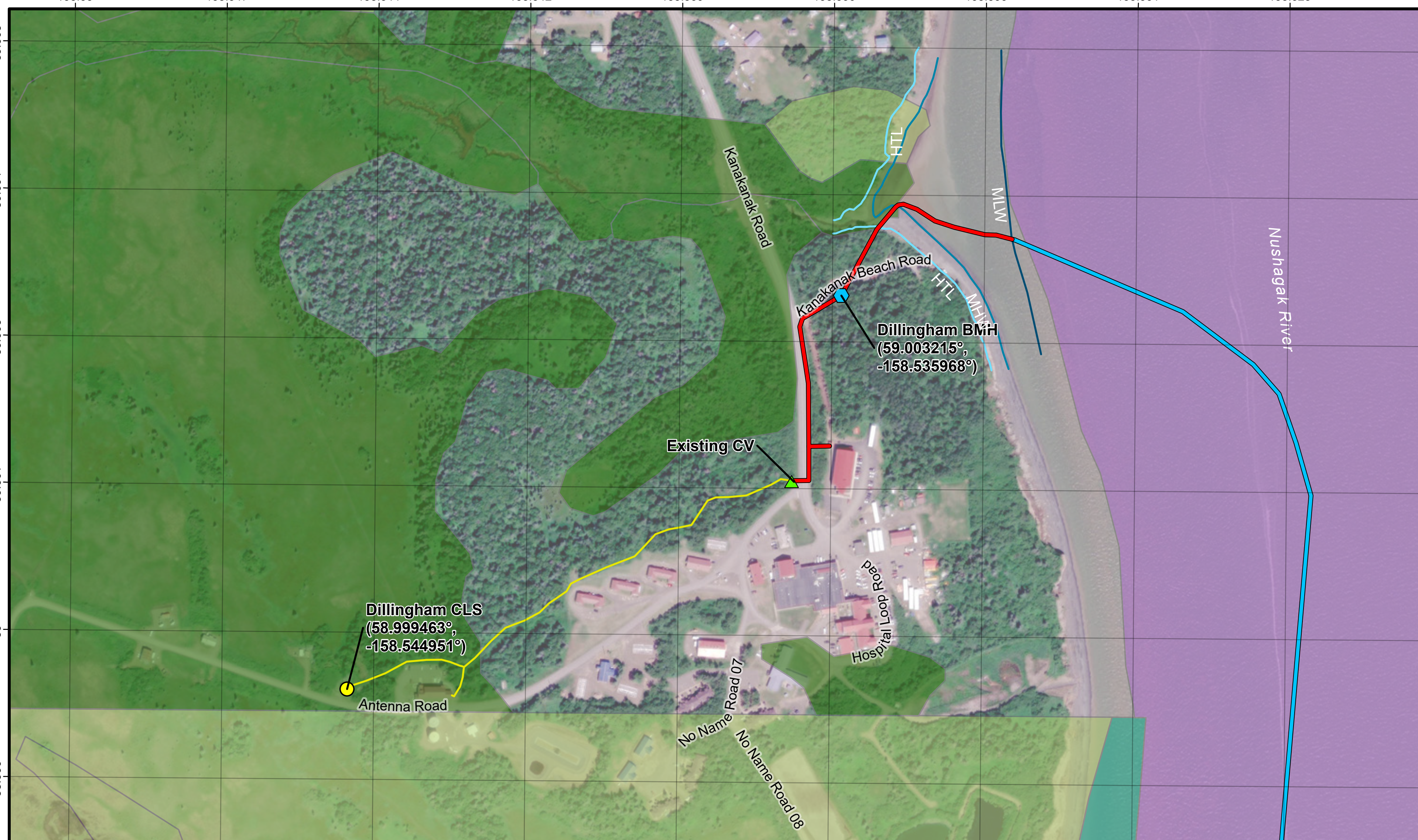
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 2

SHEET 12 of 12

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Detail Maps
Dillingham

0 275 550 Feet

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 6

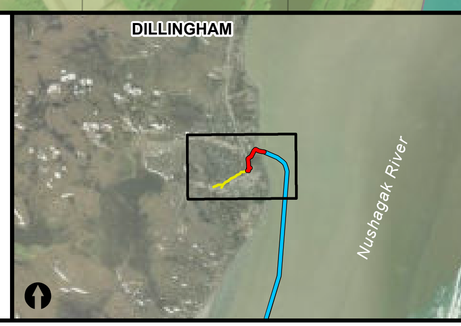
Existing Fiber (no new construction)
Existing Connection Vault

Project Activities
Beach Manhole
Cable Landing Station

FOC Construction Methods
Standard Trench
Surface Lay

Estimated Tidal/Stream Elevations
HTL
MHW
MLW

NWI Mapping (USFWS 2022)
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland



APPLICANT: Unicom, Inc/GCI

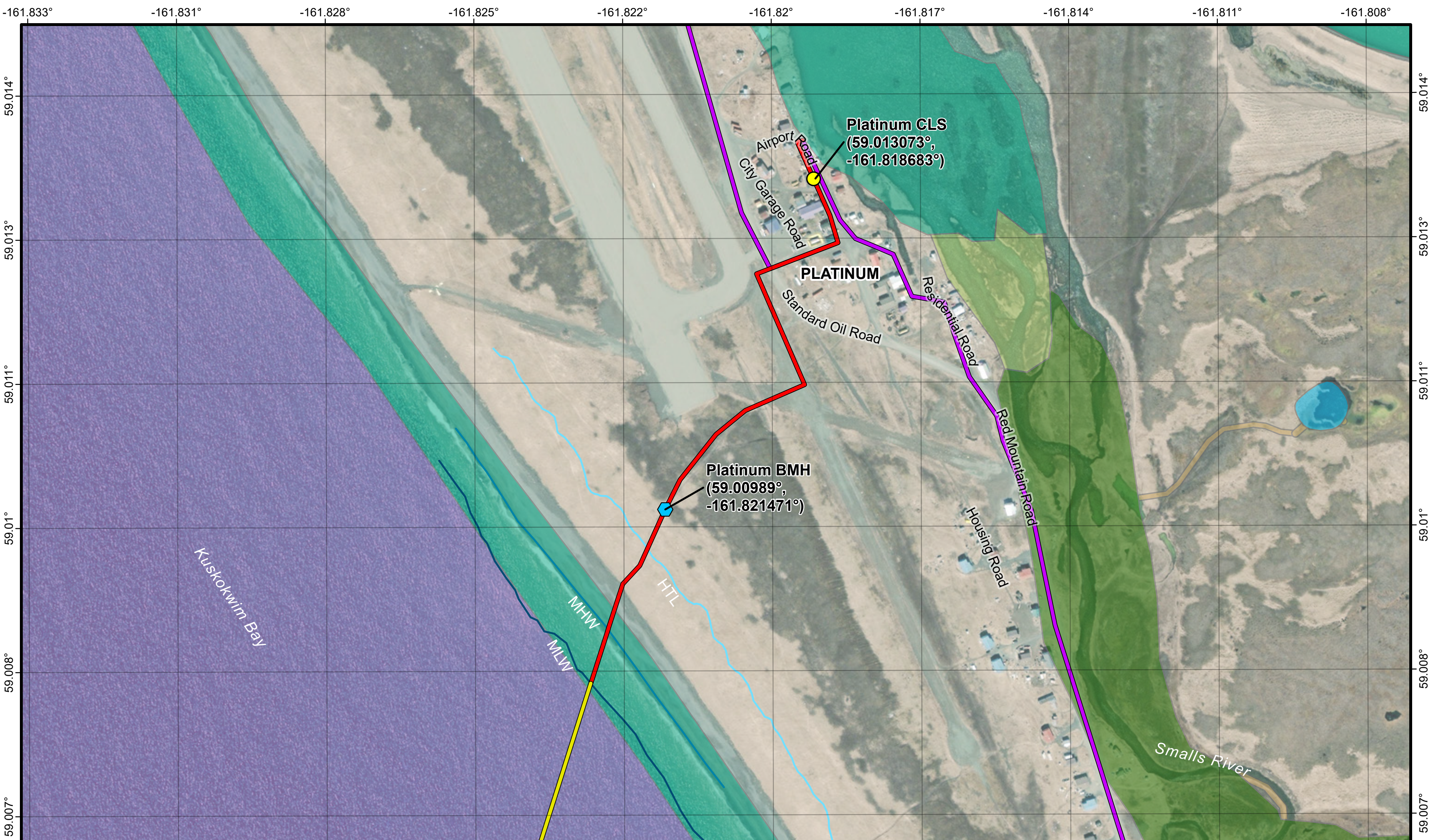
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 1 of 13

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Detail Maps
Platinum

0 275 550 Feet

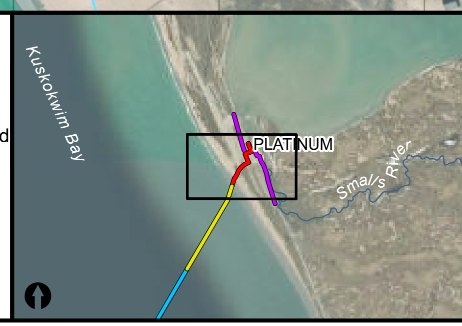
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Project Activities
- Beach Manhole
- Cable Landing Station

FOC Construction Methods
- Jet Trench
- Standard Trench
- FTTP (Buried Path)

Estimated Tidal/Stream Elevations
- HTL
- MHW
- MLW

NWI Mapping (USFWS 2022)
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine



APPLICANT: Unicom, Inc/GCI

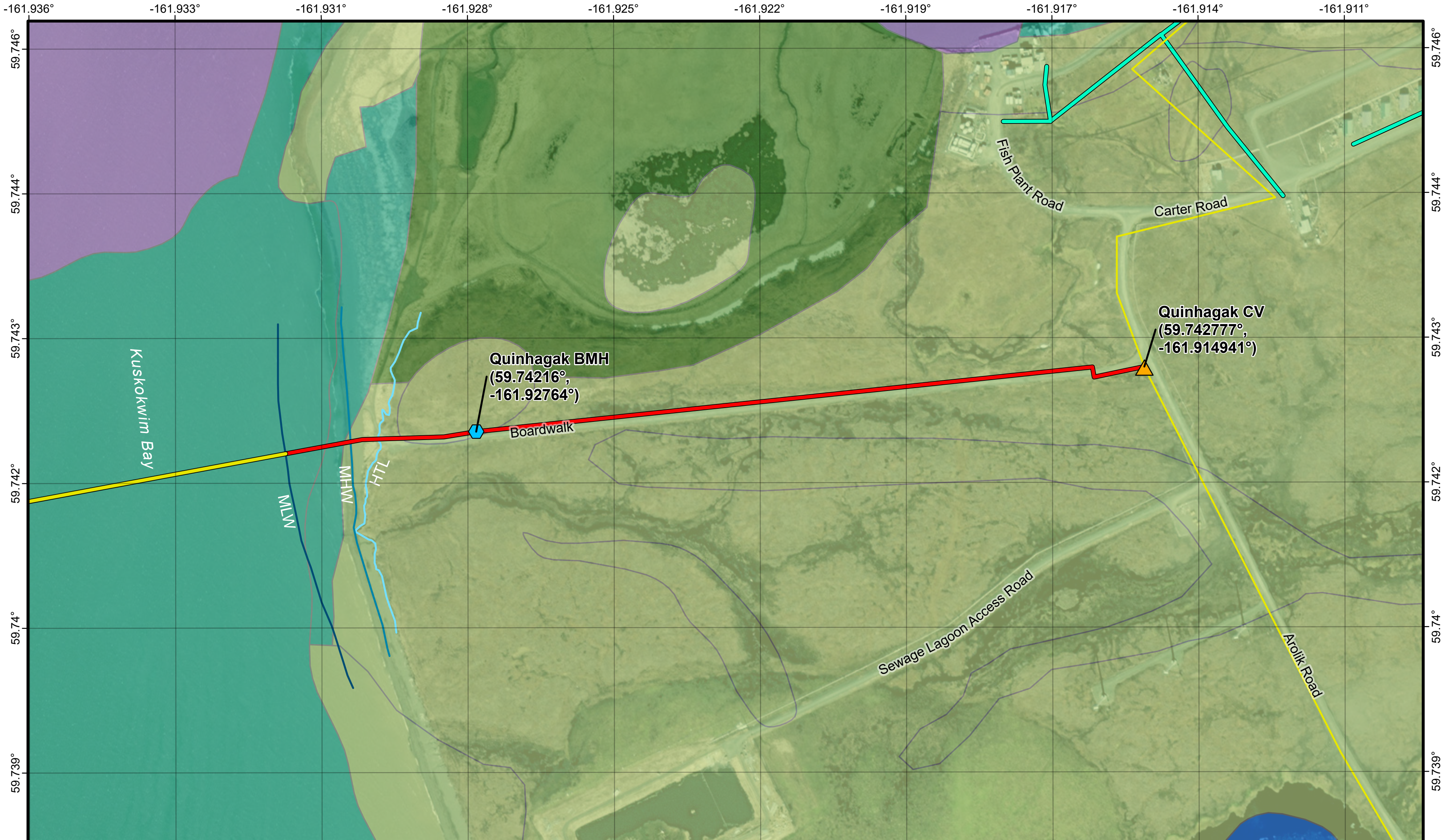
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 2 of 13

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Detail Maps
Quinhagak

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

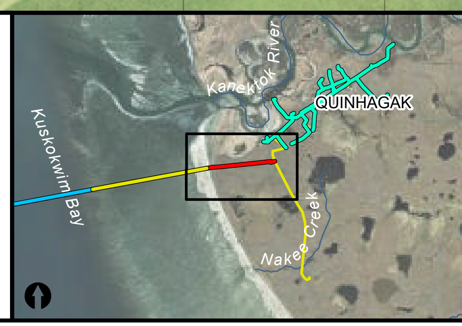
Existing Fiber (no new construction)

Project Activities
- Beach Manhole
- Connection Vault

FOC Construction Methods
- Jet Trench
- Standard Trench
- FTTP (Aerial Path)

Estimated Tidal/Stream Elevations
- HTL
- MHW
- MLW

NWI Mapping (USFWS 2022)
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Lake



APPLICANT: Unicom, Inc/GCI

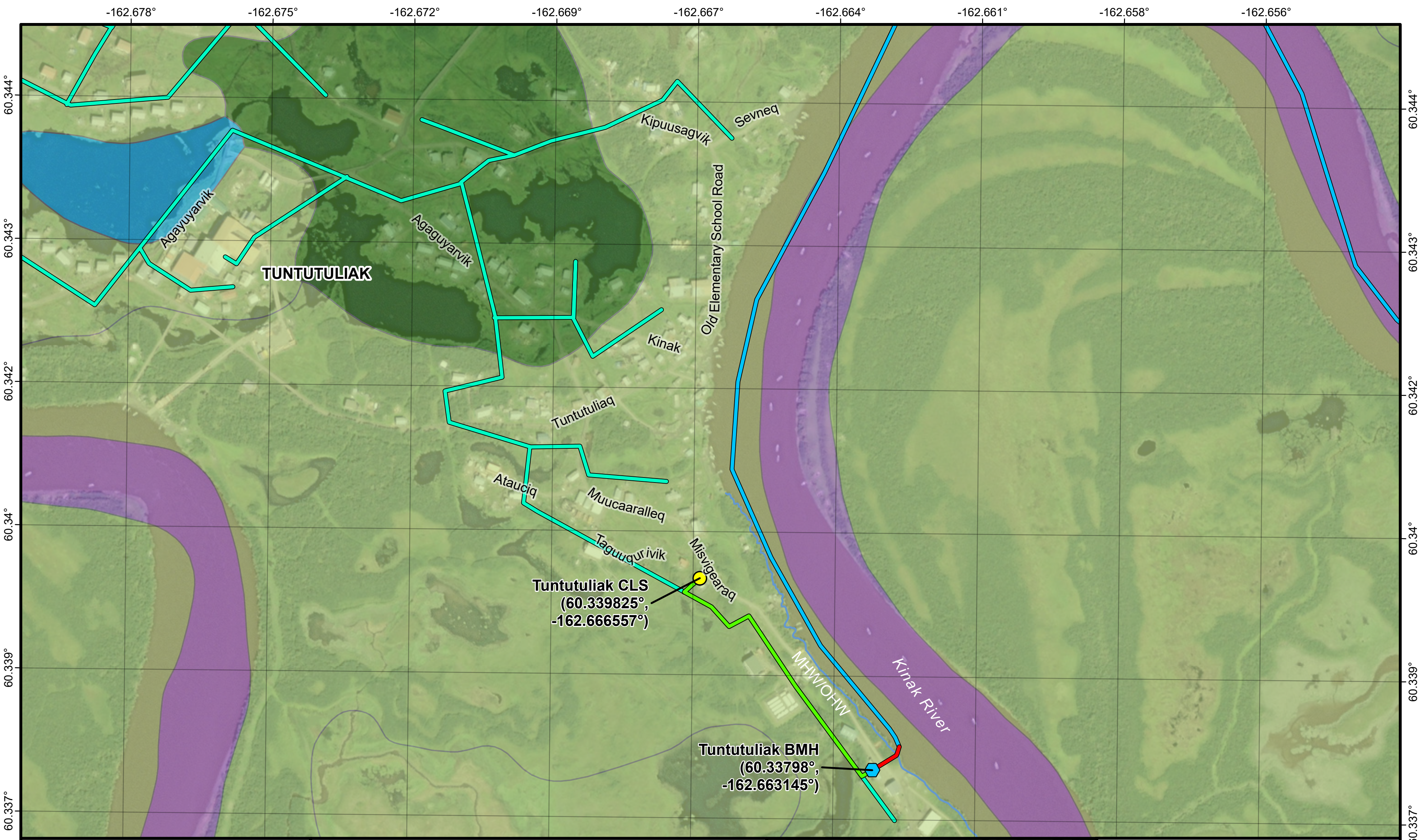
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 3 of 13

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Detail Maps
Tuntutuliak

0 275 550 Feet

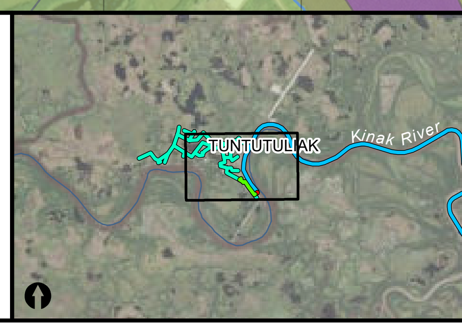
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Project Activities
- Beach Manhole
- Cable Landing Station

FOC Construction Methods
- Attach to Existing Aerial Poles
- Standard Trench
- Surface Lay
- FTTP (Aerial Path)

Estimated Tidal/Stream Elevations
- MHW/OHW

NWI Mapping (USFWS 2022)
- Estuarine and Marine Deepwater
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond



APPLICANT: Unicom, Inc/GCI

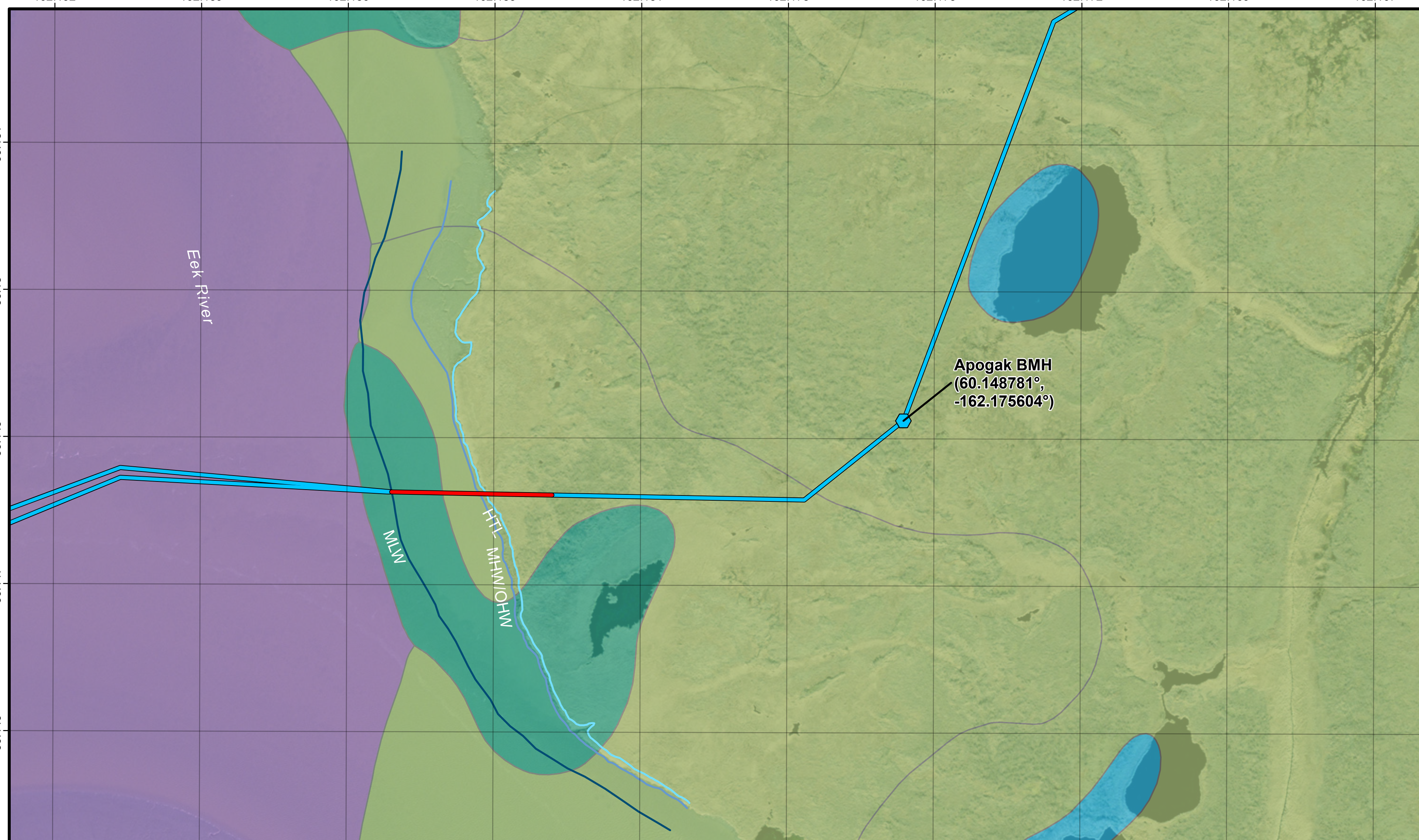
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 4 of 13

DATE: October 18, 2023



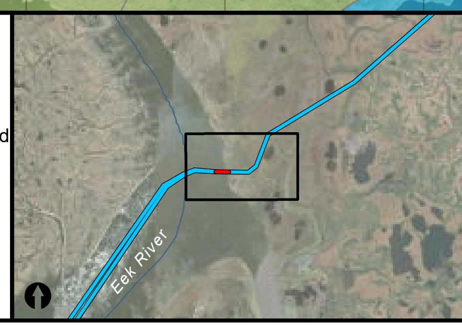
Airraq Network
Fiber Optic Cable Route

Detail Maps
Apogak

0 275 550 Feet

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Project Activities
Beach Manhole
FOC Construction Methods
Standard Trench
Surface Lay
Estimated Tidal/Stream Elevations
HTL
MHW/OHW
MLW
NWI Mapping (USFWS 2022)
Estuarine and Marine Deepwater
Estuarine and Marine Wetland
Freshwater Emergent Wetland
Freshwater Pond



APPLICANT: Unicom, Inc/GCI

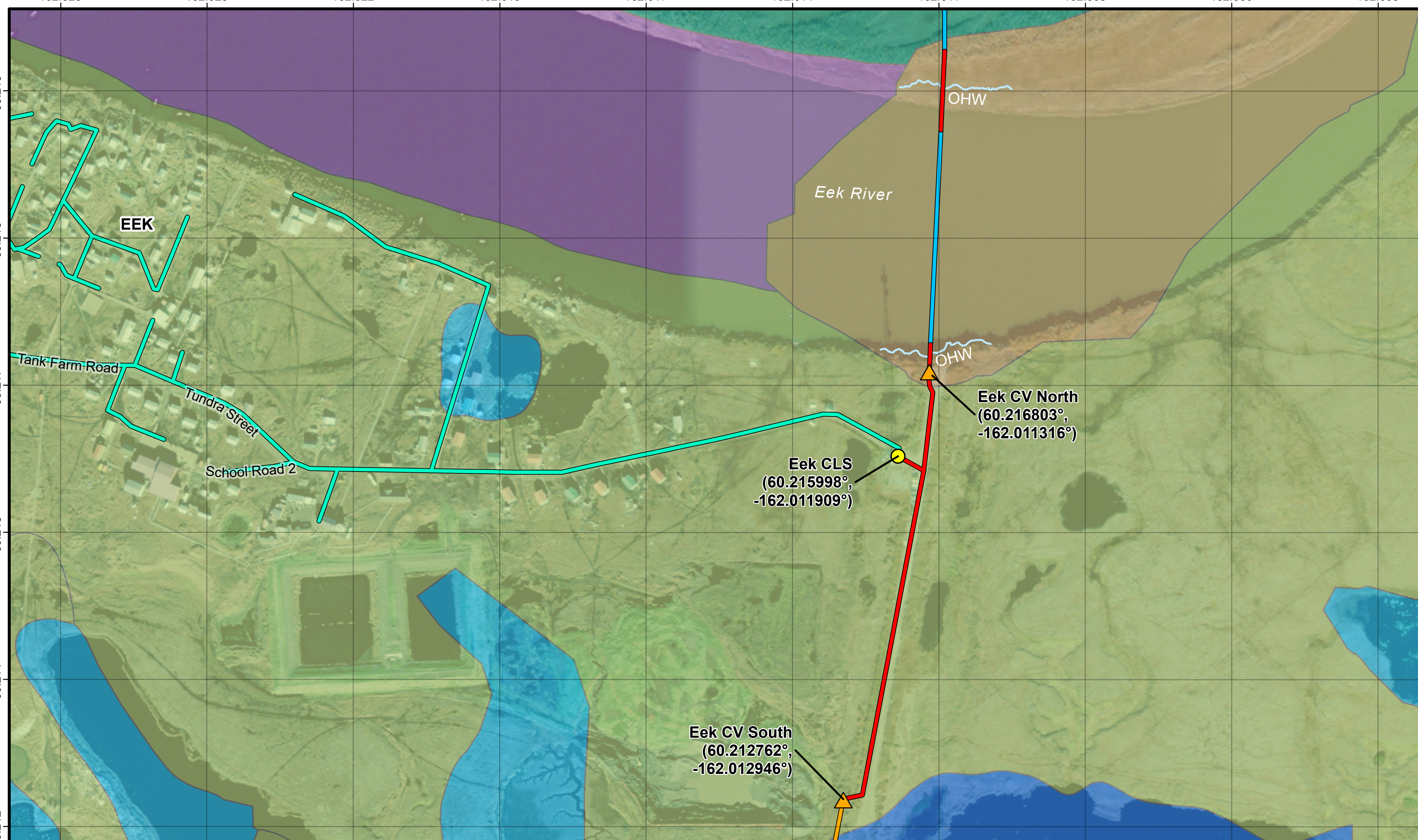
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 5 of 13

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Detail Maps
Eek

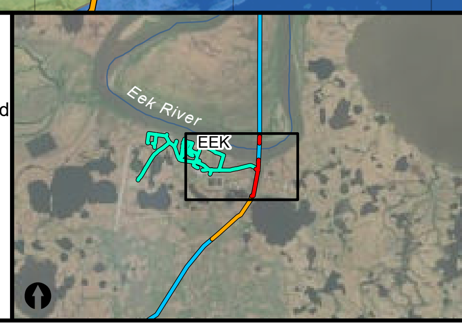
0 275 550 Feet
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Project Activities
- Cable Landing Station
- Connection Vault

FOC Construction Methods
- Standard Trench
- Trench - Rock saw
- Surface Lay
- FTTP (Aerial Path)

Estimated Tidal/Stream Elevations
- OHW

NWI Mapping (USFWS 2022)
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Pond
- Lake
- Riverine



APPLICANT: Unicom, Inc/GCI

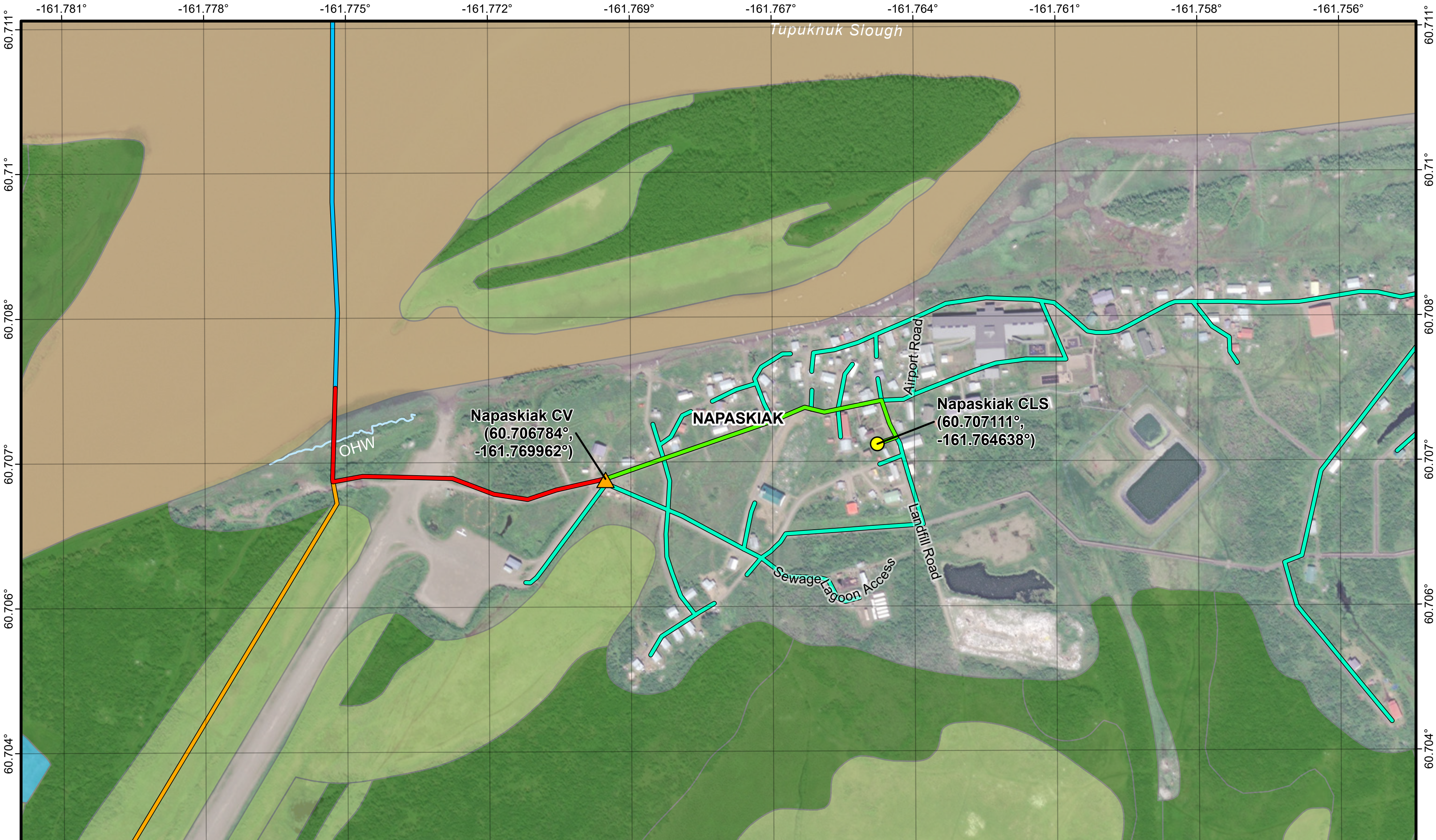
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 6 of 13

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Detail Maps
Napaskiak

0 275 550 Feet

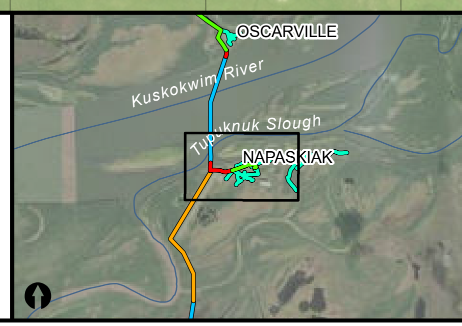
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Project Activities
- Cable Landing Station
- Connection Vault

FOC Construction Methods
- Attach to Existing Aerial Poles
- Standard Trench
- Trench - Rock saw
- Surface Lay
- FTTP (Aerial Path)

Estimated Tidal/Stream Elevations
- OHW

NWI Mapping (USFWS 2022)
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine



APPLICANT: Unicom, Inc/GCI

PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 7 of 13

DATE: October 18, 2023

Airraq Network
Fiber Optic Cable Route

Detail Maps
Oscarville

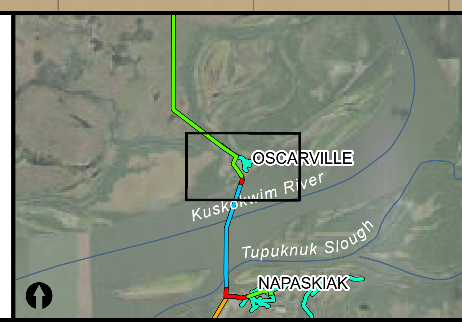
0 275 550 Feet
HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Project Activities
Connection Vault

FOC Construction Methods
Attach to Existing Aerial Poles
Standard Trench
Surface Lay
FTTP (Aerial Path)

Estimated Tidal/Stream Elevations
OHW

NWI Mapping (USFWS 2022)
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Riverine



APPLICANT: Unicom, Inc/GCI

PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 8 of 13

DATE: October 18, 2023

Airraq Network
Fiber Optic Cable Route

Detail Maps
Bethel

0 275 550 Feet

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Existing Fiber (no new construction)

Project Activities

Connection Vault

FOC Construction Methods

Attach to Existing Aerial Poles

Hybrid Fiber-coaxial Upgrades (attached to existing utility poles)

NWI Mapping (USFWS 2022)

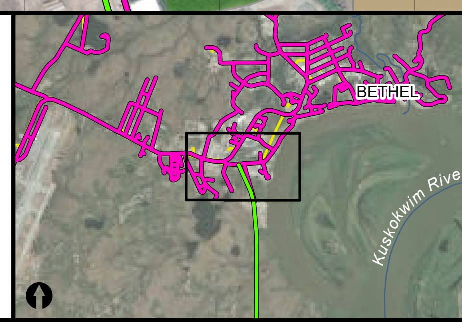
Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake

Riverine



APPLICANT: Unicom, Inc/GCI

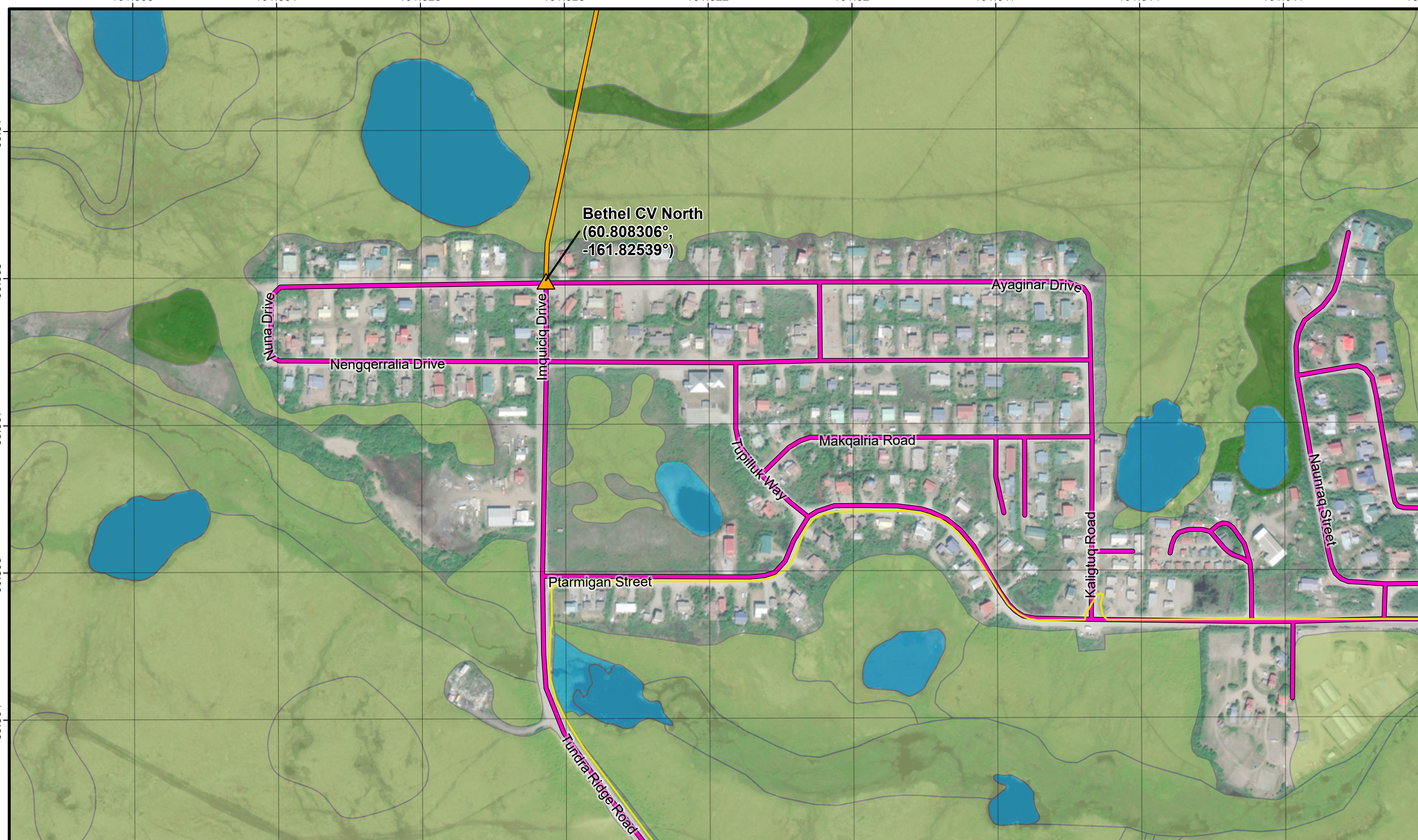
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 9 of 13

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Detail Maps
Bethel

0 275 550 Feet

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Existing Fiber (no new construction)

Project Activities

Connection Vault

FOC Construction Methods

Trench - Rock saw

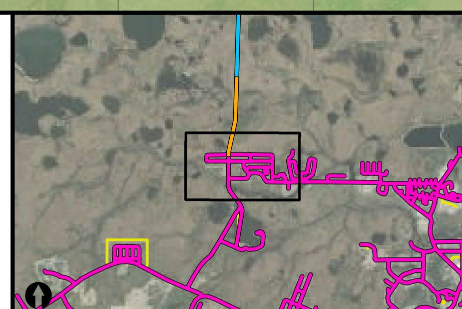
Hybrid Fiber-coaxial Upgrades (attached to existing utility poles)

NWI Mapping (USFWS 2022)

Freshwater Emergent Wetland

Freshwater Forested/Shrub Wetland

Freshwater Pond



APPLICANT: Unicom, Inc/GCI

PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 10 of 13

DATE: October 18, 2023

Airraq Network
Fiber Optic Cable Route

Detail Maps
Atmautluak

0 275 550 Feet

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Project Activities

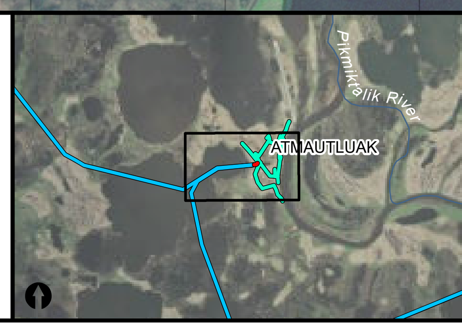
Connection Vault

FOC Construction Methods

Standard Trench

Surface Lay

FTTP (Aerial Path)



APPLICANT: Unicom, Inc/GCI

PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 11 of 13

DATE: October 18, 2023

Airraq Network
Fiber Optic Cable Route

Detail Maps
Nunapitchuk

0 275 550 Feet

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Existing Fiber (no new construction)

Project Activities

Cable Landing Station

Connection Vault

FOC Construction Methods

Attach to Existing Aerial Poles

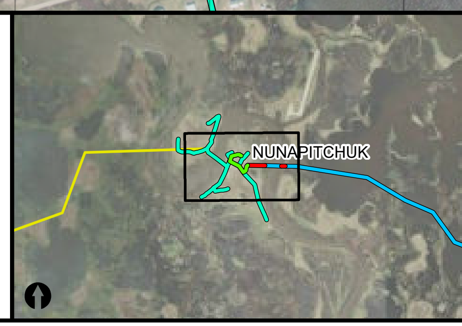
Standard Trench

Surface Lay

FTTP (Aerial Path)

Estimated Tidal/Stream Elevations

OHW



APPLICANT: Unicom, Inc/GCI

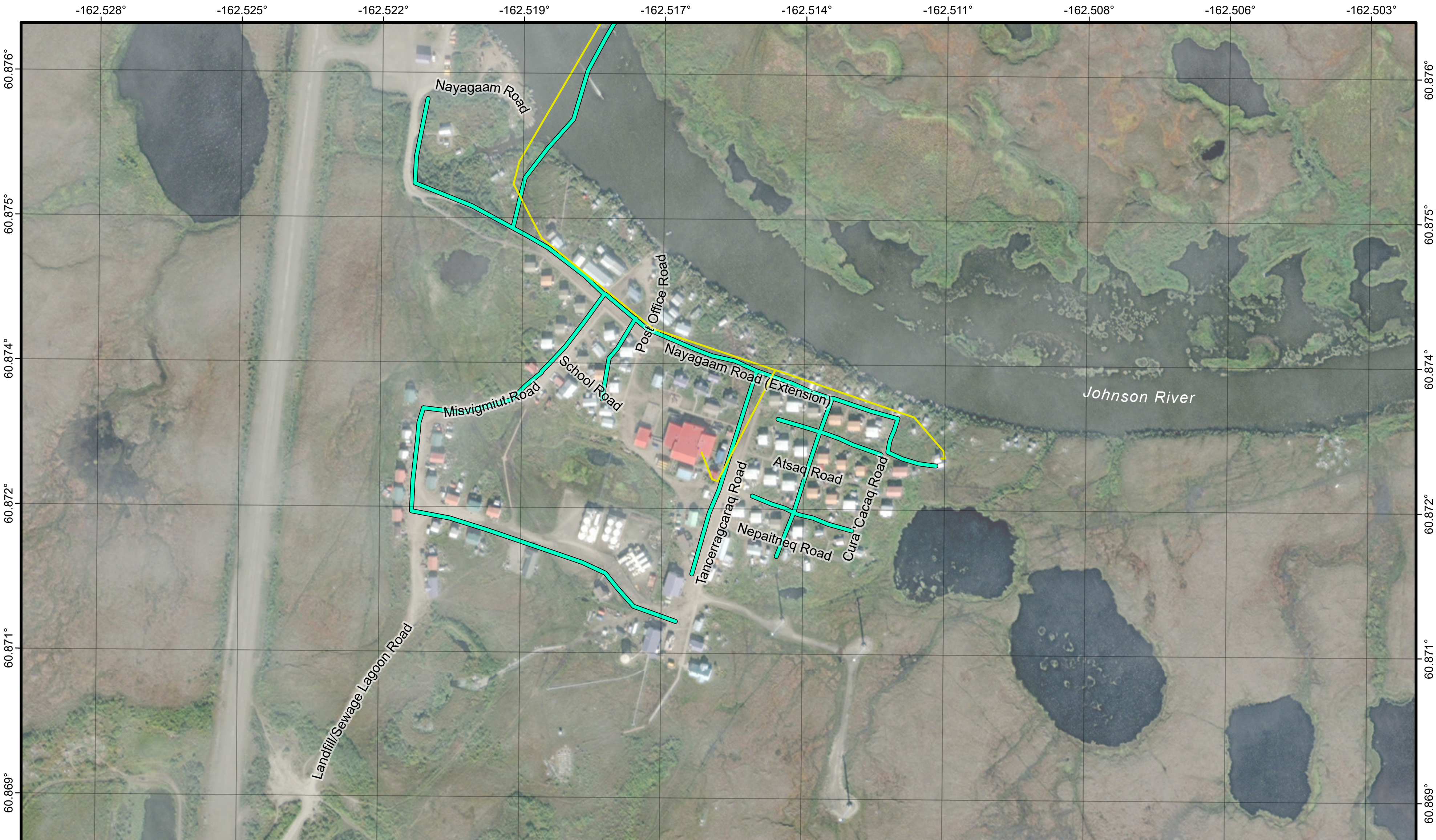
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 3

SHEET 12 of 13

DATE: October 18, 2023



Airraq Network
Fiber Optic Cable Route

Detail Maps
Kasigluk

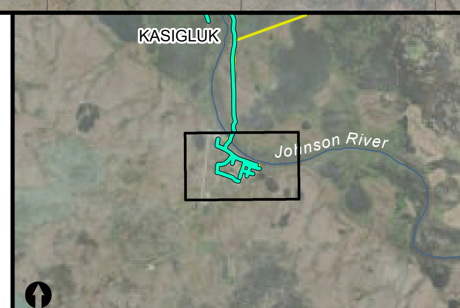
0 275 550 Feet

HORIZONTAL DATUM:
NAD 1983 State Plane Alaska Zone 7

Existing Fiber (no new construction)

FOC Construction Methods

FTTP (Aerial Path)



APPLICANT: Unicom, Inc/GCI

PERMIT NO: POA-2023-207

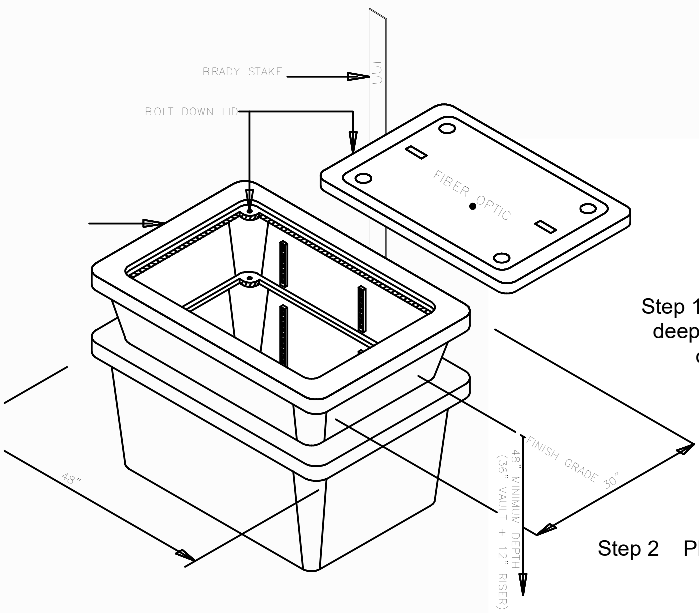
WATERWAY: Bering Sea

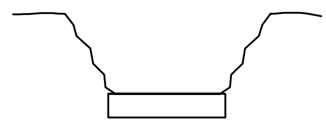
FIGURE 3

SHEET 13 of 13

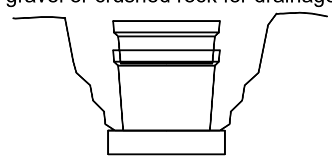
DATE: October 18, 2023

TYPICAL BEACH
MANHOLE DETAIL

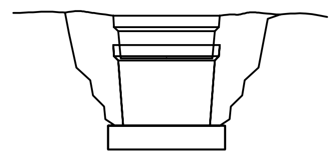




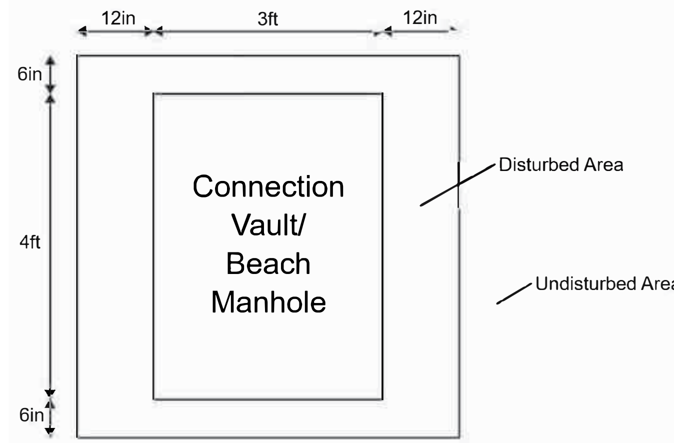
Step 1 Prepare the excavation approximately 6" deeper than the depth of the vault. Then add 6" of gravel or crushed rock for drainage.



Step 2 Place vault in hole with top at finish grade level.



Step 3 Backfill and compact around box with select material to finish grade level.



Airraq Network
Fiber Optic Cable Route

Typical BMH/CV

DRAWING NOT TO SCALE

APPLICANT: Unicom, Inc./GCI

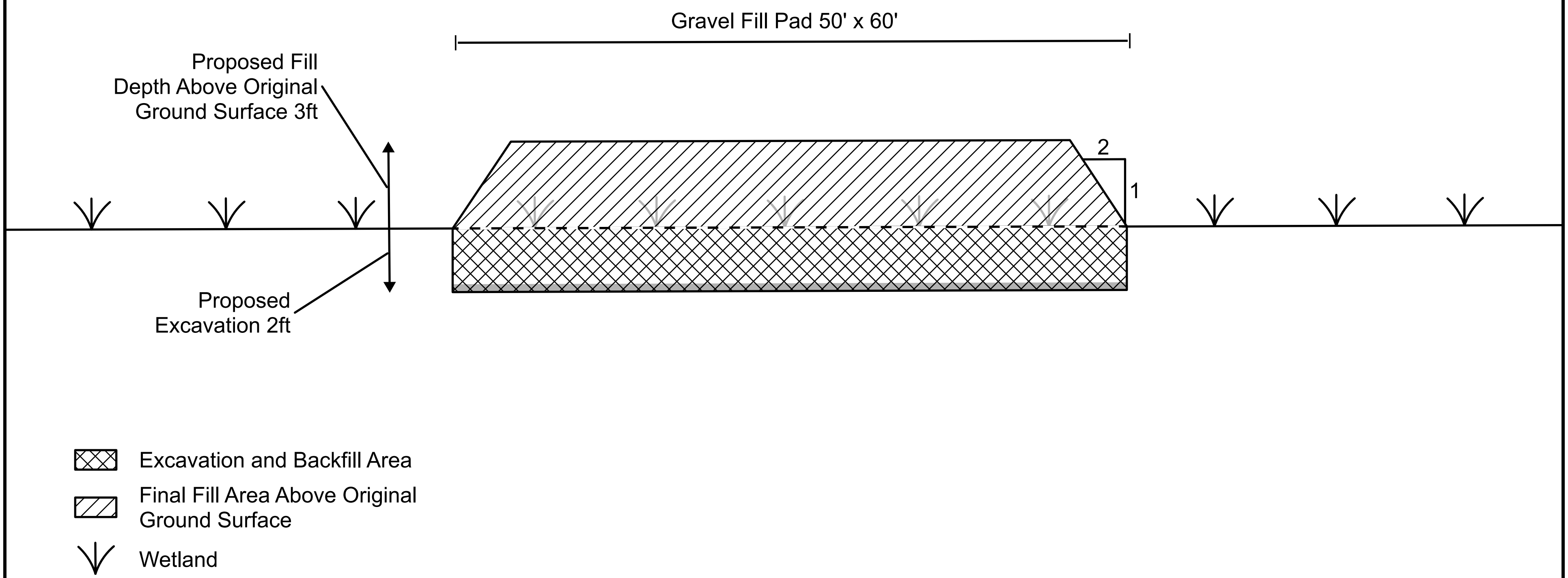
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 4

DATE: October 18, 2023

CLS Typical Cross Section



Airraq Network
Fiber Optic Cable Route

Typical CLS

DRAWING NOT TO SCALE

APPLICANT: Unicom, Inc./GCI

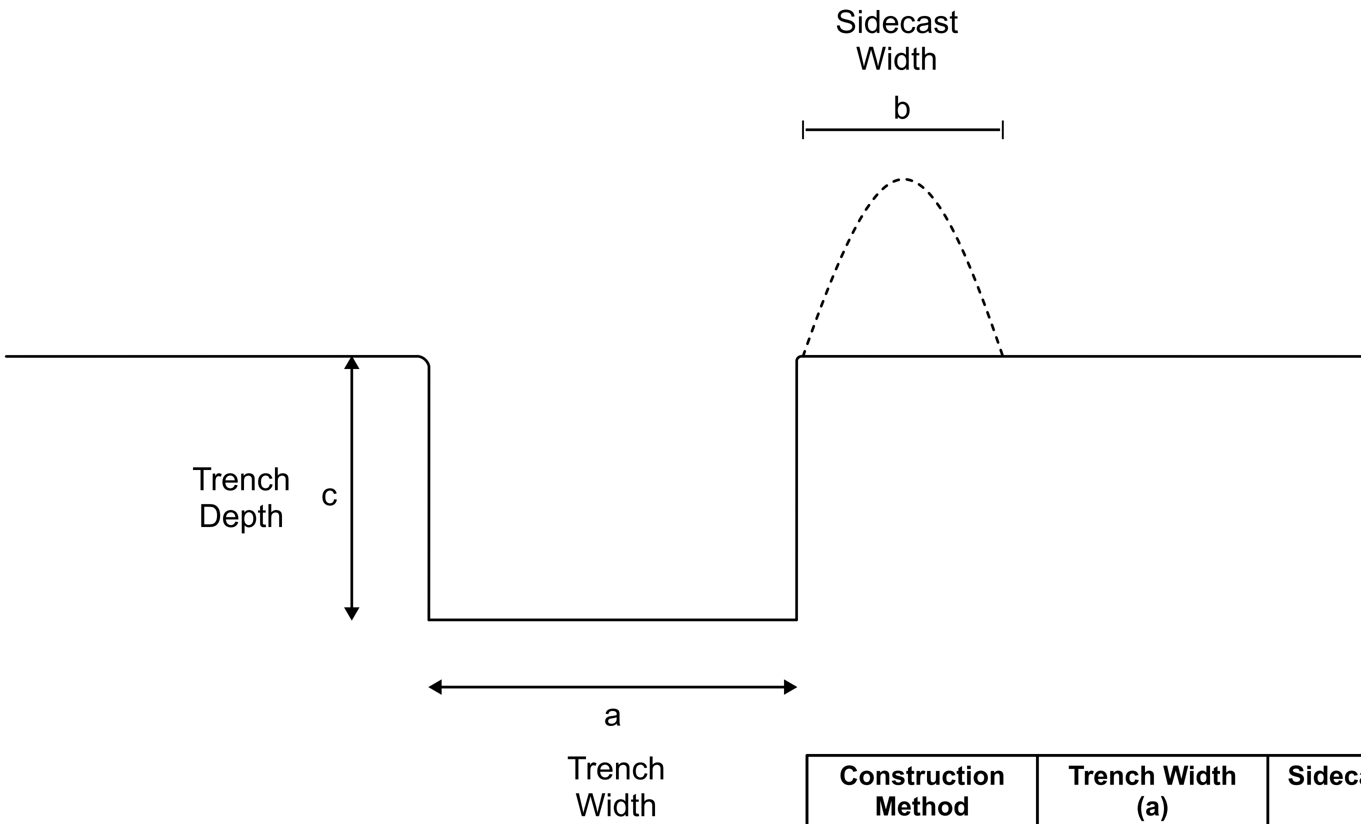
PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 5

DATE: October 18, 2023

Trench Cross Section



Construction Method	Trench Width (a)	Sidecast Width (b)	Trench Depth (c)
Standard Trench	3ft	5ft	3ft
Rock Saw	6in	1ft	8in
Jet Sled	8in	NA	1ft
Plow	1ft	NA	5ft

Airraq Network
Fiber Optic Cable Route

Trench Dimensions and Details

DRAWING NOT TO SCALE

APPLICANT: Unicom, Inc./GCI

PERMIT NO: POA-2023-207

WATERWAY: Bering Sea

FIGURE 6

DATE: October 18, 2023

Appendix A. Airraq Network Biological Assessment for the National Marine Fisheries Service

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Airraq Network

PHASES 1 AND 2

Biological Assessment for U.S. Fish and Wildlife Service

Unicom, Inc

March 2023

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Executive Summary

Unicom, Inc., a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim Delta as part of the Airraq Network (Project). The Project will extend broadband service from Dillingham to 10 communities within the Lower Kuskokwim River Delta by placing approximately 548 miles of fiber optic cable on the ocean floor, Kuskokwim River, and terrestrial landscapes throughout the region. The cable will be trenched within the seafloor when necessary to protect it from outside aggression that could make the cable prone to fault. Terrestrial route components will take advantage of the unique landscape by laying the cable on the ground surface as much as possible, which will allow it to be overgrown by vegetation and eventually self-bury. The terrestrial route will be trenched when necessary to provide additional protections and alleviate visual concerns.

The Project has received funding through grants from the National Telecommunications and Information Administration (NTIA) and U.S. Department of Agriculture (USDA). Additionally, the Project requires a permit from the U.S. Army Corps of Engineers (USACE), Alaska District under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Under Section 7 of the Endangered Species Act (ESA), NTIA, USDA, and USACE are required to consult with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) to ensure that any federal action will not jeopardize the continued existence of any species listed or proposed under the ESA, or result in the destruction or adverse modification of designated critical habitat.

Four ESA-listed species may occur within the action area (Table ES-1). This Biological Assessment includes an analysis of potential direct, indirect, and cumulative impacts to these species as a result of the Project. The NTIA and USDA conclude and request concurrence from the USFWS that the proposed Project will have **no effect** on spectacled eider (*Somateria fischeri*), short-tailed albatross (*Phoebastria albatrus*), and the Southwest Alaska Distinct Population Segment (DPS) of northern sea otter (*Enhydra lutris kenyoni*), and that the Project **may affect, but is not likely to adversely affect**, Steller's eider (*Polysticta stelleri*). No designated critical habitat for Steller's eider, spectacled eider, or the Southwest Alaska DPS of northern sea otter is present within the action area.

Table ES-1. ESA-listed Species and Critical Habitat within the Action Area

Species	ESA Status	Effect Determination for Species	Critical Habitat within Action Area
Steller's Eider (*Polysticta stelleri*)	Threatened	May affect, not likely to adversely affect	No
Spectacled Eider (*Somateria fischeri*)	Threatened	No Effect	No
Short-tailed Albatross (*Phoebastria albatrus*)	Endangered	No Effect	No
Northern Sea Otter – Southwest Alaska Distinct Population Segment (*Enhydra lutris kenyoni*)	Threatened	No Effect	No

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Appendices

Acronyms and Abbreviations

BA	Biological Assessment
BBMA	Bristol Bay Management Area
BMH	beach manhole
BSAIMA	Bering Sea Aleutian Islands Management Area
BU	branching unit
CFR	Code of Federal Regulations
CLS	Cable Landing Station
CV	Coefficient of Variation
dB	decibel
dB re 1 μPa rms	decibels referenced to a pressure of 1 microPascal root mean square
DP	dynamic positioning
DPS	Distinct Population Segment
ESA	Endangered Species Act
FOC	fiber-optic cable
FR	Federal Register
ft	foot/feet
ft^3	cubic foot/feet
FTTP	Fiber to the Premise
hr	hour(s)
HTL	high tide line
Hz	hertz
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
KMA	Kuskokwim Management Area
m	meter(s)
mi	mile(s)
mi^2	square mile(s)
MLW	mean lower low water
NAD 83	North American Datum of 1983

nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NTIA	National Telecommunications and Information Administration
OCS	Outer Continental Shelf
OHW	ordinary high water
PCE	Primary Constituent Element
PLGR	pre-lay grapnel run
Project	Airraq Network
PSO	Protected Species Observer
PTS	permanent threshold shift
ROV	remotely operated vehicle
TL	transmission loss
TTS	temporary threshold shift
Unicom	Unicom, Inc.
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
YK	Yukon-Kuskokwim

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1 Introduction

Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim (YK) Delta as part of the Airraq Network (Project). In doing so, Unicom will extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

The YK Delta is among the world's largest river deltas, with Bethel being its most populous community. The town of Bethel has a population of 6,500 individuals and lies approximately 68 river miles (mi) up the Kuskokwim River from the Kuskokwim Bay on its northern bank. The other nine communities are geographically isolated throughout the region. No roads connect the towns within the Lower YK Delta or with the rest of the state, and they are only accessible by boat or plane. All 10 communities that the Project proposes to service are home to the Yup'ik, with at least 74 percent of these communities' populations being Alaska Native.

The Project will provide a long-term solution, connecting these 10 underserviced communities within western Alaska with high-speed broadband connectivity. The Project is designed to overcome the region's harsh elements while creating a more efficient and modern way for western Alaska to connect with the rest of the world. The Project is composed of both marine and terrestrial components that have the potential to occur within habitat for Endangered Species Act (ESA) listed species managed by the U.S. Fish and Wildlife Service (USFWS).

This Biological Assessment (BA) has been prepared to address the Project's potential impacts on species listed as threatened or endangered under the ESA and is intended to fulfill the requirements for informal consultation with the USFWS under Section 7 of the ESA. The objective of this BA is to ensure that the Project, as an action authorized by the National Telecommunications and Information Administration (NTIA) and U.S. Army Corps of Engineers (USACE), does not jeopardize the continued existence of an endangered or threatened species, or adversely modify critical habitat of federally listed species.

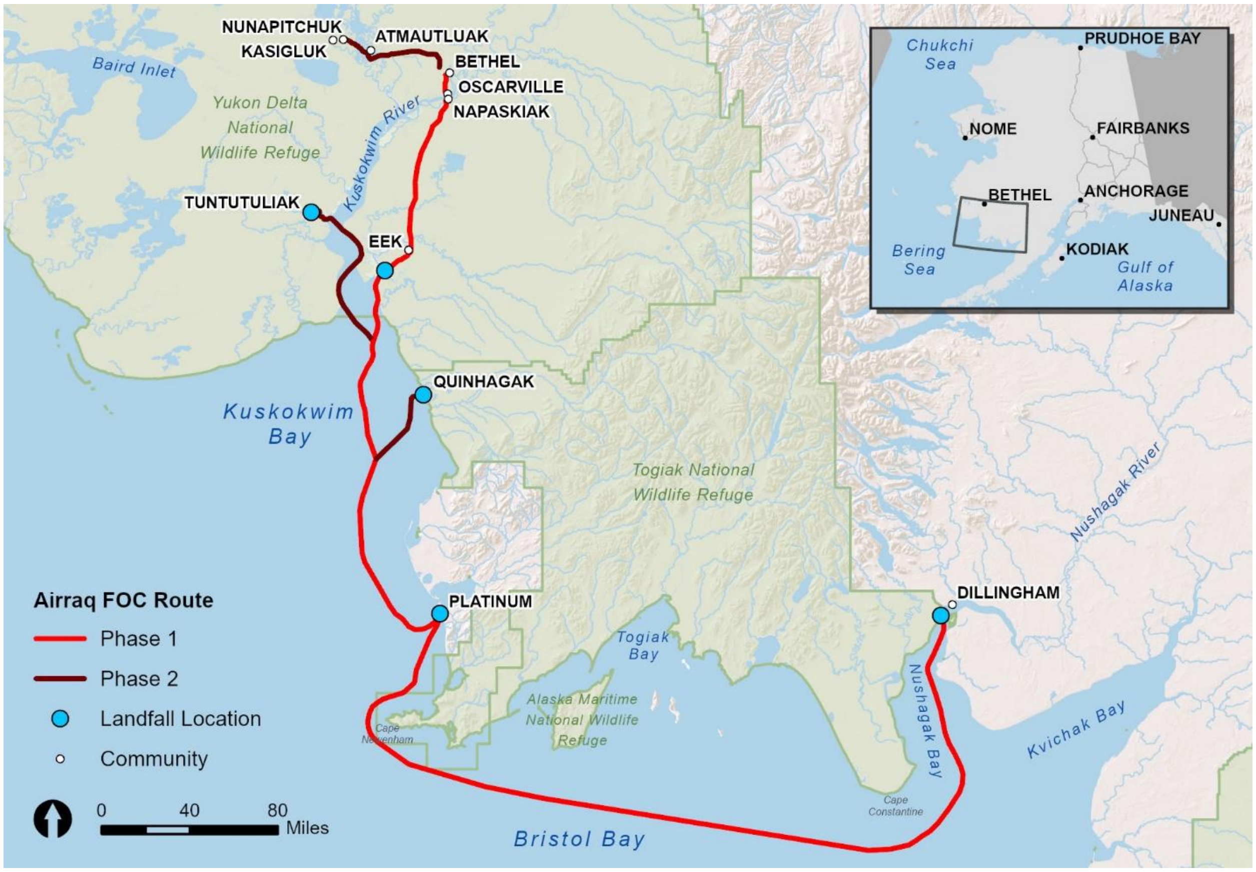
1.1 Background and Consultation History

This BA is the initial request for Section 7 ESA consultation with USFWS for this Project. A separate BA has been prepared for Section 7 ESA consultation with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS).

2 Project Description

The Project will consist of two phases. Figure 2-1 provides an overview of the full Project.

Figure 2-1. Project Vicinity



Phase 1 will combine a 443-mi FOC build and Fiber to the Premise (FTTP) last mile network[1] upgrades within five communities: Platinum, Eek, Napaskiak, Oscarville, and Bethel. For the construction of Phase 1, Unicom has partnered with Bethel Native Corporation, which has been awarded a $42 million grant from the NTIA Tribal Broadband Connectivity Program.

Using a middle mile network[2], Unicom will interconnect with an FOC and microwave network within Dillingham to begin the Project. Phase 1 has an extensive marine component, extending FOC along the ocean floor from existing Unicom facilities within Dillingham to Platinum. This segment will be a 24-strand submarine FOC with a cable landing for signal regeneration in Platinum. From Platinum, the cable will continue along the marine route, paralleling the Kuskokwim Bay shoreline until it reaches a landfall location within the Eek River, immediately upstream of its confluence with the Kuskokwim River. This will begin the overland route to Eek. From Eek, the FOC route will continue the overland route to Napaskiak, where it will cross the

[1] Last mile network refers to any broadband infrastructure that connects directly to an end-user location.
[2] Middle mile network refers to any broadband infrastructure that does not connect directly to an end-user location.

Kuskokwim River to Oscarville and end within Bethel. The Project will also establish a second FOC delivery technology, FTTP, within connected communities. FTTP local network access will provide high-speed broadband access to residences and businesses within the communities of Platinum, Eek, Napaskiak, and Oscarville. The existing hybrid fiber-coaxial access networks within Bethel will be upgraded to help facilitate broadband distribution within the community.

Phase 2 will include installation of 105 mi of FOC, which will be interconnected with Phase 1 by combining middle mile network transport segments and FTTP installation in five additional communities: Quinhagak, Tuntutuliak, Atmautluak, Kasigluk, and Nunapitchuk. This portion of the Project has been awarded federal grant funding from the U.S. Department of Agriculture through the Rural Utilities Service ReConnect Grant.

Phase 2 will build off the Phase 1 FOC route with both terrestrial and submarine components. Cable branching units (BU) originating from the Phase 1 FOC will connect the marine route within Kuskokwim Bay to the communities of Quinhagak and Tuntutuliak. A separate overland route will connect FOC from Bethel to Atmautluak and on to Nunapitchuk before it terminates in Kasigluk. Each community in Phase 2 will construct a FTTP network to bring high-speed broadband to the community.

Project activities include the following components:

- **Landfall Route:** This route involves installation of broadband submarine FOC at landfall locations between mean low water (MLW) and beach manhole (BMH) locations. BMHs are excavated manholes that provide connection points between submarine cable and either lightweight submarine or terrestrial cable. Landfall components between MLW and BMH locations are trenched.
- **Marine Route:** This route involves installation of broadband submarine FOC within marine environments below MLW, including segments extending from Kuskokwim Bay to Apogak and Tuntutuliak landfall locations. These segments are either trenched or laid on the seafloor.
- **Overland Route:** This route involves installation of broadband FOC along terrestrial landscapes, including wetlands, inland lakes, and stream crossings. Lightweight submarine cables will be used where crossing wetlands, and armored submarine cable will be used when crossing rivers. Each overland route segment will terminate at Connection Vaults (CV). CVs facilitate the splice between overland and terrestrial cable prior to connection with prefabricated Cable Landing Stations (CLSs) or existing utility poles.
- **Community Shore Route:** This route is the terrestrial FOC segment that connects BMHs or CVs with CLSs. CLSs house the infrastructure needed to convert incoming terrestrial cable to FTTP cable.
- **FTTP Route:** This route will bring cable from the CLSs, either trenched or attached to existing utility poles, to residential and commercial users. This segment will terminate the FOC route within each community.

Table 2-1 provides a Project summary. For the purposes of this BA, Phases 1 and 2 will be evaluated as a single Project.

Table 2-1. Project Summary

Project Component	Phase 1 Total Length (mi)	Phase 2 Total Length (mi)	Project Total Length (mi)	Phase 1 Associated Facilities	Phase 2 Associated facilities
Marine (below MLW)	328.4	62.1	390.5	None	None
Landfall (MLW to BMH)	0.7	0.1	0.8	BMH: 3	BMH: 2
Overland	49.2	27.7	76.9	CV: 7	CV:4
Community Shore Routes	1.2	0.4	2.0	CLS: 6	CLS: 5
FTTP	63.1	15.1	78.2	None	None
Total	**442.6**	**105.4**	**548.0**	**—**	**—**

2.1 Construction

The following sections describe the construction methods and equipment used for the Landfall Route, Marine Route, Overland Route, Community Shore Route, and FTTP. Unicom anticipates initiating terrestrial construction activities in fall 2023, conducting marine construction activities in 2024, and completing the Project in 2026. The anticipated construction schedule is provided in Section 2.2.

2.1.1 Landfall Locations

This section describes operations that occur between MLW and each landfall BMH. Landfall construction will occur concurrently with marine construction. Table 2-2 provides each Project landfall location.

Table 2-2. Project Landfall Locations

Landfall Location	Latitude (NAD 83)	Longitude (NAD 83)
Dillingham	59.003510°	-158.535688°
Platinum	59.010177°	-161.821189°
Apogak (Eek)	60.148601°	-162.183601°
Quinhagak	59.742126°	-161.929299°
Tuntutuliak	60.338149°	-162.662662°

Note: NAD 83 = North American Datum of 1983

At each landfall, the cable will be trenched within the shoreline between MLW and the BMH. A BMH is an enclosed structure that houses the splice between the incoming submarine cable and outgoing lightweight submarine or terrestrial cable that will connect to existing Unicom facilities. Each BMH will measure 3 ft by 4 ft by 4 ft, or 48 cubic ft (ft^3). Excavation dimensions may vary by shoreline, bank contour, and substrate but will not exceed 5 ft by 5 ft by 5 ft, or 125 ft^3. BMHs are positioned above the high tide line (HTL). Landfall trenching will be conducted with either a rock saw or backhoe. Rock saw trenches are typically 6 inches wide and 8 inches deep, while backhoe trenches are 3 feet (ft) wide and 3 ft deep. Excavated material from trench construction and excavation will be side cast temporarily (i.e., for less than 1 week) into wetlands and underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable.

While conducting landfall construction, care will be taken to protect the shoreline from future erosion. Additionally, best practices will be employed to address stormwater runoff concerns.

For all intertidal work (MLW to HTL), construction operations will occur only during low tide. When not constructing on shorelines with firm sediments such as large boulders, heavy equipment will be placed on mats to protect the substrate from slumping and erosion. Alterations to shorelines will be temporary.

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
- Landing craft similar to the marine vessel *Unalaq*

2.1.2 Marine Route

Marine portions of the Project route include cable-laying operations in waters below MLW. Both phases of the Project have marine components. Phase 1 will construct the primary marine cable route, while Phase 2 will build off Phase 1 with two BUs.

The path chosen for the marine routes were identified through desktop studies and a marine route benthic survey. These engineering and field practices assist in selecting routes that provide considerations for environmental and anthropogenic forms of disturbance on the cable system that may lead to cable fault. The International Cable Protection Committee has identified fishing activities as the primary cause for submarine cable faults and repairs. As such, the proposed route avoids high-impact fishing grounds where possible. When ground fishing areas cannot be avoided, the cable will be buried. Nearshore 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/turbid currents, and other geological hazards.

The marine route will rely on four or more vessels for construction operations. The vessel used for cable-laying operations will be dependent on local water depth, location, and cable-laying method. A cable ship (Figure 2-2) will be used for cable-laying operations within areas of the marine route with water depths exceeding 40 ft and will rely on dynamic positioning. Project elements in waters shallower than 40 ft will be conducted using either a tug and barge, a small landing craft stored on the cable ship, or a separate operation using an Alaska Vessel of Opportunity. Additionally, landfall locations will be assisted by a landing craft similar to the marine vessel *Unalaq*. These vessels will have a shallow draft, making shallow waters and landings accessible feasible. Segments of the cable routed into the Kuskokwim River will be laid with a cable-laying barge and tug when they reach a depth of 40 ft within Kuskokwim Bay. Tug and barge operations will continue for these segments until they reach a landfall location within

tributaries of the Kuskokwim River. The tug and barge will lay lightweight submarine cable while all other marine portions of the route will use either a single armor or double armor submarine cable. The submarine cable, measuring 1 inch in diameter, is constructed from benign materials and will not carry an electrical current.

Figure 2-2. *C.S. IT Intrepid*, Typical Cable Laying Ship

For marine components, the cable will either be laid on top of the seafloor or buried within a trench (i.e., trenching). Cable will be laid on the seafloor within areas identified as low risk to cable disturbance or when traversing seafloor substrates that do not allow for trenching. When placing cable on the seafloor, bathymetric conditions will 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, trenching will be used where there is significant risk of outside disturbance to the cable. Local reroutes or cable armoring will be implemented in high risk areas where the substrate does not allow for trenching.

Prior to trenching operations on the seabed, a pre-lay grapnel run (PLGR) will be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation will 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 along the route over the seabed. Any debris recovered by the grapnel will be discharged ashore upon completion of the operations and disposed in accordance with local regulations. If debris cannot be recovered, then a local re-route will be planned to avoid the debris. The PLGR operation will be conducted to industry standards employing towed grapnels, and the type of grapnel will be determined by the nature of the seabed.

Trench burial within waters deeper than 40 ft will be conducted using a cable plow. Trenching within deep sea segments will protect the FOC against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow

will be pulled along the seafloor by a tow wire connected to the cable ship. The cable will 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 will exit the lower aft end of the share blade, and the sediments will immediately collapse on top of the cable, behind the plow. This form of burial will eliminate side cast because the excavated substrate will be returned to the trench immediately after the cable is laid. As a result of the immediate burial, absence of side cast, and narrow excavation footprint, cable plow trenching incurs only minimal and temporary impacts.

In waters shallower than 40 ft, trenching will take place in areas where cable protection from other environmental conditions, such as surf action and ice scour, are needed. At these depths, 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 water used for jetting will be supplied from the surface by high pressure hoses. This system will allow for jetting pressure and flow rates to be manipulated based on local conditions. The pressurized water will be focused on the seafloor, liquifying the substrate. The cable will then sink within the trench without side cast. The elimination of side cast and narrow excavation footprint results in limited and temporary impacts. The jet sled will be accompanied by divers who will monitor trenching performance and assist in operations. Figure 2-3 shows a typical jet sled.

Figure 2-3. Typical Jet Sled

Phase 1 marine portions of the Project include sections of the route between the Dillingham MLW and Platinum MLW, followed by an additional segment between the Platinum MLW and MLW at the Apogak Landfall site. To reach that landing site, the cable will be routed up the Kuskokwim River and into the Eek River. The cable will be surface laid across the riverine areas so sediment transport can passively bury the cable.

Marine elements of Phase 2 consist of two BUs extending from the Phase 1 marine route. One of the BUs will supply submarine cable to Quinhagak, while the other will connect to Tuntutuliak. To reach Tuntutuliak, the cable will enter the Kuskokwim River and travel up the Kinak River. The cable will be surface laid within the thalweg of these two rivers. Sediment transport is

anticipated to self-bury the cable within the substrate. The marine portion of the BU will terminate when it reaches Tuntutuliak, above tidal influence at ordinary high water (OHW). The nearshore construction methods used at MLW at the other locations will be used at OHW adjacent to Tuntutuliak.

Upon completion of cable laying operations, a post-lay inspection and burial will be conducted using a ROVJET 207, or similar remotely operated vehicle (ROV). The purpose of the post-lay inspection and burial is to inspect portions of the cable ship route where laying operations may have encountered difficulties. These difficulties include plow failure, unplanned cable repair, uncontrolled cable payout, or other unplanned events. Where burial corrections need to be made, the ROV will use jet burial, similar to that of the jet sled, and trench the cable. The ROV will be operated remotely from the cable-laying ship; pulsed sounds will be generated from the ROV, and cameras will be used for positioning and orientation.

2.1.3 Overland Route Operations

The overland route is defined as segments of the FOC route that both begin and terminate within a BMH or CV. The overland route between Bethel and Oscarville will use pre-existing riser poles and other infrastructure; therefore, it will incur no additional surface impacts. The overland route between Nunapitchuk and Kasigluk will be conducted on existing infrastructure and will not result in surface impacts.

Inland communities not collocated with a marine landfall location will use a CV in lieu of a BMH. CVs house the splice between incoming lightweight submarine cable and outgoing terrestrial cable. Excavation dimensions and considerations for BMHs will be the same for CVs.

Overland route segments will be installed in the winter months, when the substrate is frozen, to minimize ground disturbance. The frozen ground helps protect vegetation while also being stable enough to support heavy equipment. Wetland segments will use a lightweight submarine cable provided in 20,000-foot segment spools that are towed by light tracked vehicles.

When crossing overland sections, the cable will either be laid across the ground surface or trenched. Placing the cable directly on the ground significantly reduces wetland impacts and is, therefore, the preferred installation method. The cable will be 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 riser 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 trenching activities will be conducted by a rock saw. Overland routes will be made between the locations shown in Table 2-3.

Table 2-3. Overland Route Surface Impacts

FOC Route Segment	Cable Surface Laid on Uplands (mi)	Cable Trenched in Uplands (mi)	Cable Surface Laid on Wetlands and Waterbodies (mi)	Cable Trenched in Wetlands (mi)	Cable Attached to Existing Aerials (mi)
Apogak BMH to Eek Village South CV	—	—	6.8	0.5	—
Eek Village North CV to Napaskiak CV	—	<0.1	34.9	1.3	—
Napaskiak CV to Oscarville CV	—	<0.1	0.9	0.1	—
Oscarville CV to Bethel South CV	—	—	—	—	4.7
Bethel CV to Atmautluak East CV	—	<0.1	19.7	0.6	—
Atmautluak West CV to Nunapitchuk CV	—	—	6.7	0.2	—
Nunapitchuk CV to Kasigluk CV	—	—	—	—	—
Quinhagak BMH to Quinhagak CV	—	—	—	0.5	—
Project Total	**—**	**<0.1**	**69.0**	**3.2**	**4.7**

The process of laying cable within wetlands will begin by removing deep snow from the cable route. Buried cable segments through wetlands will then be excavated and the cable laid directly within the trench. Side cast from trenching into wetlands will be underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable, and will be replaced when feasible (i.e., within less than 1 week). Trench depth will be targeted at 8 inches but will vary with the terrain. However, trench depth will always be contained within the organic vegetation mat, which balances allowing the trench to heal while providing sufficient protections for the cable.

When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface that will allow it to passively drop into the waterbody during spring break-up. When the cable sinks into the water body, the weight of the cable will allow it to self-bury within aquatic bed sediments. Submarine cable will be used to cross streams and rivers. The cable will be spliced with the overland route cable and buried into each stream bank below OHW. Best management practices will be used to avoid bank erosion and create drainage paths. Side cast will be replaced after the cable is laid (i.e., within less than 1 week).

Segments crossing major rivers (i.e., Pikmiktalik and Johnson Rivers) will use a landing craft to lay double armored submarine cable across the river. Sediment transport will passively bury the cable. Additionally, the cable will be equipped with an outer plastic covering to avoid frazil ice buildup. Care will be taken to position the crossings on stable banks to provide erosion protection.

During construction, heavy equipment will be placed on geotextile mats. The position of the laid cable will be recorded with a survey quality Global Positioning System. Post-lay inspection for terrestrial components will be conducted following snow and ice melt. Any cable left suspended after melt will be repositioned so as not to be hazardous for humans or animals. Cable

repositioning will be done manually by moving the installed slack cable accordingly. If needed, the cable can be pinned to the ground using small duckbill anchors that will be installed using a hammer and drive pin. Cable left on the vegetation will both sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Helicopter and walking inspections will be conducted on an annual basis to monitor erosion and bank failure.

In general, equipment used across overland routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Rock saw
- Chain trencher or cable plow (optional)
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Winch or turning sheave
- Small utility boat for larger rivers
- Splicing equipment, small genset, and splicing tent

2.1.4 Community Shore Routes

Community shore routes include segments of FOC between each community's BMH or CV and the CLS. The BMHs and CVs located adjacent to communities will house the splice between overland or marine route cable and terrestrial cable. The terrestrial cable will extend beyond these splicing houses to a CLS.

All cable segments within community shore routes will be trenched or attached to existing electrical distribution poles. Trenching will be excavated using backhoes and conventional trenching methods. When possible, the cable will be routed adjacent to existing roads. Excavated material will be temporarily side cast (i.e., for less than 1 week) next to the trench and used to bury the cable. Backhoes and standard trenching techniques will be used to re-grade the BMH or CV footprint as well as all trenched areas to original pre-existing contours. The trenching will employ best management practices to prevent erosion and water discharge.

Where possible, each CLS facility will be constructed adjacent to existing Unicom facilities. CLSs will be built on gravel pads that are 50 ft wide, 60 ft long, and 5 ft deep. Figure 2-4 shows a typical CLS facility.

Figure 2-4. Typical CLS Facility

In general, equipment used for community shore routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.1.5 FTTP

The way fiber is routed to the end user is dependent on what existing infrastructure is in place, if any. FTTP begins at the CLS, which houses the FTTP local access distribution equipment. FTTP is then routed throughout the community, connecting to local nodes, where splitters enable branching into feeder lines that deliver connectivity to the premise locations.

FTTP will be distributed throughout communities by trenching or attaching cable to existing utility poles. Unicom will not construct any new utility poles for the Project but will instead use existing utility poles where they are present. When utility poles are not present, the FTTP route will be trenched. When possible, this will occur along existing roads and rights-of-way. FTTP trenching will be conducted by a backhoe and standard trenching practices.

Upon construction completion, all trenched areas will be re-graded to original pre-existing contours. No excess material is anticipated to be produced that will require disposal.

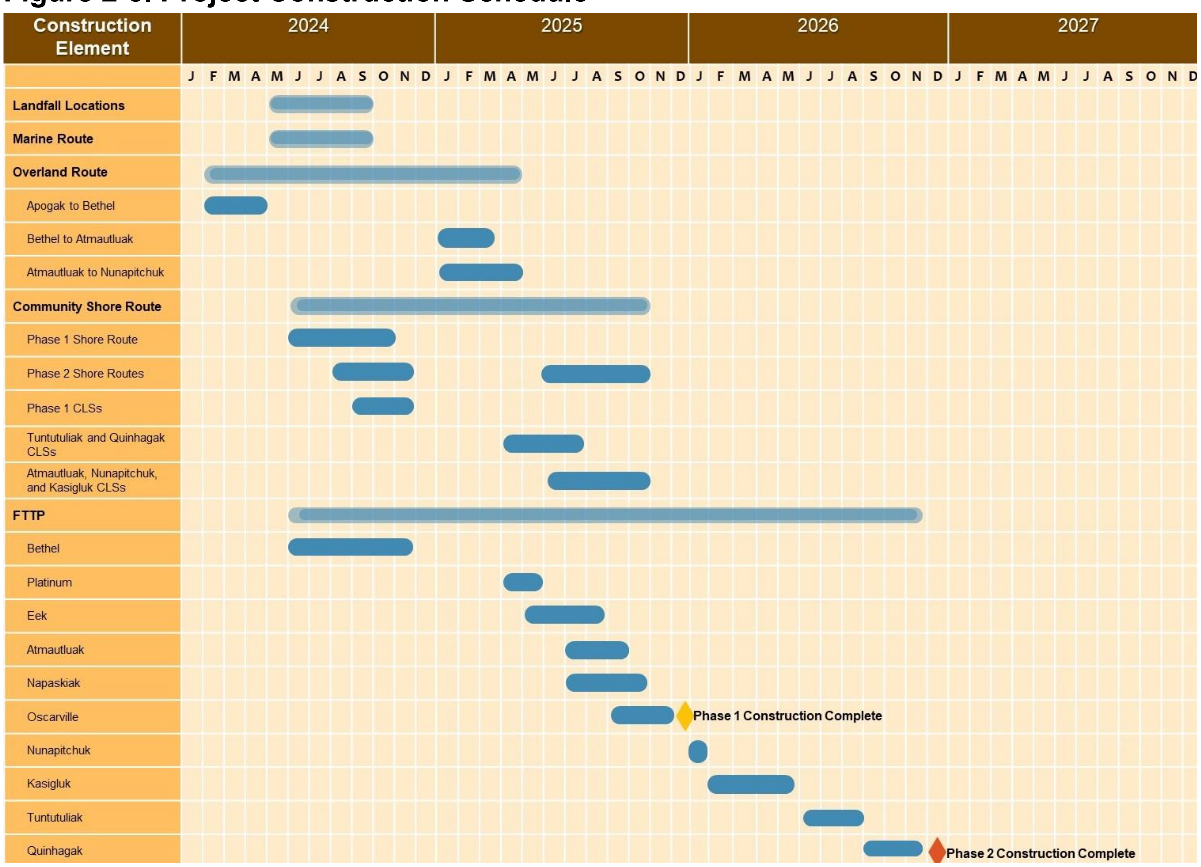
In general, equipment used for FTTP includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.2 Schedule

Project construction is anticipated to begin in 2024 and end in 2026 (Figure 2-5). It is anticipated that Phase 1 construction will be completed in winter 2024, and Phase 2 construction will be completed in spring 2026. Project construction schedule elements are detailed in Figure 2-5.

Figure 2-5. Project Construction Schedule



2.3 Avoidance and Minimization Measures

As part of the proposed Project, Unicom has committed to the following measures intended to avoid and minimize adverse impacts on ESA-listed species and their habitat:

- Vessels will be traveling at speeds less than 5 knots during cable laying operations, PLGR, and post-lay inspection and burial.
- Cable routing has been selected to avoid concentration areas where eiders and albatross occur to reduce potential behavioral or disturbance effects.
- The overland cable routes will be laid or trenched in winter, when protected bird species are not present onshore.
- Artificial lighting will be reduced or shielded so it is not projected skyward to reduce attracting birds.
- The cable-laying vessels will not discharge materials into the ocean that may attract seabirds, including short-tailed albatross.
- Bird strikes with vessels will be unlikely since marine cable-laying activities will occur in May through September, when long daylight hours occur.
- Prior to the start of cable-laying operations, Protected Species Observers (PSO) will clear the disturbance zone for a period of 30 minutes when activities have been stopped for longer than a 30-minute period. Clearing the zone means no marine mammals have been observed within the zone for that 30-minute period. If a marine mammal is observed within the zone, activities may not start until it:
    - Is visually observed to have left the zone; or
    - Has not been seen within the zone for 15 minutes in the case of pinnipeds, sea otters (*Enhydra lutris*), and harbor porpoises (*Phocoena phocoena*); or
    - Has not been seen within the zone for 30 minutes in the case of cetaceans.
- Consistent with safe navigation, Project vessels will avoid traveling within 3 nautical miles (nm; 5.6 kilometers [km]) of any of Steller sea lion (*Eumetopias jubatus*) rookeries or major haulouts (to reduce the risks of disturbance of Steller sea lions and collision with protected species).
- If travel within 3 nm (5.6 km) of major rookeries or major haulouts is unavoidable, transiting vessels will reduce speed to 9 knots (16.6 km/hour [hr]) or less while within 3 nm (5.6 km) of those locations. Vessels laying cables are already operating at speeds less than 3 knots (5.6 km/hr).
- The transit route for the vessels will avoid known Steller sea lion biologically important areas and designated critical habitat to the extent practicable. Vessels may not be operated in such a way as to separate members of a group of marine mammals from other members of the group.
- Vessels should take reasonable steps to alert other vessels in the vicinity of whale(s), and report any stranded, dead, or injured listed whale or pinniped to the Alaska Marine Mammal Stranding Hotline at 877-925-7773.
- Although take is not authorized, if a listed marine mammal is taken (e.g., struck by a vessel), it must be reported to NMFS within 24 hours. The following will be included when reporting take of a listed species:

- Number of listed animals taken
- Date, time, and location of the take
- Cause of the take (e.g., vessel strike)
- Time the animal(s) was first observed and last seen
- Mitigation measures implemented prior to and after the animal was taken
- Contact information for PSO, if any, at the time of the collision, ship's pilot at the time of the collision, or ship's captain.

Unicom will train crew members as PSOs on the cable-laying barge and ship to be on watch during all daylight hours when traveling at speeds greater than 5 knots (9.3 km/hr). Crew member PSOs will:

- Be trained in marine mammal identification and behaviors.
- Have no other primary duty than to watch for and report on events related to marine mammals, when observing.
- Work in shifts lasting no longer than 4 hours without breaks, and will not perform duties as a PSO for more than 12 hours in a 24-hour period (to reduce PSO fatigue).
- Have the following to aid in determining the location of observed listed species, take action if listed species enter the exclusion zone, and record these events:
  - Binoculars, range finder, Global Positioning System, and compass
  - Two-way radio communication with construction foreman/superintendent
- PSOs will record all mitigation measures taken to avoid marine mammals observed using NMFS-approved observation forms. Reported actions on sighting reports will include time, location, the vessels position, speed, and corrected bearing.
- Reports will be sent to NMFS at the end of Project activities.

Unicom has also committed to the following measures intended to reduce the potential for spills of hazardous substances and implement plans for spill response:

- All fuel and hazardous substances used by the Project will be handled and stored on site in compliance with state and federal regulatory guidance. All fuels and chemicals will be stored in appropriate primary containment areas. Secondary containment areas will be designed in compliance with all applicable permits and regulations.
- Fuels and other products will be transported to the action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.

3 Action Area

The action area defined by the ESA includes all areas directly or indirectly affected by the proposed action and not merely the immediate area involved in the action (50 Code of Federal Regulations [CFR] 402.02). The action area is based upon the maximum geographic extent of the physical, chemical, and biological effects resulting from the Project, including direct and indirect effects. The action area is defined differently for each Project component and is composed of separate underwater and in-air portions. The Project action area is shown in Figure 3-1.

Underwater sound propagation depends on many factors, including sound speed gradients in water, depth, temperature, salinity, and bottom composition. Additionally, the characteristics of the sound source such as frequency, source level, type of sound, and depth of the source, will also affect propagation. The terms in the spreading loss calculation were rearranged to estimate distances to thresholds:

$$R = D*10^{(TL/TLc)}$$

Where

- Transmission Loss (TL) is the difference between the reference sound level in decibels referenced to a pressure of 1 micro Pascal root mean square (dB re 1 μPa rms) and the harassment threshold in dB re 1 μPa rms;
- TL_c is the transmission loss coefficient;
- R is the estimated distance to where the sound level is equal to the harassment threshold; and
- D is the distance from the sound source at which the reference sound level was measured.

A cable-laying landing craft or barge and tug will be used to install cable in waters 40 ft (12 meters [m]) or shallower within Kuskokwim Bay, the Kuskokwim River, and Kuskokwim River tributaries. The distance to the 160 dB re 1 μPa rms threshold for either vessel was estimated using measurements taken from the tug, *Leo*, pushing a full barge, *Katie II*, near the Port of Alaska and recorded 149 dB re 1 μPa rms at 328 ft (100 m) when the tug was using its thrusters to maneuver the barge during docking. Assuming spherical spreading transmission loss (20 log), the distance to which noise will attenuate to ambient is calculated to be 92 ft (28 m) for the cable-laying landing craft or barge and tug.

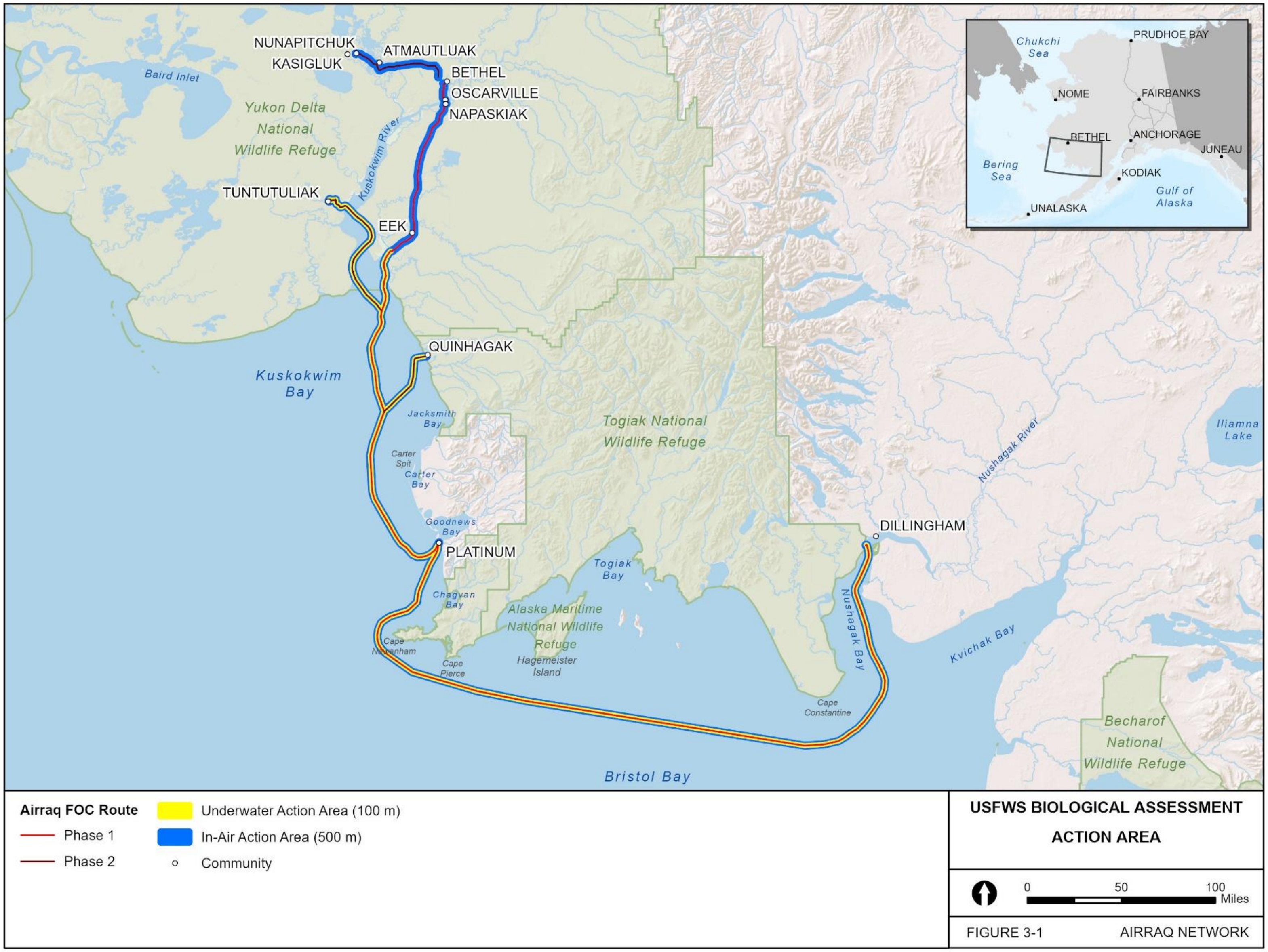
For the cable-laying ship installing cable for all waters except those listed above, the distance to the 160 dB re 1 μPa rms threshold was estimated using measurements taken from a vessel of similar size and class within the Chukchi Sea. In 2011, Statoil conducted geotechnical coring operations within the Chukchi Sea using the vessel *Fugro Synergy*. Measurements were taken using bottom founded recorders at 164 ft (50 m), 328 ft (100 m), and 0.6 mi (1 km) away from the borehole while the vessel used dynamic positioning thrusters. Sound levels measured at the recorder 0.6 mi (1 km) away ranged from 119 dB re 1 μPa rms to 127 dB re 1 μPa rms, with most acoustic energy in the 110 to 140 hertz (Hz) range (Warner and McCrodan 2011). A sound

propagation curve equation fit to the data and encompassing 90 percent of all measured values during the period of strongest sound emissions provided an estimate that sound levels will drop below 160 dB re 1 μPa rms at 20 ft (6 m).

The underwater portion of the action area is defined as the cable route plus a buffer of 328 ft (100 m) on each side of the route. This distance is conservative and, therefore, larger than the calculated distance to the potential acoustic harrassment disturbance threshold. This same rationale was used to inform tug and barge cable-laying operations within the shallow waters of Unalaska, Akutan, King Cove, Sand Point, Chignik Bay, and Larsen Bay for the Unicom AU-Aleutian Fiber Optic Cable Installation Project (USFWS Consultation #07CAAN00-2021-I-0196).

The in-air portion of the action area applies to the marine and terrestrial cable-laying route. This area is a 1,640-ft (500-m) buffer of the marine and terrestrial cable-laying route, and is the potential disturbance area due to the presence of the cable-laying vessel and terrestrial cable-laying equipment (Figure 3-1). This distance was used for the potential disturbance area from the presence of the vessel for the Unicom AU-Aleutian Fiber Optic Cable Installation Project (USFWS Consultation #07CAAN00-2021-I-0196).

Figure 3-1. Project Action Area



4 Species Descriptions

A list of ESA-listed species or populations that may be present within or near the action area was requested and received from the USFWS on February 2, 2023 (Appendix A). Species listed under the ESA that are known or suspected to occur within the action area include Steller's eider (*Polysticta stelleri*), spectacled eider (*Somateria fischeri*), short-tailed albatross (*Phoebastria albatrus*), and the Southwest Alaska Distinct Population Segment (DPS) of northern sea otter (*Enhydra lutris kenyoni*). No designated critical habitat for any of these species is located within the action area.

A summary of the existing biological information for each species is presented below, including distribution and life history, species status, presence within the action area, and critical habitat.

4.1 Steller's Eider

4.1.1 Distribution and Life History

The Steller's eider (*Polysticta stelleri*) is a sea duck and the smallest eider species, with behavioral and physical traits similar to dabbling duck species. Three breeding populations of Steller's eiders exist in the world, two of which occur within Arctic Russia, one within Alaska (USFWS 2021a). Nearly all Steller's eiders breed in eastern Russia and may number more than 128,000 individuals (ADF&G 2022, Hodges and Eldridge 2001).

Steller's eiders breed along the Arctic coast of Russia from the Yamal Peninsula to the Kolyma Delta and along the Arctic Coastal Plain of Alaska, primarily near Utqiaġvik, with a very small subpopulation also breeding on the Yukon- Kuskokwim Delta (Amundson et al. 2019, BirdLife International 2017, USFWS 2002, USFWS 2019b). Birds typically arrive to the breeding grounds by late May to June and depart in August (Fredrickson 2020, Kondratiev 1997). Eggs hatch in late June. Males typically depart from the breeding grounds beginning in late June or early July. Females that fail in their breeding attempts may remain in the Utqiaġvik area into late summer. Females and fledged young depart the breeding grounds in early to mid-September. In Alaska, Steller's eider nests on tundra habitats often associated with polygonal ground both near the coast and at inland locations (e.g., Quakenbush et al. 2004); nests have been found as far as 56 mi (90 km) inland (USFWS 2002). Emergent species of Carex and Arctophila provide important areas for feeding and cover.

After breeding, Steller's eiders move to marine waters to molt. Molting occurs throughout Southwest Alaska but is concentrated at four areas along the northern side of the Alaska Peninsula (USFWS 2002). Thousands of this species also use the Kuskokwim Shoals to molt (Martin et al. 2015, USFWS 2001a). Fall migration surveys conducted by the Bureau of Land Management have also recorded small numbers of Steller's eiders in mixed-species flocks within Carter Bay, the waters off Carter Spit, and Jacksmith Bay, to the southeast of the Kuskokwim Shoals (Seppi 1997). Individuals have also been recorded molting at St. Lawrence and Nunivak Islands, as well as along the coast of Bristol Bay (Martin et al. 2015). The estuaries and lagoons along the Alaska Peninsula are also used by this species for staging during fall migration.

The molting period occurs from approximately late July to late October (USFWS 2002). Molting areas are near breeding areas and tend to be shallow areas with eelgrass (*Zostera marina*) beds, intertidal sand flats, and mudflats (USFWS 2002). In these areas, Steller's eiders feed on marine invertebrates such as crustaceans and mollusks (e.g., Petersen 1980, 1981).

From approximately November through April, many Steller's eiders winter within the shallow, nearshore waters along the northern side of the Alaska Peninsula; however, many also disperse to the southern side of the Alaska Peninsula; the Aleutian Islands; and the western Gulf of Alaska, including Kodiak Island and Lower Cook Inlet (Martin et al. 2015, USFWS 2002). Steller's eiders, from both Alaska and eastern Russia, migrate to these areas for wintering as well as molting (Rosenberg et al. 2016). Wintering habitat includes shallow lagoons with extensive mudflats typically less than 30 ft (10 m) deep; however, satellite-tracked birds were found to frequently use deep bays and water up to 98 ft (30 m) almost exclusively at night (Fredrickson 2001; Martin et al. 2015). During winter months, this species feeds on marine invertebrates such as crustaceans, small mollusks, and gastropods that are closely associated with eelgrass, sea lettuce (*Ulva*), and brown seaweed (*Fucus)* habitat (Frederickson 2020).

Spring migration begins approximately mid to late April and typically continues into June (Fredrickson 2020). Most of the worldwide population of Steller's eider stage and migrate along the northern side of the Alaska Peninsula (Larned 2008, USFWS 2001a). They then cross western Bristol Bay and spend days to weeks staging in northern Kuskokwim Bay and small bays along its perimeter (Larned 2008, Rosenberg et al. 2016, USFWS 2001a). During this time, flocks of this species, numbering in the tens of thousands, congregate within the Kuskokwim Shoals, an extremely important staging area, prior to flying northward (USFWS 2001a). Some will also stage southeast of the Kuskokwim Shoals at Chagvan Bay, at Goodnews Bay, and within the waters offshore from Goodnews Bay northward to Jacksmith Bay (ADF&G 2020a, National Audubon Society 2023, Rosenberg et al. 2016). Flocks have also been recorded nearby within Carter Bay, the waters off Carter Spit, and Jacksmith Bay (ADF&G 2020a, Seppi 1997). Flocks of staging eiders also use the southern coast of Nunivak Island during spring migration (Larned et al. 1994, as cited in USFWS 2001a). Migrating eiders then travel northward through the Bering Strait between approximately mid-May to early June (Bailey 1943 and Kessel 1989, as cited in USFWS 2001a). Some subadults may stay behind within their wintering or migration route locations (USFWS 2001a). Staging eiders typically feed and rest within and near lagoons and shoals rich in benthic invertebrate prey and generally less than 33 ft (10 m) in depth (Larned 2012, USFWS 2002).

During the breeding season, non-breeding individuals have been documented using the nearshore waters within the Gulf of Anadyr and Amguema River (both in Russia), as well as the Kuskokwim Shoals in the eastern Bering Sea of Alaska and Hagemeister Island in northern Bristol Bay (Rosenberg et al. 2016). Non-breeding birds were found to stay for approximately 57 days on average (Rosenberg et al. 2016).

4.1.2 Species Status

The Alaska-breeding population of Steller's eider is currently listed as **threatened** under the ESA (USFWS 2022a) and was first listed in July 1997 due to the reduced number of breeding birds and suspected reduction in the breeding range in Alaska (USFWS 1997, 2019a). The

estimates of the breeding population within Alaska averaged 4,800 pairs between 1990 and 1998 (Fredrickson 2001) but is now thought to number less than 500 individuals (USFWS 2011, Stehn et al. 2013). The worldwide population of Steller's eider is thought to number approximately 130,000 to 150,000 individuals (BirdLife International 2022). Threats to the Alaska-breeding population include ingestion of lead, shooting, collisions with human structures, human disturbance in nesting areas, nest predation, and changes to the ecological community (USFWS 2021a).

4.1.3 Presence within Action Area

The Steller's eider's range overlaps with the action area (USFWS 2022b; Figure 4-1).

The in-air portion of the action area overlaps with Goodnews Bay, near the Platinum BMH. Aerial surveys conducted by USFWS from 1992 to 2012 have recorded concentrations of Steller's eiders numbering in the hundreds to thousands at Goodnews Bay during spring and summer (ADF&G 2020a, Larned 2012). Individuals staging at Goodnews Bay have been shown to stay within the area between mid-April and mid-May for approximately 8 days on average (Rosenberg et al. 2016).

Additionally, large congregations of Steller's eiders, numbering in the hundreds to thousands, have been observed in waters east of the action area, off Carter Spit northward to Jacksmith Bay (ADF&G 2020a, National Audubon Society 2023, Seppi 1997). Though records do not indicate how far offshore they tend to use this area, migrating and staging eiders are known to primarily use shallow waters less than 30 ft (10 m) in depth (Larned 2012). Coarse-scale bathymetry data (USGS 2018) indicate that the action area in this location will be in waters deeper than 49 ft (15 m); these data correlate with coarse-scale ADF&G (2020a) Steller's eider occurrence data, which indicate they are typically found closer to shore and outside the action area. During fall migration, small numbers of eiders in mixed flocks have been documented east of the action area, north of Goodnews Bay (Seppi 1997).

Steller's eiders have been recorded near Kuskokwim and Bristol Bays, but outside the action area. Birds have been recorded using Chagvan Bay, the waters off Cape Peirce, and the Kuskokwim Shoals critical habitat unit during spring and summer months (ADF&G 2020a). Non-breeding eiders have also been documented within the nearshore waters close to Hagemeister Island within Bristol Bay during summer months (Rosenberg et al. 2016), approximately 11 mi (18 km) north of the action area.

4.1.4 Critical Habitat

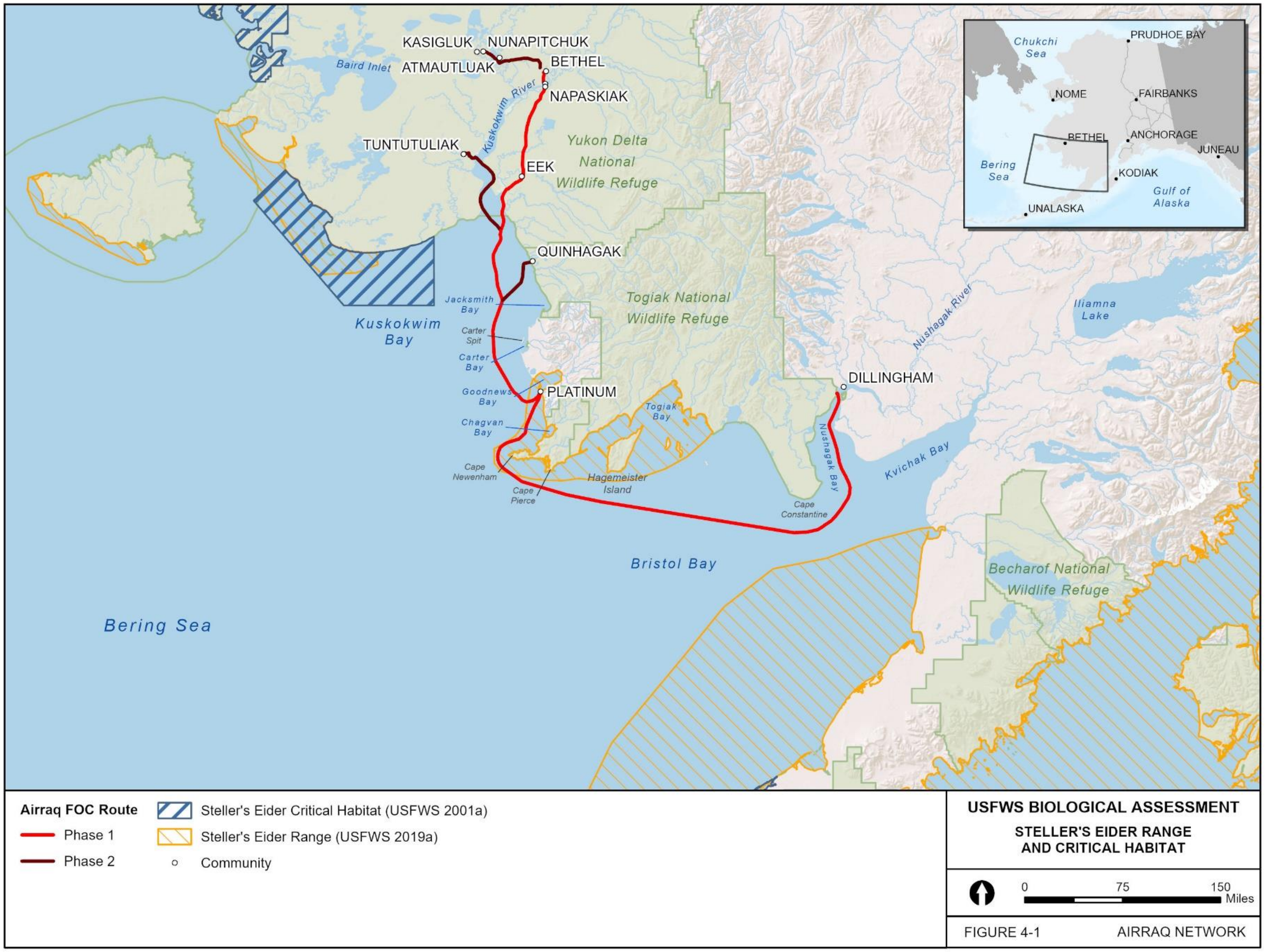
The final designation of critical habitat for the Steller's eider was issued in 2001 (USFWS 2001a). The USFWS has established Steller's eider critical habitat at the Seal Island, Nelson Lagoon, and Izembek Lagoon units on the Alaska Peninsula as well as the YK Delta nesting area and Kuskokwim Shoals unit in Southwest Alaska (USFWS 2001a; Figure 4-1). These areas were designated as critical habitat as they are used by large numbers of this species during breeding, molting, wintering, or staging for spring migration (USFWS 2002).

The YK Delta nesting area, Seal Island, Nelson Lagoon, and Izembek Lagoon units are well removed from the action area and will not be considered further. The Kuskokwim Shoals is the

only designated Steller's eider critical habitat located near the Project; however, this unit is more than 19 mi (30 km) west of the Project and outside the action area.

The Kuskokwim Shoals Steller's eider critical habitat unit covers part of northern Kuskokwim Bay from the mouth of the Kolavinarak River to near the village of Kwigillingok and extends approximately 11 to 24 mi (17 to 38 km) offshore. Approximately 1,472 square mi (mi^2; 3,813 square km [km^2]) of marine waters and approximately 115 mi (184 km) of shoreline (including the shoreline of barrier islands) are included within this unit (USFWS 2001a).

Figure 4-1. Steller's Eider Range and Critical Habitat



4.2 Spectacled Eider

4.2.1 Distribution and Life History

The spectacled eider (*Somateria fischeri*) is a large sea duck ranging from 20 to 22 inches (51 to 56 centimeters) long. They spend most of their life at sea (Peterson et al. 2020), where they forage on benthic prey by diving as well as dabbling on the surface (ADF&G 2022). In total, males spend approximately 11 months per year at sea, while females spend approximately 8 to 9 months; nonbreeding subadults are thought to remain at sea until they are 2 to 3 years old (Peterson et al. 2020).

Three distinct coastal breeding populations of spectacled eiders exist, one in Russia and two in Alaska. The Russia breeding population is much larger than the two Alaska breeding populations combined (Peterson et al. 2020). All populations winter in large, single-species flocks within the Bering Sea, south of St. Lawrence Island, using polynyas (i.e., large areas of open water surrounded by sea ice) and leads (i.e., linear areas of open water surrounded by sea ice) (Peterson et al.1999). The species only spends a few months each year on land, during the breeding season, and remains within the Bering Sea the rest of the year (Petersen et al. 2000, as cited in Flint et al. 2016).

In Alaska, spectacled eiders breed along the coast of the Arctic Coastal Plain and on the YK Delta in the western part of the state (Dau and Kistchinski 1977, Flint et al. 2016). Established pairs migrate together to their nesting grounds between May and June, generally within 12 mi (20 km) of the coast (Peterson et al. 2020, USFWS 2010a). Breeding generally lasts 4 to 5 days, and nests are built on the day the first egg is laid. The average time between arrival at the breeding grounds and nest initiation for the YK Delta population is estimated at 7.2 days (Dau 1974).

Females lay one egg per day for a clutch of three to nine oval, olive-green eggs at nest sites on tundra islands and peninsulas (ADF&G 2022, USFWS 2010a). Eggs are incubated for 24 to 28 days, and young fledge in late August (USFWS 2010a). Within a few weeks after arriving at the breeding grounds, males fly back to sea to undergo molt and will remain at sea for the rest of the year; females will remain with their young until fall migration (Peterson et al. 2020). While on land during the nesting season, they forage in ponds by diving as well as dabbling for aquatic insects, crustaceans, mollusks, and vegetation, but will also feed on arachnids, seeds, and berries (ADF&G 2022, BirdLife International 2022, Peterson et al. 2020).

During nesting, spectacled eiders disperse throughout much of their range, though they are considered semicolonial at some locations (Peterson et al. 2020). Annual surveys conducted since 1985 to assess the population status for the YK Delta breeding population have been focused on the coastal tundra habitats surrounding Hazen Bay, which is considered their core nesting area within this region (Fischer and Stehn 2015).

Following the breeding season, spectacled eiders migrate offshore along the Beaufort, Chukchi, and Bering Sea coasts to molt in the bays and other coastal areas of these waters, prior to moving to their wintering location within the Bering Sea (Peterson et al. 1999, 2020). Spectacled eiders typically spend the molting period between 1 and 28 mi (2 and 45 km) from shore

(Peterson et al. 2020). During molting, they primarily use Ledyard Bay, Mechigmenskiy Bay (in Russia), Indigirka/Kolyma River deltas (in Russia), Norton Sound, and the waters off eastern St. Lawrence Island (Petersen et al. 1999). Norton Sound is considered the primary molting location for females that breed on the YK Delta (Petersen et al. 1999).

After molting, spectacled eiders primarily winter within the Bering Sea, south of St. Lawrence Island (Peterson et al. 2020). During winter, they typically concentrate in large, dense flocks in openings in the sea ice. While at sea, they will dive down to feed on benthic mollusks and crustaceans in shallow waters (less than 262 ft [80 m] deep) or free-floating amphipods in deeper waters (ADF&G 2022).

From approximately March through May, spectacled eiders congregate in available open leads within the northern Bering Sea, Bering Strait, and Chukchi Sea for spring staging and migration (Dau and Kistchinski 1977), principally staging in Ledyard Bay and eastern Norton Sound (Petersen et al. 1999). During early May, the offshore coastal fringe of the YK Delta contains shore-fast ice connected to broken and drifting ice with open leads in it that are also used by many migrating eiders (Dau and Kistchinski 1977). In the Bering Strait, northern Bering Sea, and southern Chukchi Sea, where the May ice pack is more extensive, the periodic opening and closing of the leads dictate the location and concentration of the spring passage of eiders.

4.2.2 Species Status

The spectacled eider is currently listed as **threatened** under the ESA and was first listed in May 1993 due to the reduced number of breeding birds and reduction in the breeding range within western Alaska (USFWS 1993, 2022c). A 96 percent decline in the breeding population was documented on the YK Delta, which was thought to account for half of the world's breeding population, though the cause for the decline is still unknown. However, several threats have been identified, including lead poisoning and shooting as stressors of high concern; and collisions with human structures, human disturbance in nesting areas, nest predation, and changes to the ecological community as stressors of moderate concern (USFWS 2021a).

Since the species was listed, the YK breeding population has increased, with the population estimated to number more than 12,000 individuals (USFWS 2021b) The population in Russia, which is estimated to contain 90 percent of the breeding population, is numbered at approximately 140,000 individuals (ADF&G 2022, Warnock 2017). The species is estimated to have a worldwide population between 360,000 and 400,000 individuals (BirdLife International 2022, Wetlands International 2022).

4.2.3 Presence within Action Area

The current range of spectacled eider is shown in Figure 4-2. Based on anecdotal information, the historical breeding range for the spectacled eider was estimated to extend along the coastal areas of the YK Delta southward to the coastal areas along Kuskokwim Bay, several miles south of Tuntutuliak, and continuing south to Goodnews Bay (USFWS 1996). However, the YK Delta breeding range was drastically reduced following the species precipitous decline; in 1996, the southern limits of the YK breeding range were estimated to not extend south of roughly Nyctea Hills, approximately 50 mi (80 km) east of Tuntutuliak (USFWS 1996). Annual aerial and ground-based population surveys conducted between 1985 and 2014 by the USFWS have been

focused on the YK Delta coastal zone extending from the northern YK Delta south to areas near Kwigillingok, over 20 mi (32 km) southeast of Tuntutuliak (Fischer et al. 2018, Lewis et al. 2019). Since 2000, USFWS ground-based nesting survey efforts have shifted focus to only include the YK breeding population's "core nesting area," where it is thought that the majority of all pairs on the YK Delta nest (Fischer and Stehn 2015). The core nesting area on the YK Delta includes the coastal habitats surrounding Hazen Bay (Fischer and Stehn 2015) and is located more than 62 mi (100 km) to the northeast, and well outside the action area. The species' Recovery Plan notes that low-density breeding may still occur outside confirmed breeding pair occurrence locations (USFWS 1996); however, spectacled eider nesting within the action area will be extremely rare.

Though no records exist of spectacled eiders nesting within the action area, a record exists of a single individual crossing Kuskokwim Bay then spending a few weeks in Chagvan Bay, on the perimeter of eastern Kuskokwim Bay, during winter 2011 (USGS 2019). However, Chagvan Bay is located approximately 12 mi (20 km) east and well removed from the action area.

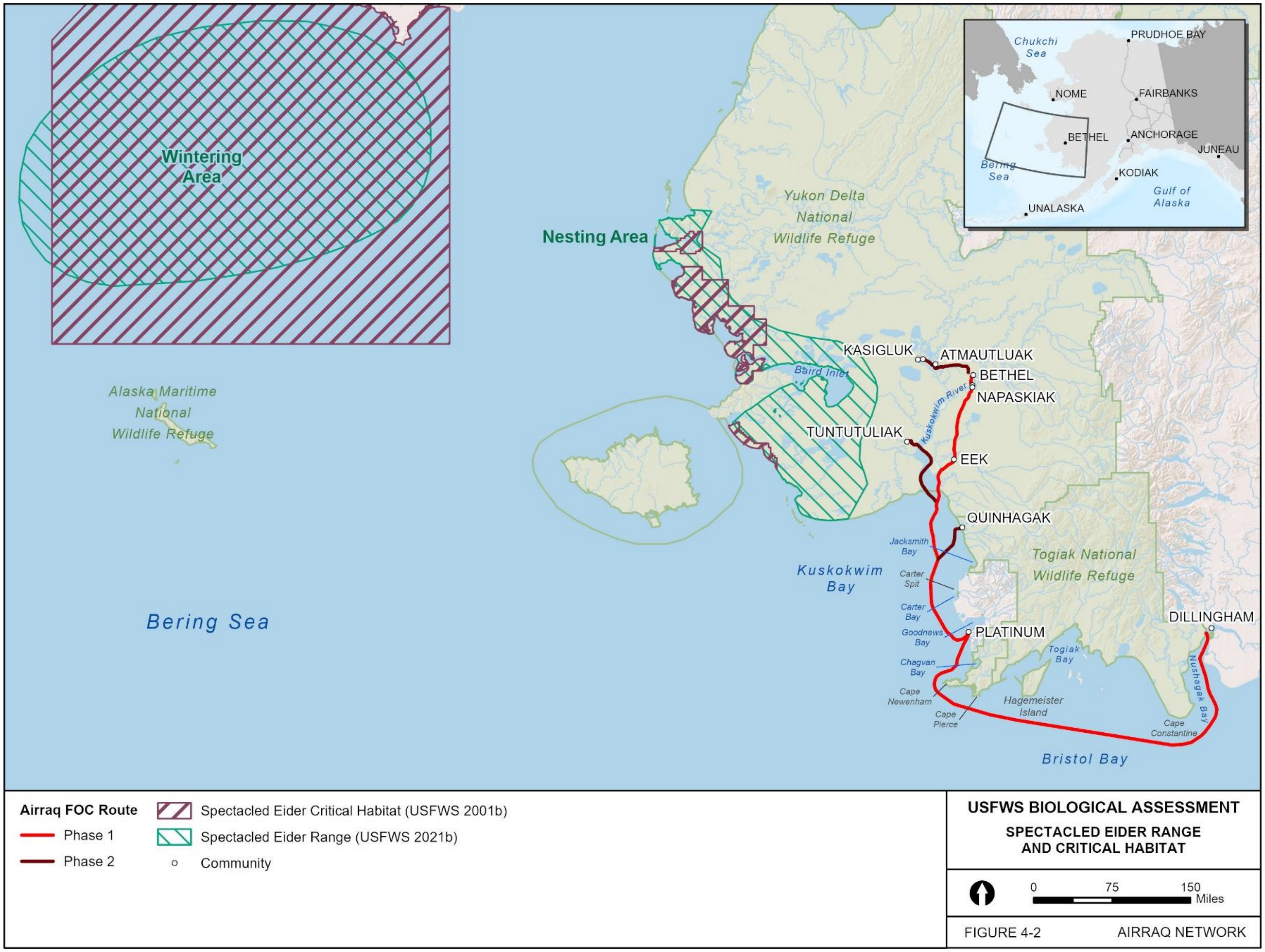
4.2.4 Critical Habitat

The final designation of critical habitat for the spectacled eider was issued in 2001 (USFWS 2001b). The USFWS has established spectacled eider critical habitat within the Central YK Delta, the Southern YK Delta, Norton Sound, Ledyard Bay, and the Wintering Area unit (Figure 4-2). The Project action area is not located within any of these critical habitat units.

The Central YK Delta, the Southern YK Delta, Norton Sound, Ledyard Bay, and the Wintering Area units are well removed from the action area and will not be considered further. The Southern YK Delta unit is approximately 62 mi (100 km) west of the action area. This critical habitat unit covers the vegetated intertidal zone along the coast from Nelson Island south to Chefornak (USFWS 2001b).

As described in Section 4.1.4, critical habitat Primary Constituent Elements (PCE) are those habitat components that are essential for the primary biological needs of feeding, nesting, brood rearing, roosting, molting, migrating, and wintering (USFWS 2001b). The PCEs for the Southern YK Delta unit include the vegetated intertidal zone and all open water inclusions within this zone; the vegetated intertidal zone includes all lands inundated often enough by tidally influenced water that it affects plant growth, habit, or community composition (USFWS 2001b). Areas within the unit boundary that are not within the vegetated intertidal zone (e.g., barren mudflats and lands that are above the highest HTL) are not considered critical habitat; nor are areas with existing human development within the unit (USFWS 2001b).

Figure 4-2. Spectacled Eider Range and Critical Habitat



4.3 Short-tailed Albatross

4.3.1 Distribution and Life History

The short-tailed albatross (*Phoebastria albatrus*) is a large, pelagic seabird with an average wingspan of 7.5 ft (2.3 m) and body length of 3 ft (1 m). They spend most of their life at sea, over the continental shelf edge foraging on squid, shrimp, crustaceans, and fish (USFWS 2008). This species forages either alone or in groups and primarily capture prey at the surface- (USFWS 2022a).

Historically, the species had 14 known breeding colonies within the northwestern Pacific and potentially within the North Atlantic. However, current breeding colonies exist primarily on two small islands within the North Pacific, with 80 to 85 percent of short-tailed albatross nesting on Torishima Island, Japan (USFWS 2008). Most of the remaining population of breeding birds are believed to use the Senkaku Islands; however, nest searches have not occurred since 2002 (USFWS 2022a). China, Japan, and Taiwan all claim ownership of the islands, which are therefore politically difficult to access. There have been early successes in establishing a colony at Mukojima in the Ogasawara (Bonin) Islands, Japan, after translocation efforts from 2008 to 2012; a breeding pair at the Midway Atoll, Hawaii, fledged a chick each in 2011, 2012, and 2014 (Deguchi et al. 2016).

Satellite tagging of breeding adults in 2006 to 2008 and juveniles in 2008 to 2012 provided marine distribution information for the species. Both adult and juvenile short-tailed albatross extensively used areas of the western Pacific east of Japan as well as the waters surrounding the Kuril Islands, Aleutian Islands, and the outer Bering Sea continental shelf (USFWS 2014a). The outer Bering Sea shelf was used most during summer and fall, moving to the northern submarine canyons in late summer and fall (USFWS 2014a). The birds moved south during winter, but continued to use the southeastern Bering Sea, Aleutian Islands, and Gulf of Alaska. Juveniles traveled much more widely throughout the North Pacific than adults, moving through nearly the entirety of the species' range and spending more time within the Sea of Okhotsk, western Bering Sea, transition zone between Hawaii and Alaska, and Arctic regions of the Bering Strait (USFWS 2014a, 2020).

Short-tailed albatross nest on isolated, windswept, offshore islands that have limited human access. Nest sites may be flat or sloped, with sparse or full vegetation. The majority of birds on Torishima Island nest on a steep site with loose volcanic ash; however, a new, growing colony on the island is situated on a gentle, vegetated slope. The vegetation consists of clump-forming grass (*Miscanthus sinensis* var. *condensatus*) that helps stabilize the soil, provides protection from the weather, and acts as a visual barrier between nesting pairs. The limited vegetation allows for safe, open takeoffs and landings (USFWS 2008). Females will lay a single egg in a nest on the ground in October or November, and eggs hatch in late December through early January. The chicks are nearly full grown by late May to early June, and the adults begin to leave the colony, with the chicks heading out to sea soon thereafter. By mid-July, the colony is empty (USFWS 2001c). Non-breeders and failed breeders disperse during late winter through spring (USFWS 2018).

The short-tailed albatross relies on waters of the North Pacific characterized by upwelling and high productivity, in particular regions along the northern edge of the Gulf of Alaska, Aleutian Island chain, and Bering Sea shelf break from the Alaska Peninsula toward St. Matthew Island. Strong tidal currents combined with the abrupt, steep shelf break promote upwelling, and primary production remains high throughout summer within these areas. Tagged adult and subadult birds frequented waters greater than 3,280 ft (1,000 m) deep more than 70 percent of the time, and juveniles spent approximately 80 percent of their time within these shallower waters (USFWS 2008). Adults spent less than 20 percent of their time over waters exceeding 9,842 ft (3,000 m) deep (USFWS 2008). Waters around the Aleutian Islands also appear to be important for feeding while the species is undergoing an extensive molt (USFWS 2020).

4.3.2 Species Status

The short-tailed albatross was listed as **endangered** as a foreign species under the ESA; on July 31, 2000, the short-tailed albatross was listed as **endangered** throughout its range under the ESA (USFWS 2014a). The biggest threat to this species is the limited breeding distribution; other threats include commercial fisheries, shipping traffic, and changes in prey distribution resulting from climate change (USFWS 2020).

Thought to be extinct in the 1940s, the species is making progress toward meeting some of the recovery criteria for delisting, with the current worldwide population (7,365 individuals) exceeding the criteria of 4,000 individuals. Following the 2018 to 2019 breeding season, their population was estimated to be increasing at an average annual rate of 8.9 percent (USFWS 2020). There is potential for the species to be down listed from endangered to threatened by 2028, if the Ogasawara Islands breeding population maintains an average annual growth rate of 8.9 percent with greater than 50 breeding pairs, and with confirmation that the population on the Senkaku Islands has met recovery criteria (USFWS 2020).

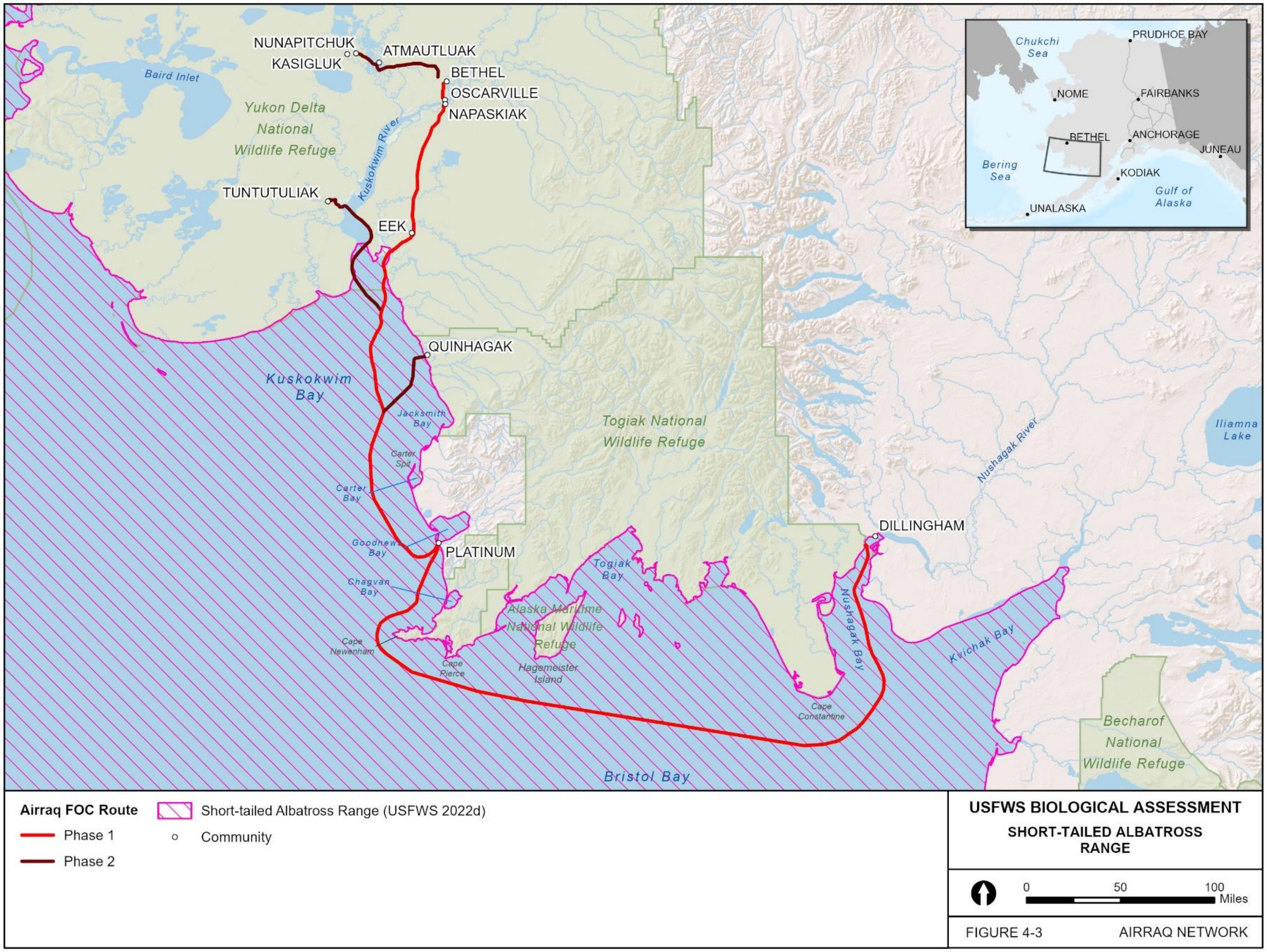
4.3.3 Presence within Action Area

The short-tailed albatross' potential range overlaps the action area (USFWS 2022d; Figure 4-3). However, review of the compiled North Pacific Pelagic Seabird Database for short-tailed albatross sightings from 1940 to 2004 did not show the species present within the action area (Hyrenbach et al. 2013, Piatt et al. 2006). As described in Section 4.3.1, this is because their preferred prey and foraging waters are deeper than available within the action area. Satellite tagging data of juveniles from 2008 to 2012 showed that individuals have been recorded within Bristol Bay, south of the action area (USFWS 2014a). The species nests far outside the action area and are likely rarely found within the action area.

4.3.4 Critical Habitat

Critical habitat has not been designated for the short-tailed albatross. The USFWS determined that it was not prudent to designate critical habitat due to the lack of habitat-related threats, areas that could be identified as meeting the definition of critical habitat within U.S. jurisdiction, and recognition or educational benefits to the American public as a result of such a designation (USFWS 2008).

Figure 4-3. Short-tailed Albatross Potential Range



4.4 Northern Sea Otter

Three stocks of northern sea otters (*Enhydra lutris kenyoni*) exist within Alaska: Southeast, Southcentral, and Southwest (USFWS 2014b). Individuals that could occur within the proposed action area are from the threatened Southwest Alaska DPS.

4.4.1 Distribution and Life History

Historic sea otter (*Enhydra lutris*) habitat ranged from the northern islands of Japan within the western Pacific; through the Kuril Islands and Kamchatka Peninsula within Russia; through the Aleutian Islands; toward the eastern Pacific; following the coast of Alaska, Canada, and the contiguous United States; to central Baja California in Mexico (Wilson et al. 1991). Following their decline, fragmented populations are present within Alaska, Russia, British Columbia, Washington, and California (Davis et al. 2019, ADF&G 2023a).

The northern sea otter (*Enhydra lutris kenyoni*) is a subspecies of sea otter whose habitat ranges from Washington in the south, north toward British Columbia, following along the coast of Southeast and Southcentral Alaska before continuing west to the Aleutian Islands (Wilson et al. 1991). The range of the Southwest Alaska DPS spans from the western edge of Cook Inlet to the Aleutian Islands, and includes the Alaska Peninsula and Bristol Bay coasts as well as the Aleutian, Barren, Kodiak, and Pribilof Islands (Figure 4-4).

Following the near extinction of sea otters, Kenyon (1969) found the Southwest Alaska DPS of northern sea otter from the central to outer Aleutians to be one of the most rapidly growing populations. Following the recovery of sea otters within the Aleutian Islands, Kenyon (1969) observed several fluxes in population due to rapid growth when resources were available, and rapid decline due to starvation and emigration. Kenyon (1969) estimated that a stable population density of sea otters is 10 to 15 individuals per square mile, and the Alaska Peninsula has the potential to support a population of 50,000 to 74,000 individuals.

Sea otters generally occur in shallow (less than 115 ft [35 m]), nearshore waters within areas with sandy or rocky bottoms, where they feed on a wide variety of slow-moving benthic invertebrates (Rotterman and Simon-Jackson 1988), including sea urchins, abalone, clams, mussels, and crabs (Riedman and Estes 1990). They can also feed on epibenthic fish within areas where otter populations are near equilibrium density (Riedman and Estes 1990). They typically forage at depths between 7 and 98 (2 and 30 m) but can dive as deep as 322 ft (100 m) (Kenyon 1969, Bodkin et al. 2004).

Sea otters in Alaska are generally not migratory and do not disperse over long distances. However, individual sea otters are capable of long-distance movements of more than 60 mi (100 km) (Garshelis and Garshelis 1984), although movements are likely limited by geographic barriers, high energy requirements of animals, and social behavior. Data within Alaska regarding sea otter movement and home ranges are limited (Gorbics and Bodkin 2001). Garshelis and Garshelis (1984) found that female sea otters within Prince William Sound had home ranges between 0.4 and 1.9 mi^2 (1.0 to 4.8 km^2), and males had much larger home ranges ranging from 1.8 to 4.2 mi^2 (4.6 to 11.0 km^2). Despite limited home ranges, male sea otters within Prince William Sound traveled up to 60 mi (100 km) to breeding areas. Gorbics and Bodkin (2001) estimated 30 mi (50 km) to be the maximum interisland distance that sea otters

will travel, but translocated sea otters have been found to travel up to 250 mi (400 km) (Monnett et al. 1990).

Sea otters do not have specific breeding and pupping habitat; rather, they appear to conduct all aspects of their life history within the same places (USFWS 2009). In Alaska, most pups are born in late spring (Bodkin and Monson 2002). Assuming a 6- to 8-month gestation, including 2 to 4 months of delayed implantation, breeding likely occurs in late summer or fall.

The energy of in-air sea otter vocalizations is concentrated at 3 to 5 kilohertz (kHz; McShane et al. 1995, Thomson and Richardson 1995). Sea otter vocalizations are considered to be most suitable for short-range communication among individuals (McShane et al. 1995). However, Ghoul and Reichmuth (2012) noted that the in-air “screams” of sea otters are loud signals (source level up to 113 dB re 20 µPa rms) that may be used over larger distances and have dominant frequencies of 4 to 8 kHz. Ghoul and Reichmuth (2012) examined the hearing abilities of sea otters using a behavioral approach. They found that the in-air upper-frequency hearing limit was at least 32 kHz, and the lower-frequency limit was less than 0.125 kHz. Ghoul and Reichmuth (2016) reported that sea otter hearing is most sensitive underwater at 8 to 16 kHz; however, their hearing is not specialized to detect sounds in background noise.

4.4.2 Species Status

Sea otter population estimates were once as high as 300,000 (Davis et al. 2019), but maritime fur trade in the eighteenth and nineteenth centuries reduced numbers to as low as 1,000 to 2,000 (Kenyon 1969). The current estimated population size for the Southwest Alaska DPS stocks of northern sea otter is 54,771 (USFWS 2014b). The Southwest Alaska DPS sea otter population has declined by 56 to 68 percent since the mid-1980s (Burn and Doroff 2005). In the Aleutian archipelago, sea otters have declined by as much as 70 percent since 1992 (Doroff et al. 2003). Unlike the declines observed within the Aleutian Islands, Shumagin Islands, and western Alaska Peninsula, other portions of the Southwest Alaska DPS stock have not shown signs of decline, including the Kodiak Archipelago, the eastern coast of the Alaska Peninsula from Castle Cape to Cape Douglas, and Kamishak Bay in Lower Cook Inlet (Burn and Doroff 2005, USFWS 2014b). Surveys conducted from 2003 to 2005 show continued declines within the Aleutian Islands (Estes et al. 2005). The main threat to sea otter recovery, and the primary reason for the decline, is likely attributable to increased predation, particularly by killer whales (*Orcinus orca*) (Estes et al. 1998, 2005; USFWS 2010b).

The first legal protections of sea otters began before most marine mammals, when the North Pacific Fur Seal Treaty of 1911 was signed (Kenyon 1969). The treaty banned commercial hunting of both sea otters and North Pacific fur seals (*Callorhinus ursinus*). Sea otters received additional protections in 1972 when the Marine Mammal Protection Act was passed. The Southwest Alaska DPS of northern sea otter was listed as **threatened** under the ESA in 2005 (71 *Federal Register* [FR] 46864).

4.4.3 Presence within Action Area

The historical range of sea otters extends into Bristol Bay; however, it does not include the action area (Figure 4-4; Davis et al. 2019). This is possibly due to the historical range of sea ice extent (Pease et al. 1982) and the unsuitability of sea ice for sea otter habitat (Schneider and

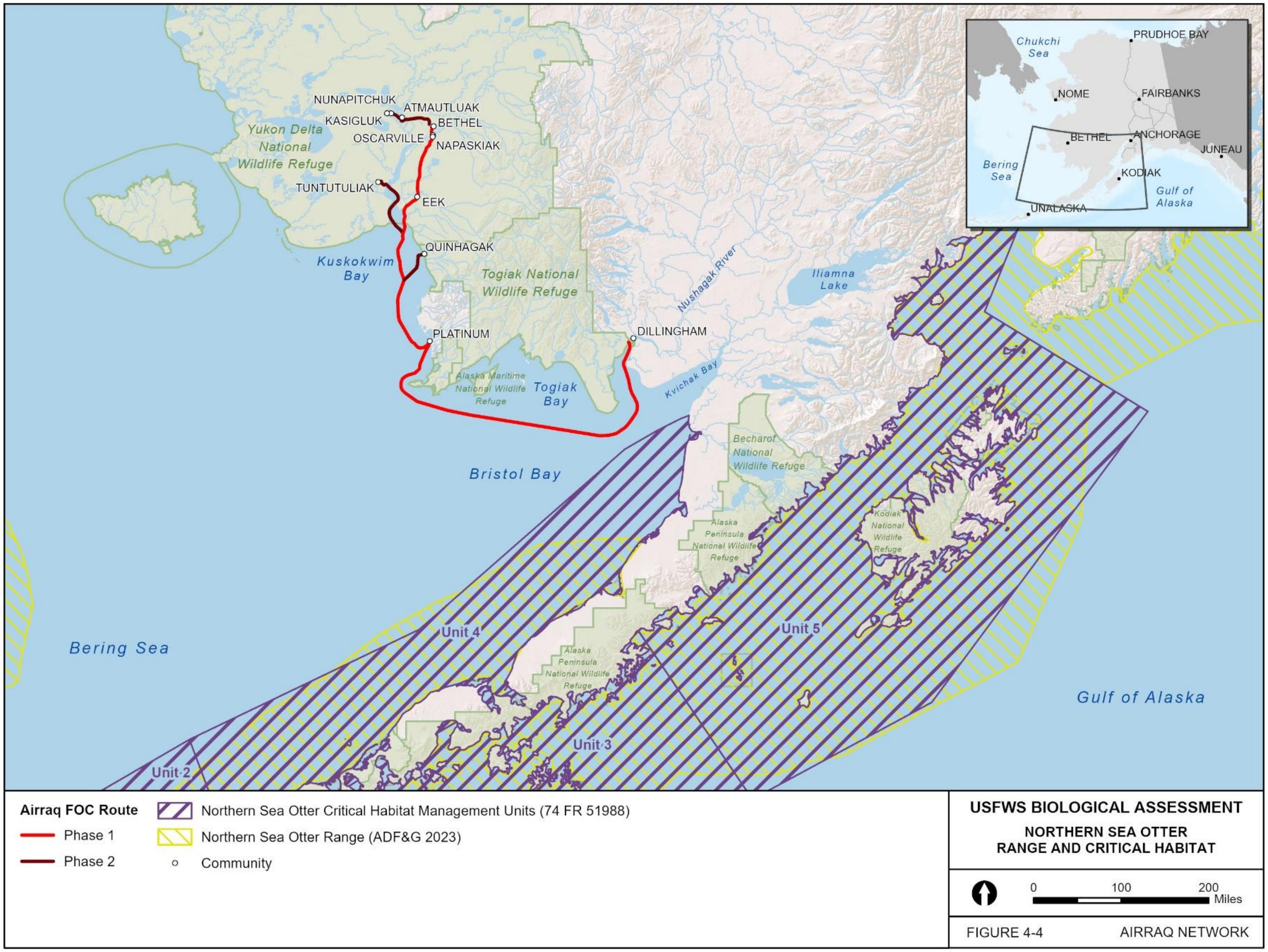
Faro 1975). The current sea otter range does not include the action area (ADF&G 2023b). Bristol Bay may provide suitable habitat for sea otters, but they do not frequently emigrate outside their home ranges (Kenyon 1969).

4.4.4 Critical Habitat

Critical habitat for the Southwest Alaska DPS of northern sea otter was designated in November 2009 and includes an area of 5,855 mi^2 (164 km^2; 74 FR 51988). The critical habitat primarily consists of shallow water areas less than 66 ft (20 m) deep and nearshore water within 328 ft (100 m) of the mean tide line (Figure 4-4). No designated critical habitat exists for the northern sea otter within the action area.

In the Northern Sea Otter Recovery Plan (USFWS 2013), the Southwest Alaska DPS of northern sea otter is divided into five management units: Western Aleutian (Unit 1); Eastern Aleutian (Unit 2); South Alaska Peninsula (Unit 3); Bristol Bay (Unit 4); and Kamishak, Kodiak, Alaska Peninsula (Unit 5). The action area does not fall into one of the management units but is closest to the Bristol Bay Management Unit.

Figure 4-4. Northern Sea Otter Range and Critical Habitat



5 Environmental Setting

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat within the action area (included in this section). The environmental baseline also includes the past and present impacts of all federal, state, or private actions and other human activities within the action area; the anticipated impacts of all proposed federal projects within the action area that have already undergone formal or early Section 7 consultation; and the impact of state or private actions that are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are also part of the environmental baseline (50 CFR 402.02).

The action area is composed of diverse marine environments, stretching from the northernmost extent of Nushagak Bay along the coast to the mouth of the Kuskokwim River. The coastline includes part of the Alaska Maritime National Wildlife Refuge, the Togiak National Wildlife Refuge, and the Cape Newenham State Game Refuge, while falling primarily within the Bering Sea and Kuskokwim Bay. The action area will reach a maximum distance of approximately 51 mi (82 km) from shore and will occur within areas up to approximately 147 ft (45 m) deep.

Flood tides influence the Bering Sea through Aleutian Island passes, creating the Aleutian North Shore Current. East of Unimak Pass, the marine current flows northeastward, composing the Bering Coastal Current along the Alaskan Peninsula and into Bristol Bay. At this point, the current creates a counterclockwise gyre (NMFS 2013). Currents then primarily flow northward and westward around Cape Newenham toward Kuskokwim Bay, while also flowing eastward to the inner bay.

Six major watersheds drain into Bristol Bay: the Togiak, Nushagak, Kvichak, Naknek, Egegik, and Ugashik River watersheds. The Nushagak and Kvichak River watersheds are the largest among them, occupying approximately 50 percent of the region’s watershed. They comprise five distinct physiographic divisions: the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak–Bristol Bay Lowland (EPA 2014). These watersheds are turbid and dominated by seasonal runoff. In summer, during periods of significant freshwater out welling, the ebb tide currents often substantially exceed the flood tides. This input keeps the Nushagak and Kvichak Bays colder in spring relative to the rest of Bristol Bay. As terrestrial waters warm later in summer with increasing ambient temperatures, so do the bays. The turbidity weakens primary production within the bay, but high nutrient levels are driven by out welling discharge from detritus, dissolved organic material, and salmon-derived nutrients (NMFS 2013). In addition to fish and invertebrates, the nutrients help support aquatic vegetation such as eel grass and kelp species. The two watersheds are composed of the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak-Bristol Bay Lowland, all of which play a major role in dividing the region’s watersheds. These features range from sea level to 9,186 ft (2,800 m) and contain more than 33,554 mi (54,000 km) of streams (NMFS 2013).

The Kuskokwim River Basin is the largest river basin providing freshwater input to Kuskokwim Bay. It is drained by the Kuskokwim River and many of its tributaries, from Cape Newenham State Game Refuge to the Ninglick River (BLM n.d.). The region is contained within the Alaska Range to the south and east, with the Kuskokwim Mountains on the north and west. The bay experiences some of the largest tides in Southwest Alaska, and it is assumed that tidal influence is present up to river mile 97 of the Kuskokwim River. Tidal amplitude begins to subside to the north and outside the bay. In winter, annual ice tends to cover Kuskokwim Bay in its entirety and includes portions of Bristol Bay. At a minimum, the sheet ice will also include the Bering Sea shelf and the entire Chukchi Sea (USFWS 2012). During this time, the Kuskokwim Bay can reach 29 degrees Fahrenheit (-2 degrees Celsius).

The Kuskokwim Bay and Bering Sea region is subject to a large number of earthquakes. This is the result of the presence of six fault systems within the area: the Tintina-Kaltag Fault, the Iditarod-Nixon Fork Fault, the Denali-Farewell Fault, the Lake Clark-Castle Mountain Fault System, the Bruin Bay Fault, and the Border Ranges Fault. Some sections along these faults are seismically active and have generated earthquakes (EPA 2014). Seasonal weather changes are often drastic within the region and have consequences for marine life. The Bering Sea is subject to circulation patterns from both the north and south. These circulation patterns bring in strong winds, which influence ice movement, but keep air temperatures relatively mild. The prevailing circulation pattern may last months to decades. Bering Sea summer weather tends to be mild. Skies remain somewhat clear for long periods, which can cause sea temperatures to rise. Additionally, occasional moderate summer storms produce winds that are responsible for ocean mixing. The state of the Bering Sea influences the YK Delta’s climate, where there is a strong inland gradient in coastal temperature.

5.1 Coastal Development

At its southernmost extent, the action area includes the community of Dillingham. It then traverses through Nushagak Bay to Bristol Bay, and around Cape Newenham National Wildlife Refuge to Kuskokwim Bay. It then enters the Kuskokwim River, where it splits. Two boroughs are included within the action area: the Dillingham Census Area and Bethel Census Area. Both boroughs combined cover the Alaska coastline from Kvichak Bay in the south to the coastline directly west of Newtok in the north and include extensive inland components. Due to the region’s remoteness, it is largely undisturbed from human development.

The Bethel Census Area includes 18,207 residents. Bethel is the largest community within the region, with a population of 6,500 residents. A majority of Bethel’s economy originates from regional services such as government administration, transportation, freight, and social services. One of the few non-government sources of revenue for the region is commercial fisheries. The Coastal Villages Region Fund is a non-profit group that allocates revenue from fishing rights from the federal government to create jobs, build infrastructure, and fund education (Agnew Beck Consulting 2011).

The Dillingham Census Area includes 4,673 residents across 10 communities, the largest of which are Dillingham (population 2,327), Togiak (population 873), Manokotak (population 483), New Stuyahok (population 476), and Aleknagik (population 208) (Robinson et al. 2020). The region’s economy is predominately seasonal employment and composed of the harvesting and

processing of local salmon fisheries. Each year, 70 percent of the fish returning to the Bristol Bay area are harvested. In addition to fisheries, tourism plays a part in the local economy as Dillingham provides an entry point to Togiak National Wildlife Refuge and Wood-Tikchik State Park. Table 5-1 provides a summary of regional economic expenditures, expressed in 2009 dollars.

Table 5-1. Summary of Regional Economic Expenditures Based on Salmon Ecosystem Services

Economic Sector	Estimated Direct Expenditure (sales per year, in $ millions)
Commercial Fisheries, Wholesale Value	300.2
Sport Fisheries	60.5
Sport Hunting	8.2
Wildlife Viewing/Tourism	104.4
Subsistence Harvest	6.3
Total	**479.6**

Source: EPA 2014

5.2 Transportation

None of the communities serviced by the Project are accessible to the rest of the state by road. The existing road network is discontinuous and limited to the areas surrounding a few communities; therefore, water and air are the primary modes of inter-community transportation. The Alaska Marine Highway System does not serve the communities within or near the action area. Aviation is the principal means of transporting people to communities throughout the region. Except Oscarville, each serviced community has an Alaska Department of Transportation and Public Facilities or other government-controlled public airport, as well as numerous additional Federal Aviation Administration-registered public and private runways (DOT&PF 2017).

Marine waters within the action area experience varying levels of marine-based vessel traffic. Marine vessels are typically associated with freight, fishing, transportation, and fuel delivery (USACE 2008). In particular, Nushagak Bay experiences very high vessel traffic from spring through fall during the commercial salmon fishing season. Due to a lack of interconnecting roads, the region's local communities rely on barges for local commerce and shipment of items not feasible to transport by air (USACE 2009).

5.3 Fisheries

Both state and federally managed fisheries occur within the action area. Two state fishery management areas overlap the action area: the Kuskokwim Management Area (KMA) and Bristol Bay Management Area (BBMA) (Smith and Gray 2022, Tiernan et al. 2022). Within these management areas are sport, commercial, subsistence, and personal use fisheries. Additionally, federally managed fisheries within the action area supply subsistence and commercial opportunities.

Alaska Statute 16.05.258, *Subsistence Use and Allocation of Fish and Game*, establishes the subsistence use priority for reasonable harvest opportunity consistent with sustained yield when resources are not abundant enough to provide for all consumptive uses (Smith and Gray 2022). The Alaska National Interest Lands Conservation Act of 1980 provided a priority for rural Alaska

residents for taking fish and wildlife on federal public lands and called for creation of regional advisory councils to provide rural residents' input into the Federal Subsistence Program. These policies have made subsistence user groups the priority in management throughout the State of Alaska. For the KMA, 2010 to 2014 surveys identified that salmon contributed 40 percent of the total subsistence resource harvest within Kuskokwim River communities, broken up as 65 percent within middle and upper river communities and 25 percent within lower river communities (Smith and Gray 2022).

Fishing efforts in state fisheries are primarily focused on salmon. The BBMA supports the largest wild sockeye salmon (*Oncorhynchus nerka*) fishery in the world, providing approximately 46 percent of the average global abundance of wild sockeye salmon (EPA 2023). Within the BBMA, one of the five commercial salmon districts occur within the action area, the Nushagak District. Fishing gear types within the Nushagak District include set gillnet and drift gillnet. Harvest diversity includes sockeye, Chinook (*O. tshawytscha*), chum (*O. keta*), pink (*O. gorbuscha*), and coho (*O. kisutch*) salmon. Sockeye salmon are the most harvested salmon within the district and provide significant economic benefits to the region. Between 2018 and 2022, three of the largest sockeye salmon harvests ever recorded for the district occurred, and its systems repeatedly ranked among the highest recorded for escapement numbers. Due to dwindling Chinook salmon returns for the district, the Alaska Department of Fish and Game is recommending it be listed as a stock of concern within the Nushagak District (Tiernan et al. 2022).

The KMA is composed of three active commercial salmon fishing districts, all of which occur within the action area: District 1, District 4, and District 5. Sockeye, Chinook, chum, pink, and coho salmon have been harvested within the KMA. In recent years, Chinook and chum salmon returns within the Kuskokwim River have been inconsistent. Chinook salmon runs in 2012, 2013, and 2014 were the lowest three on record. Escapement made a slight rebound, reaching a nearly average run total in 2019, only to significantly decline again in 2020 and 2021. Chum salmon return numbers remained near average between 2007 and 2019. However, 2020 numbers were well below average, and 2021 was the lowest on record. Sockeye salmon abundance in 2021 was mixed throughout the Kuskokwim River drainage and ranged from average to below average. Reliable coho salmon return numbers are not available for the region, but available data suggests that returns have been average to below average since 2016 (Smith and Gray 2022).

Other state-managed fisheries within the KMA include subsistence herring, while the BBMA includes a herring sac roe fishery, which is composed of seine, gillnet, and hand harvests (Tiernan et al. 2022). The Bering Sea Aleutian Islands Management Area (BSAIMA), a state-managed area for shellfish, has several registration areas overlapping the action area that target tanner (*Chionoecetes bairdi*), snow (*C. opilio*), Dungeness (*Metacarcinus magister*), and king (Lithodidae) crabs as well as scallops (Pectinidae) (Nichols and Shaishnikoff 2022). Federal subsistence and commercial fisheries also occur off the western coast of Alaska, along the action area. These fisheries occur within the federally managed BSAIMA, which are both commercial and subsistence groundfish fisheries. Commercial opportunities include trawl, longline, jig, and pot fisheries. These fisheries have 19 different target species, with walleye pollock (*Gadus chalcogrammus*) being the most popular among them. Walleye pollock account

for a majority of the harvest in terms of both metric tons and ex-vessel value. Subsistence harvests are very small relative to that of commercial harvests and target cod, halibut, rockfish, and other species in nearshore waters (NPFMC 2020). These commercial fisheries have the potential to compete with marine mammals for resources.

5.4 Tourism

The recreational tourism economy provides significant benefits for residents of the Bristol Bay region. In addition to being a source of employment, it helps support an economy that provides essential goods to Bristol Bay residents. Recreational tourism is responsible for 15 percent of jobs within the region (EPA 2014). In addition to tourism related to the local salmon ecosystem, access to the Nushagak and Kvichak River watersheds as well as the Togiak National Wildlife Refuge and Cape Newenham State Park via air, boat, snowmachine, and foot are largely regulated by the local tourism industry (USFWS 2009).

Tourism within the YK Delta is limited. This is partially due to high costs associated with transportation as well as limited accommodations and tourism-centric infrastructure, and inconsistent and unreported weather that can restrict air travel. Despite this, the region offers many forms of recreation and ecotourism, including access to the Yukon Delta National Wildlife Refuge, the largest wildlife refuge in the United States; fishing; and events such as the Kuskokwim 300 sled dog race (Agnew Beck Consulting 2011).

5.5 Vessel Traffic

Vessel traffic within the action area is closely linked to commercial fisheries. The average number of salmon permit holders fishing in District 4 within the KMA since 1980 is 223. Participation has ranged between 67 and 408 during this time. In 2021, participation was the lowest on record, with 74 individual permit holders. The only season with lower participation was 2020 (Smith and Gray 2022). A significant decrease in participation has been mirrored across all KMA districts. Permit registration within the BBMA has been more consistent and significantly exceeds that within the KMA. Participation in the salmon fisheries for both management areas is shown in Table 5-2.

Passenger water transportation services are limited within the action area and are largely related to sightseeing, guiding services, and general transportation support.

Table 5-2. Permits Fished by District and Gear Type within the KMA and BBMA, 2001–2021

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2001	412	159	32	1,566	834
2002	318	114	30	1,183	680
2003	359	114	34	1,389	714
2004	390	116	29	1,426	797
2005	403	145	29	1,526	829
2006	373	132	24	1,567	844
2007	366	125	28	1,621	836
2008	374	146	25	1,636	850
2009	342	179	39	1,642	855
2010	433	241	48	1,731	861
2011	413	219	48	1,747	878

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2012	379	179	58	1,740	883
2013	378	197	71	1,709	854
2014	358	194	61	1,751	881
2015	283	189	61	1,744	885
2016	—[b]	—[b]	—[b]	1,715	858
2017	—[b]	—[b]	—[b]	1,728	881
2018	—[b]	—[b]	—[b]	1,735	879
2019	—[b]	—[b]	—[b]	1,767	893
2020	—[b]	67	17	1,724	841
2021	—[b]	74	13	1,753	870
2001–2011 Average	**380**	**153**	**33**	**1,529**	**82**
2011–2021 Average	**140**	**90**	**28**	**1,736**	**90**
Average	**265**	**123**	**31**	**1,632**	**86**

Source: Smith and Gray 2021, Tiernan et al. 2022
[a] Two drift permit holders may concurrently fish from the same vessel.
[b] Confidential due to three or fewer permits fished, processors, or buyers. Included as 0 in averages.

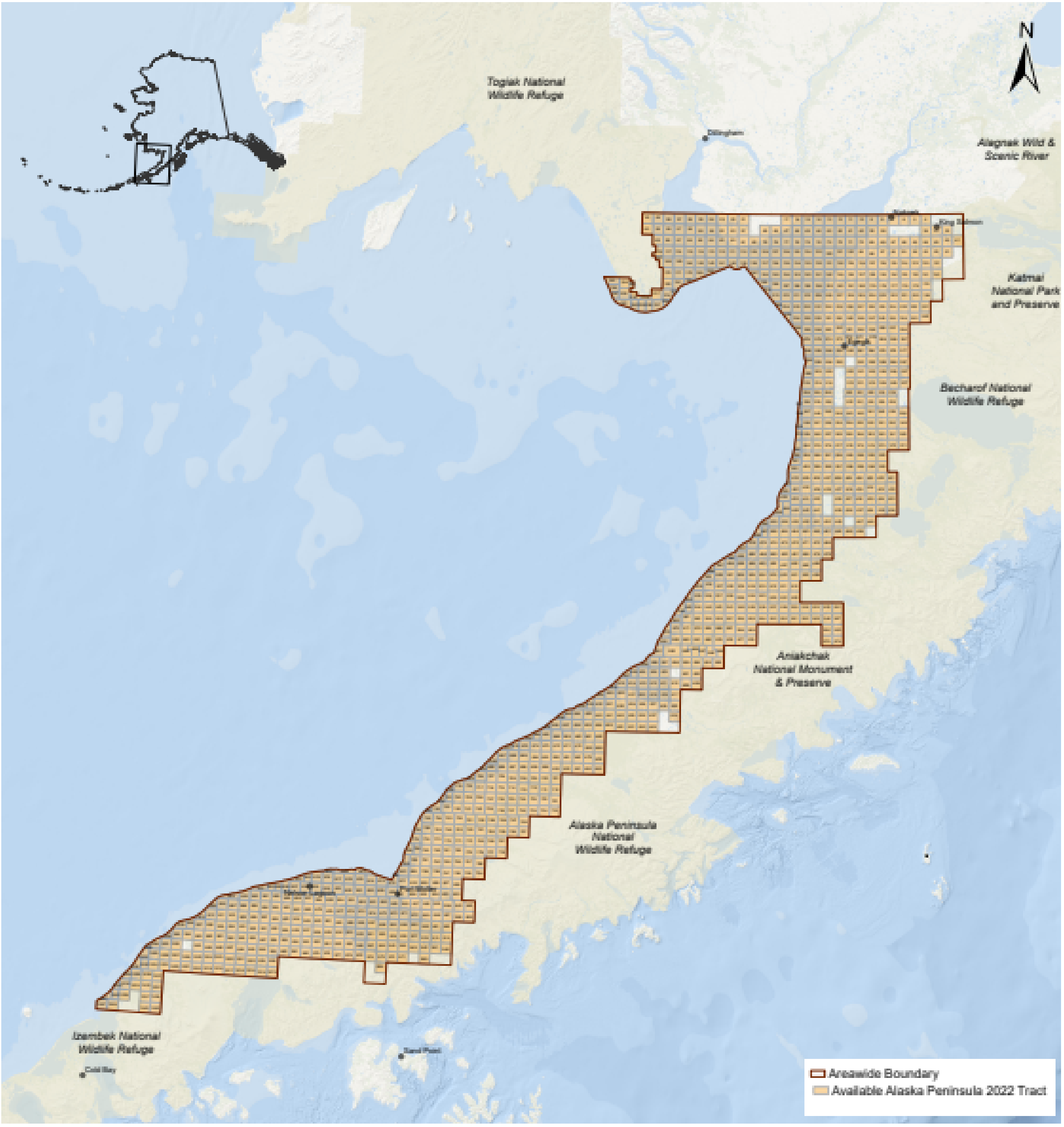
5.6 Resource Extraction

The Bristol Bay area contains significant mineral deposits, which creates mining potential for the region. The most popular among these deposits are porphyry copper and gold (EPA 2014). The only mining project currently within the Bristol Bay watershed is the Pebble Project. On January 30, 2023, the U.S. Environmental Protection Agency issued a Final Determination under its Clean Water Act Section 404(c) authority to limit actions related to the development of the Pebble Deposit in order to protect salmon resources (EPA 2023). Other large potential mine operations within the Bristol Bay region include Big Chunk South, Big Chunk North, Groundhog, Audn/Iliamna, and Humble (EPA 2014).

The only current project within the Kuskokwim River Watershed is Donlin Gold. Donlin Gold is pursuing an open pit gold mine 10 mi (16 km) north of Crooked Creek (ADNR 2023). Crooked Creek is approximately 190 mi (307 km) from the mouth of the Kuskokwim River. To meet project energy demands, a 312-mi (502-km) long pipeline is proposed to be buried to bring natural gas from Cook Inlet to the mine site. Historically, the Kuskokwim River Basin has been an active mining region. Platinum placer mines have occurred intermittently within the area surrounding Goodnews Bay since the 1920s. Platinum mining has ceased within the Goodnews Bay area since 2012. The most recent platinum mine within the region was shut down due to the misuse of wastewater ponds and pollution of nearby waters.

The North Aleutian Basin Outer Continental Shelf (OCS) overlaps the eastern portion of the action area. Within the OCS, oil and gas leases exist, beginning on the western side of Nushagak Bay, east around Bristol Bay, and south to the Alaskan Peninsula (Figure 5-1). Past exploration has not yielded any commercial production within the region (ADNR 2014). Additionally, no bids on leases have occurred within the region in recent years.

Figure 5-1. Alaska Peninsula Oil and Gas Lease Tract Map



Source: ADNR 2022

Oil and gas exploration within the western and northern portions of the action area have been primarily focused on the Bethel and Holitna Basins. With the exception of deep well exploration near Bethel in the 1980s, the region has not focused on subsurface exploration. Additionally, research suggests a very low probability for the occurrence of conventional, economically recoverable oil resources within the region (Nuvista 2015).

6 Effects of the Action

Effects of the action are all consequences, including those from other activities, to listed species or critical habitat that are caused by the proposed action. A consequence is caused by the proposed action if it will not occur but for the proposed action and 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, as amended by 83 FR 35178).

Effects that are common to seabirds generally are described in Section 6.1. Effects that pertain to a particular seabird species are described in Sections 6.2, 6.3, and 6.4. Effects on northern sea otters are described in Section 6.5. Indirect effects for all species included in this BA are described in Section 6.6.

6.1 Seabirds

6.1.1 Noise

Very little information is available about the underwater hearing of seabirds; to date only studies on great cormorants (*Phalacrocorax carbo*) have been published. Great cormorants were found to respond to underwater sounds and may have special adaptations for hearing underwater (Hansen et al. 2016, Johansen et al. 2016). The in-air hearing of a number of seabirds (including loons, scaups, gannets, and ducks) has been investigated by Crowell (2016), and the peak hearing sensitivity was found to be between 1.5 and 3 kHz. The best hearing frequency for the common eider (*Somateria mollissima*) was 2.4 kHz (Crowell 2016).

The effects of underwater noise on birds in general have not been well studied, but could include masking, behavioral disturbance, and hearing impairment. One study on the effects of underwater seismic survey sound on molting long-tailed ducks (*Clangula hyemalis*) within the Beaufort Sea showed little effect on their behavior (Lacroix et al. 2003). However, the study did not consider potential physical effects on the ducks. The authors suggested caution in interpreting the data because of their limited utility to detect subtle disturbance effects, and recommended studies on other species to better understand the effects of seismic airgun sound on seabirds. Stemp (1985) conducted opportunistic observations on the effects of seismic exploration on seabirds; he did not observe any effects of seismic testing but warned that his observations should not be extrapolated to areas with large concentrations of feeding or molting birds.

Seabirds are not known to communicate underwater or use underwater hearing during feeding activities. Therefore, masking from underwater noise is unlikely to be a concern, but research on this issue is lacking. No data is available about the physiological effects of underwater noise on birds (e.g., temporary threshold shifts [TTS] or permanent threshold shifts [PTS]). However, comparative studies of in-air hearing of many bird species have shown that TTS may occur when exposed to continuous noise (12 to 24 hours) between 93 and 110 dB re 20 μPa rms (Dooling and Popper 2016); this will roughly translate to 119 to 136 dB re 1 μPa rms as measured underwater. In air, PTS occurred when birds were exposed to continuous noise above 110 dB re 20 μPa rms or to single impulse sounds above 140 dB re 20 μPa rms (Dooling and Popper 2016). Underwater, those limits will be approximately 136 dB re 1 μPa rms for

continuous noise and 176 dB re 1 μPa rms for single impulse sounds. However, it is not clear if values determined from in-air studies can be applied to seabirds in the water, especially given that they spend only a small portion of their time underwater.

6.1.2 Vessel Traffic

Investigations into the effects of disturbance by vessel traffic on birds are limited. Schwemmer et al. (2011) examined the effects of disturbance by ships on seabirds in Germany. In areas with vessel traffic channels, sea ducks appeared to habituate to vessels. Four species of sea ducks examined had variable flushing distances, which was related to flock size; common eiders had the shortest flush distance. Flushing distances varied for the common scoter (*Melanitta nigra*), with larger flocks flushing at distances of 0.6 to 1.2 mi (1 to 2 km), and smaller flocks flushing at 0.6 mi (less than 1 km). Loons were found to avoid areas with high vessel traffic (Schwemmer et al. 2011). During boat surveys, Steller's eiders flushed when approached by a small skiff at distances between 328 and 656 ft (100 and 200 m) in January and 984 ft (300 m) in March (LGL 2000, HDR 2004).

Speckman et al. (2004) reported that marbled murrelets (*Brachyramphus marmoratus*) appeared to habituate to small boat traffic during surveys, with only a few birds flying away when approached by a skiff; most birds merely paddled away, while others dove and resurfaced before moving away. However, fish-holding murrelets were found to swallow the fish when approached by a boat, a behavior that could have consequences for the chicks the prey was intended for (Speckman et al. 2004). Lacroix et al. (2003) noted that molting, flightless ducks frequently dove and swam away short distances when approached by a small research vessel but resurfaced quickly after the vessel passed. Even when long-tailed ducks were experimentally disturbed by a small research vessel doing transits every other day, they showed relatively high site fidelity; however, all ducks showed a disturbance response at distances less than 328 ft (less than 100 m; Flint et al. 2004).

Lacroix et al. (2003) did not detect any effects of nearshore seismic exploration on molting long-tailed ducks within the inshore lagoon systems of Alaska's North Slope. Both aerial surveys and radio-tracking indicated the proportion of ducks that stayed near their marking location from before to after seismic exploration was unaffected by proximity to seismic survey activities. No large-scale movement from the seismic area occurred, even though the vessel transited the same area numerous times throughout the survey over the course of approximately 3 weeks. Nonetheless, several studies have shown that some bird species avoid areas with high levels of disturbance. Kaiser et al. (2006) reported that common scoters avoided areas with high levels of shipping traffic. Similarly, Johnson (1982 in Lacroix et al. 2003) reported that long-tailed ducks moved from one habitat to another in response to vessel disturbance. Similarly, Thornburg (1973), Havera et al. (1992), and Kenow et al. (2003) reported that staging waterfowl were displaced from foraging areas by boating, but some of these areas had high levels of boating activity. Merkel et al. (2009) showed reduced feeding and increased movement by common eiders when disturbed by fast-moving, open boats. The degree of disturbance was related to the number of boats within the area. However, the eiders did attempt to compensate for lost feeding opportunities by feeding at different, perhaps less favorable, times of the day (Merkel et al. 2009).

Similar results were obtained by Velando and Munilla (2011), who found that foraging by European shags (*Phalacrocorax aristotelis*) was reduced by boat disturbance. Agness et al. (2008) suggested changes in behavior of Kittlitz's murrelets (*Brachyramphus brevirostris*) in the presence of large, fast-moving vessels, and the possibility of biological effects because of increased energy expenditure by the birds. In contrast, Flint et al. (2003) reported that boat disturbance did not affect the body condition of molting long-tailed ducks.

6.1.3 Artificial Lighting

Artificial lighting will be used on the cable-laying vessel for routine vessel safety and navigation purposes. Several bird species are attracted to bright lights on ships at night and collide with the ship (e.g., Ryan 1991, Black 2005, Merkel and Johansen 2011). Birds that spend most of their lives at sea are often highly influenced by artificial light (Montevecchi 2006, Montevecchi et al. 1999, Gauthreaux and Belser 2006, Ronconi et al. 2015). In Alaska, crested auklets (*Aethia cristatella*) mass-stranded on a crab fishing boat. An estimated 1.5 tons of crested auklets either collided with or landed on the brightly lit fishing boat at night (Dick and Donaldson 1978).

It has also been noted that seabird strandings seem to peak around the time of the new moon, when moonlight levels are lowest (Telfer et al. 1987, Rodríguez and Rodríguez 2009, Miles et al. 2010). Birds are more strongly attracted to lights at sea during fog and drizzle conditions (Telfer et al. 1987, Black 2005). Moisture droplets in the air refract light, increasing illumination and creating a glow around vessels at sea. Birds may be confused or blinded by the contrast between a vessel's lights and the surrounding darkness. During the confusion, a seabird may collide with the vessel's superstructure, resulting in injury or death. They may also fly at the lights for long periods and tire or exhaust themselves, decreasing their ability to feed and survive (Ryan et al. 2021).

Many seabirds have great difficulty becoming airborne from flat surfaces. Once on a hard surface, stranded seabirds tend to crawl into corners or under objects, such as machinery, to hide. While there, they may die from exposure, dehydration, or starvation over hours or days. Once stranded on a deck, a seabird's plumage is prone to oiling from residual oil often present in varying degrees on ship decks. Even a dime-sized spot of oil on a bird's plumage is sufficient to breach the thermal insulation essential for maintaining vital body heat. Therefore, even if rescued and released over the side of the vessel, a bird may later die from hypothermia (Ryan et al. 2021, Howard 2021).

6.1.4 Spills

The vessels that will be used for the cable-laying operations will have hazardous chemicals, including hydrocarbons, present. If petroleum or other hazardous material were to spill during Project activities, the level of impact on seabirds will depend on the size of the spill, location, time of year, and number of seabirds present. As noted in Section 6.1.3, even a very small amount of oil on a bird's plumage can result in injury or mortality. Oil spills can be lethal to waterbirds, particularly divers, which spend a lot of time sitting on the surface of the water where the oil floats (International Bird Rescue 2023). Eiders are especially vulnerable to oil spills due to their large flock sizes, distance to shore, and use of moderate ice areas (Smith et al. 2017). Persistent oil contamination is a major threat for eiders within areas near shipping lanes, such

as the Aleutian Islands, Bering Sea and Strait, and Chukchi and Beaufort Seas (Smith et al. 2017).

However, hazardous chemicals associated with the Project will be in small quantities and properly contained, following all regulations, so the occurrence of a spill or leak from Project vessels will be very unlikely. If a spill occurred, it will likely be of a low volume and quickly contained.

6.1.5 Habitat Disturbance

This Project will cause some disturbance to the benthic community through seafloor clearing, plowing, and trenching to bury the cable. Trawling and dredging are known to reduce habitat complexity and reduce productivity. The benthic community can recover from these disturbances, but recovery times could range from a few months to several decades depending on the location, substrate, original ecosystem, and scale of the disturbance (National Academy of Sciences 2002). In one Alaska example, it took the benthic community 4 years to recover after underwater mining in Norton Sound (Jewett and Naidu 2000).

Overland cable-laying activities will result in minor, temporary, tundra habitat disturbance. These activities will take place in winter using vehicles that will not cause surface damage to the tundra, and all trenched segments will be backfilled with native soil. Cable laid directly on the tundra surface or within waterbodies will not preclude the use of these habitats for any birds, including ESA-listed species.

6.2 Steller's Eider

The Steller's eider is known to occur within a portion of the action area, near Goodnews Bay, as well as the waters off Carter Spit northward to Jacksmith Bay, located easterly adjacent to the action area. The potential for Project activities to cause behavioral disturbance or displacement, injury or mortality, or habitat disturbance is described in the following sections.

6.2.1 Behavioral Disturbance and Displacement

Steller's eiders stage in Goodnews Bay and have been recorded there in large numbers during spring and summer months (ADF&G 2020a, Larned 2012). Additionally, Steller's eiders, numbering in the hundreds to thousands, have been observed within waters easterly adjacent to the action area offshore of Carter Spit northward to Jacksmith Bay during summer, as well as in small numbers in fall (ADF&G 2020a, National Audubon Society 2023, Seppi 1997). There is also potential that some non-breeding birds may stay behind at stopover locations (USFWS 2001a).

The in-air portion of the action area overlaps with Goodnews Bay. The cable-laying route is located west of the waters off Carter Spit and Jacksmith Bay, and will not run through the shallower nearshore waters that is likely be preferred by Steller's eiders (i.e., typically less than 32 ft [10 m] in depth; Larned 2012).

If eiders remain within the action area, in Goodnews Bay or nearby waters, during spring and summer months, disturbance due to vessel traffic will occur. Behavioral disturbances resulting from vessel traffic will likely occur at relatively short distances from the vessel. As described in

Section 6.1.2, Steller's eiders may flush within 656 ft (200 m) of a fast-moving skiff. However, the cable-laying vessels will be operating at slow speeds (typically 0.5 to 2 knots [1 to 4 km/hr]) and are therefore much less likely to cause a flushing response. Disturbance to staging or non-breeding Steller's eiders is unlikely given the short duration of cable-laying activities within their potential summer range. Any disturbance will only be temporary, given the continual movement of Project activities along the cable route; therefore, potential effects from disturbance caused by the vessel are discountable.

Intertidal cable-laying activities near Goodnews Bay will occur near a previously developed area within the village of Platinum. Disturbance or displacement caused by equipment noise and the presence of humans within the area will only occur temporarily during Project activities and will be of short duration. Therefore, the Steller's eider is not expected to be affected by intertidal cable-laying activities.

The overland cable installation activities will occur during winter months, when the species will not occur within the action area or use terrestrial habitat. Therefore, the overland route is not expected to result in behavioral disturbance or displacement.

6.2.2 Injury or Mortality

Although the effect of underwater sound on eiders has not been studied, noise produced by the proposed Project activities could affect the behavior of the Steller's eider along the cable-laying route. However, masking and hearing impairment are unlikely during the proposed activities because the continuous sound sources (e.g., dynamic positioning [DP] thrusters) have lower frequencies than the range of peak hearing sensitivity for seabirds, and the impulse sounds (e.g., echosounders) have most of their energy at frequencies well above the range of peak hearing sensitivity for seabirds. Additionally, the duration of potential exposure to these low-level sounds will be insufficient to affect hearing abilities.

The Steller's eider is not expected to be affected by artificial lighting on vessels. Eiders are primarily diurnal (McNeil et al. 1992), although they may feed at night when disturbed during the day or in winter when daylight is limited (Merkel et al. 2009, Merkel and Mosbech 2008). In a study of the effects of artificial lighting from gas-flaring at Northstar Island in the Alaska Beaufort Sea, only one eider flock was observed, and they showed no reaction to the flaring (Day et al. 2015). Though collisions with fishing vessels resulting in mortality to eiders, including Steller's eiders, have been anecdotally reported on numerous occasions within Alaska; nearly all these documented strikes with eiders occurred during hours of complete darkness in late winter and early spring, and involved bright lighting (Funk 2008).

The Steller's eider is not expected to be impacted by spills. As described above in Section 6.1.4, eiders are particularly vulnerable to oil spills, and even a very small amount has the potential to result in injury or mortality. However, the likelihood of a spill resulting from Project activities will be extremely low and of small quantity.

6.2.3 Habitat Disturbance

The Steller's eider is primarily a benthic feeder, with most of its diet composed of small bivalves, gastropods, and crustaceans (Bustnes and Systad 2001, Fredrickson 2001). Some disturbance

to the benthos from cable-laying activities will occur along the area that will be dragged or trenched; this may, in turn, affect food supply over a very small area. However, given that this will be a one-time action along a relatively narrow strip and well away from critical habitat areas, it will likely have little impact on eider feeding efficiency.

The action area for this proposed Project does not occur within designated critical habitat of Steller's eider; therefore, it will not impact any defined PCEs.

As described in Sections 6.1.5 and 6.6.1, potential adverse effects on Steller's eider prey species from Project activities are very unlikely.

6.3 Spectacled Eider

Although the action area is within the historical breeding range of the spectacled eider, the species has not been observed within the action area in surveys performed by USFWS between 1985 and 2014 (Fischer and Stehn 2015). Current breeding activity within the region is concentrated along the coastal portions of the YK Delta, near Hazen Bay (Fischer and Stehn 2015), located well outside the action area. However, the possibility exists for low-density breeding to occur outside confirmed breeding pair occurrence locations, though it would be extremely rare. During the non-breeding seasons, spectacled eiders are found within the Bering Sea, far from the action area. The potential for Project activities to cause behavioral disturbance or displacement, or habitat disturbance is described in the following sections.

6.3.1 Behavioral Disturbance and Displacement

If spectacled eiders nested within the action area, behavioral disturbance or even displacement from overland Project activities could occur. However, overland activities for the Project will only occur in winter when eiders will not be nesting or located near the action area. Therefore, the spectacled eider is not expected to be affected by overland Project activities.

6.3.2 Habitat Disturbance

During nesting, the spectacled eider typically forages within ponds by diving and dabbling for aquatic insects, crustaceans, mollusks, and vegetation. Ground disturbance from overland cable installation could impact potential nesting habitat within the action area near Tuntutuliak, which is several miles north of the spectacled eider's historical breeding range. However, overland cable installation through potential nesting habitat will occur in winter months, when spectacled eiders will not be present. Installation of cable in winter will minimize impacts to vegetation. Additionally, the action area is outside the historical and current breeding range for the YK Delta nesting population; therefore, nesting by this species within the action area will be extremely rare. As such, impacts to spectacled eider nesting habitat are not expected.

The action area does not occur within designated critical habitat for the spectacled eider; therefore, the Project will not impact any defined PCEs.

6.4 Short-tailed Albatross

The short-tailed albatross forages widely across the North Pacific, and the species may move through the action area, though it would be rare. The potential for Project activities to cause behavioral disturbance or displacement, injury or mortality, or habitat disturbance is described in the following sections.

6.4.1 Behavioral Disturbance and Displacement

Noise produced by the proposed Project activities could affect the behavior of short-tailed albatross along the cable-laying route, should they move through the action area. However, masking and hearing impairment are unlikely during the proposed activities because the continuous sound sources (e.g., DP thrusters) have lower frequencies than the range of peak hearing sensitivity for seabirds, and the impulse sounds (e.g., echosounders) have most of their energy at frequencies well above the range of peak hearing sensitivity for seabirds. Additionally, the duration of potential exposure to these low-level sounds will be insufficient to affect hearing abilities.

If short-tailed albatross occur within the action area, behavioral disturbance or displacement due to vessel traffic could occur, although at relatively short distances from the vessel, which may cause birds to move to less ideal habitats to travel and forage. However, this disturbance will only be temporary, given the continual movement of Project activities along the cable route. The slow operating speeds of the vessel (typically 0.5 to 2 knots [1 to 4 km/hr]) will also be less likely to disrupt behavior.

The short-tailed albatross primarily hunts by seizing prey from the water surface (USFWS 2022a). Therefore, the likelihood of underwater impacts from Project activities resulting in disturbance to feeding abilities is extremely low.

6.4.2 Injury or Mortality

The short-tailed albatross is generally more active during the day, and birds within the action area are not expected to be affected by artificial lighting on the vessels (USFWS 2008). Additionally, injury or mortality of this species resulting from artificial lighting is unlikely, given the rarity of this species within the action area, the reduction in the outward radiation from artificial lighting, and slow operating speeds of the vessel (typically 0.5 to 2 knots [1 to 4 km/hr]).

6.4.3 Habitat Disturbance

The short-tailed albatross feeds primarily on squid, shrimp, and crustaceans. These birds are very strong, wide-ranging fliers that are not restricted to a limited foraging area (USFWS 2008). The species is considered a continental shelf-edge specialist and is well documented along the Bering Sea shelf edge, although historical accounts suggest the species may have been relatively common nearshore, including near Kodiak, the Aleutians, and St. Lawrence Islands during conditions of highly productive upwellings (Piatt et al. 2006). Therefore, given the mobility and preferred foraging habitat of this species, vessel traffic and cable-laying activities within the action area are unlikely to impact albatross feeding. Cable laying activities will disturb the benthos along the seafloor that is dragged or trenched, which has the potential to affect a small portion of prey species within that area. However, this is a one-time action along a relatively

narrow strip of water outside of prime foraging habitat along the Bering Sea shelf edge (Piatt et al. 2006, USFWS 2022a).

As described below in Section 6.6.1, potential adverse effects on short-tailed albatross prey species from Project activities would be extremely limited given their large range.

6.5 Northern Sea Otter

The Southwest Alaska DPS of northern sea otter's range does not encompass the action area, and their use of the action area during the single marine cable-laying season is unlikely. However, since potential suitable habitat exists within the action area, a small number of sea otters could experience behavioral disturbance and displacement, injury or mortality, and habitat disturbance.

6.5.1 Behavioral Disturbance and Displacement

Vessels will use main drive propellers and/or DP thrusters to maintain position or move slowly during cable-laying operations. During these activities, non-impulse sounds will be generated by the collapse of air bubbles (cavitation) created when propeller blades move rapidly through the water. Several acoustic measurements of vessels conducting similar operations using these types of propulsion have been made within Alaska waters in previous years. While sea otters are not likely to be exposed to these sounds within the action area, general information on the effects of vessel noise on marine mammals is provided in this section.

Project activities may also include the production of pulsed sounds from single-beam navigational echo sounders and positioning beacons (transceivers and transponders) used to determine the location of trenching or ROV equipment on or near the seafloor. These acoustic sources typically produce pulsed sounds at much higher frequencies than those produced by vessel thrusters; in narrow frequency bands; and in some cases (e.g., navigational echosounders), with narrow downward directed beamforms. For example, positioning beacons measured within the Chukchi Sea operated with center frequencies of 27 kHz (most energy between 26 and 28 kHz), 32 kHz (most energy between 25 and 35 kHz), and 22 to 23 kHz or 21 to 21.5 kHz (most energy between 20 and 25 kHz). For directional sources, the difference between in-beam and out-of-beam sound pressure levels at the same distance ranged from 5 to 15 dB re 1 μPa rms. Because high-frequency sounds attenuate more quickly within water, distances to threshold levels that may elicit behavioral responses in marine mammals were in the teens to several tens of meters, even within the narrow in-beam sound fields (Warner and McCrodan 2011). For this reason, and because the species considered in this BA have less sensitive hearing at these higher frequencies, potential impacts from non-impulsive vessels sounds are likely to subsume potential impacts from these sonar sources, and they are not addressed further below.

Marine mammals, including sea otters, rely heavily on the use of underwater sounds to communicate and gain information about their surroundings. Experiments and monitoring studies also show that they hear and may react to many types of anthropogenic sounds (e.g., Richardson et al. 1995, Gordon et al. 2004, Nowacek et al. 2007, Tyack 2008).

The effects of sound from vessel noise on marine mammals are highly variable, and can be generally categorized as follows (adapted from Richardson et al. 1995):

- The sound may be too weak to be heard at the animal's location (i.e., lower than the prevailing ambient sound level, the hearing threshold of the animal at relevant frequencies, or both).
- The sound may be audible but not strong enough to elicit any overt behavioral response (i.e., the animal may tolerate it, either without or with some deleterious effects such as masking or stress).
- The sound may elicit behavioral reactions of variable conspicuousness and variable relevance to the wellbeing of the animal; these can range from subtle effects on respiration or other behaviors (detectable only by statistical analysis) to active avoidance reactions.
- Upon repeated exposure, the animal may exhibit diminishing responsiveness (habituation/sensitization), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics, unpredictable in occurrence, and associated with situations that the animal may perceive as a threat.
- Any anthropogenic sound that is strong enough to be heard has the potential to reduce (mask) the ability of marine mammals to hear natural sounds at similar frequencies, including calls from conspecifics, echolocation sounds of odontocetes, and environmental sounds due to wave action or (at high latitudes) ice movement. Marine mammal calls and other sounds are often audible during the intervals between pulses, but mild to moderate masking may occur during that time because of reverberation.
- Very strong sounds have the potential to cause temporary or permanent reduction in hearing sensitivity (temporary and permanent threshold shift), or other physical or physiological effects. Received sound levels must far exceed the animal's hearing threshold for any temporary threshold shift to occur. Received levels must be even higher for a risk of permanent hearing impairment.

It is very unlikely that sea otters will be found within the action area. However, if present, some sea otters may exhibit minor, short-term disturbance responses to underwater sounds from cable-laying activities. Based on expected sound levels produced by the activity, any potential impacts on otter behavior will likely be localized to within an area around the vessels in use.

6.5.2 Injury or Mortality

Due to the low-intensity and non-impulsive nature of sounds produced by cable-laying activities, strandings or mortality resulting from acoustic exposure is highly unlikely. Any potential effects of this nature are more likely to come from ship strikes (e.g., Redfern et al. 2013). Areas where high densities of marine mammals overlap with frequent transits by large and fast-moving ships present high-risk areas. Wiley et al. (2016) concluded that reducing ship speed is one of the most reliable ways to avoid ship strikes. The collision risk of a cable-laying vessel with marine mammals exists but is extremely unlikely because of the relatively slow operating speed (typically 0.5 to 2 knots [1 to 4 km/hr]) of the vessel and the generally straight-line movement (Laist et al. 2001, Vanderlaan and Taggart 2007). For these reasons, collisions are unlikely between sea otters and vessels proposed for use during Project activities. Additionally, sea otters generally respond to an approaching vessel by swimming away from the area, further

reducing the risk of collision. According to the USFWS (2013), injury by vessel strikes is likely to be rare within areas with limited boat traffic.

6.5.3 Spills

The vessels that will be used for the cable-laying operations will have hazardous chemicals, including hydrocarbons, present. If petroleum or other hazardous materials spilled during Project activities, the level of impact on northern sea otters will depend on the size of the spill, location, time of year, and number of sea otters present.

Sea otters are particularly vulnerable to oil spills, and even a small amount has the potential to result in injury or mortality. Unlike many other marine mammals, sea otters do not rely on blubber for insulation, but rather on their fur and a high metabolism to thermoregulate. Fur contaminated by oil loses its ability to properly insulate, resulting in increased metabolic rates in the sea otter. Additionally, detergent used to wash sea otters after oil contamination also temporarily (minimum 8 days) reduces the water repellency feature of sea otter fur, compounding the energy expense for the otter.

The acute effects of oiling on sea otters can result in death from causes such as hypothermia and pneumonia (Costa and Kooyman 1982). For months following the *Exxon Valdez* oil spill in 1989, sea otter deaths from acute effects ranged from 1,000 to several thousands (Ballachey et al. 2014). Sea otter recovery following the spill was delayed due to continued reduction in sea otter survival rates. A study conducted by Bodkin et al. (2012) found that sea otters in Prince William Sound were still being exposed to oil from the *Exxon Valdez* oil spill on a weekly to monthly basis nearly two decades after the spill occurred. According to Ballachey et al. (2014), it took 24 years for sea otter populations in western Prince William Sound to recover from this oil spill. Sea otters are not expected to be impacted by spills caused by the proposed action. Hazardous chemicals associated with the Project will be in small quantities and properly contained, following all regulations, so the occurrence of a spill or leak from Project vessels is unlikely. If a spill occurred, it will be of a low volume and quickly contained.

6.5.4 Habitat Disturbance

Sea bottom disturbance from cable installation activities, route clearance, and plowing could affect sea otters if they are present within the action area. A brief and limited increase in turbidity from suspension of sediments is expected to have minimal effect on sea otters. Cable laying may also disturb the benthic community, which could, in turn, affect food supply over a small area. Sea otters feed on a wide variety of benthic invertebrates (Rotterman and Simon-Jackson 1988), including sea urchins, abalone, clams, mussels, and crabs (Riedman and Estes 1990). The disturbance effects on the benthos will be localized, short-term, and likely indistinguishable from naturally occurring disturbances. Given the brief duration of this activity, likelihood of no sea otters being present, and relatively small area impacted, no impact on sea otter feeding efficiency is anticipated.

No designated critical habitat for the Southwest Alaska DPS of northern sea otter occurs within the action area.

6.6 Indirect Effects of the Action

The proposed activities will result in primarily temporary indirect impacts to the listed species through their food sources. Although activities affect individual prey species, it is not expected that prey availability for the Steller's eider, spectacled eider, short-tailed albatross, and northern sea otter will be significantly affected.

Potential effects of the noise and bottom disturbance produced by Project activities on fish and invertebrates are summarized below. Any effects on these potential prey species could indirectly affect listed species within the action area.

6.6.1 Impacts to Prey Species

Exposure to anthropogenic underwater sounds has the potential to cause physical and behavioral effects on marine invertebrates and fish. Studies that conclude physical and physiological effects occur typically involve captive subjects that are unable to move away from the sound source and are, therefore, exposed to higher sound levels than they will be under natural conditions. Comprehensive literature reviews related to auditory capabilities of fish and marine invertebrates as well as the potential effects of noise include Hastings and Popper (2005), Popper and Hastings (2009a, 2009b), and Hawkins et al. (2015).

6.6.1.1 INVERTEBRATES

The sound detection abilities of marine invertebrates are the subject of ongoing scientific inquiry. Aquatic invertebrates, except aquatic insects, do not possess the equivalent physical structures present in fish and marine mammals that can be stimulated by the pressure component of sound. It appears that marine invertebrates respond to vibrations (i.e., particle displacement) rather than pressure (Breithaupt 2002).

Among the marine invertebrates, decapod crustaceans and cephalopods have been the most intensively studied in terms of sound detection and the effects of exposure to sound. Crustaceans appear to be most sensitive to low-frequency sounds (i.e., less than 1,000 Hz) (Budelmann 1992, Popper et al. 2001). Both cephalopods (Packard et al. 1990) and crustaceans (Heuch and Karlsen 1997) have been shown to possess acute infrasound (i.e., less than 20 Hz) sensitivity. Some studies suggest that invertebrate species, such as the American lobster (*Homarus americanus*), may also be sensitive to frequencies greater than 1,000 Hz (Pye and Watson 2004). A recent study concluded that planktonic coral larvae can detect and respond to sound, the first description of an auditory response in the invertebrate phylum Cnidaria (Vermeij et al. 2010).

Currently, no studies suggest that invertebrates are likely to be harmed by, or show long-term responses to, brief exposures to vessel sounds similar to those that will occur during this Project.

6.6.1.2 FISH

Marine fish are known to vary widely in their abilities to detect sound. Although hearing capability data only exist for fewer than 100 of the 27,000 fish species (Hastings and Popper 2005), current data suggest that most fish species detect sounds with frequencies less than 1,500 Hz (Popper and Fay 2010). Some marine fish, such as shad and menhaden, can detect sound at frequencies greater than 180 kHz (Mann et al. 1997, 1998, 2001).

Numerous papers about the behavioral responses of fish to marine vessel sounds have been published in the primary literature. They consider the responses of small pelagic fish (e.g., Misund et al. 1996, Vabo et al. 2002, Jørgensen et al. 2004, Skaret et al. 2005, Ona et al. 2007, Sand et al. 2008), large pelagic fish (Sarà et al. 2007), and groundfish (Engås et al. 1998, Handegard et al. 2003, De Robertis et al. 2008). Generally, most studies indicate fish typically exhibit some level of reaction to the sound of approaching marine vessels, the degree of reaction being dependent on a variety of factors, including fish activity at the time of exposure (e.g., reproduction, feeding, migration), vessel sound characteristics, and water depth. Simpson et al. (2016) found that vessel noise and direct disturbance by vessels raised stress levels and reduced anti-predator responses in some reef fish and, therefore, more than doubled mortality by predation. This response has negative consequences for fish but could be beneficial to marine mammals that prey on fish.

However, given the routine presence of other vessels within the region and the lack of significant effects on fish species from their presence, indirect effects to listed species from exposure of fish to Project vessel sounds is expected to be very unlikely.

7 Cumulative Effects

Cumulative effects are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.2). Since the Determination of Effects for each species is either no effect or not likely to adversely affect (see Section 8), cumulative effects are not described in this BA.

8 Determination of Effects

This BA evaluates the potential impacts of the Project on Steller's eider, spectacled eider, short-tailed albatross, and Southwest Alaska DPS of northern sea otter. To reach a conclusion, Project impacts are not considered in isolation, but are placed in the context of the current status of the species and critical habitat, the environmental baseline, and cumulative effects. Consistent with ESA guidance, a "may affect, but is not likely to adversely affect" determination means that all effects are beneficial, insignificant, or discountable. For purposes of this BA, "may affect, but is not likely to adversely affect" suggests that any potential effects are highly unlikely; will be of short duration; will not have any adverse effects to the species or critical habitat; and will not be measurable, or are considered insignificant or discountable. A "may affect, and is likely to adversely affect" determination means that listed resources are likely to be exposed to the action or its environmental consequences, and may respond in a negative manner to this exposure. After considering these aggregate effects on the species, the recommended effect determinations are described in the following sections.

8.1 Steller's Eider

The Project **may affect, but is not likely to adversely affect** Steller's eider. A **may affect** determination is warranted because the action area is located within the species' range, and Steller's eiders have been observed within the action area in the past. A **not likely to adversely affect** determination is warranted because the low levels and low frequency of the noise associated with construction is not likely to result in disturbance or injury. The eiders are unlikely to be disturbed by the presence of vessels due to their slow speeds. The artificial lighting on the vessels is unlikely to disturb eiders because marine-based cable laying will occur during summer. The short-term disturbance of the benthic habitat in which eiders may feed will have an insignificant impact on eider foraging ability or efficiency.

8.2 Spectacled Eider

While the historical range of the spectacled eider has been observed within the action area in the past, a **no effect** determination is warranted because the probability of spectacled eiders occurring within the action area is so low as to be discountable.

8.3 Short-tailed Albatross

A **no effect** determination is warranted because the probability of short-tailed albatross occurring during cable-laying activities between May and June is so low as to be discountable.

8.4 Southwest Alaska DPS of Northern Sea Otter

A **no effect** determination is warranted because the action area is not within the current known range of the Southwest Alaska DPS of northern sea otter, so the probability of this species occurring within the action area is so low as to be discountable.

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Appendix A. ESA-listed Species/Populations Present within/near the Action Area (USFWS, February 2, 2023)

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IPaC

U.S. Fish & Wildlife Service

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS offce(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

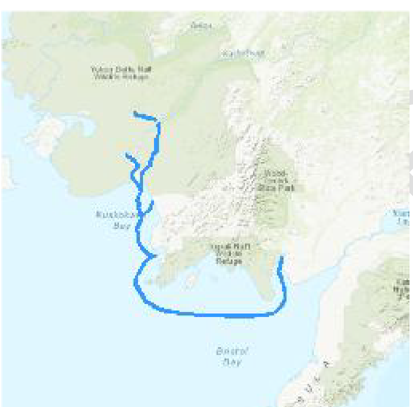
Project information

NAME

Airraq Phase 1 and 2

LOCATION

Bethel and Dillingham counties, Alaska



DESCRIPTION

None

Local office

Anchorage Fish & Wildlife Field Office

Phone (907) 271-2888

Fax (907) 271-2786

4700 Blm Road

Anchorage, AK 99507

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local offce and a species list which fulfills this requirement can only be obtained by requesting an offcial species list from either the Regulatory Review section in IPaC (see directions below) or from the local field offce directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an offcial species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are not shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Sea Otter Enhydra lutris kenyoni There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2884	Threatened Marine mammal
Wood Bison Bison bison athabascae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8362	Threatened

Birds

NAME	STATUS
Short-tailed Albatross Phoebastria (=Diomedea) albatrus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/433	Endangered
Spectacled Eider Somateria fischeri Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/762	Threatened
Steller's Eider Polysticta stelleri There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1475	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing

appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take- migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation- measures.pdf

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

Please refer to Alaskas Bird Nesting Season for recommendations to minimize impacts to migratory birds, including eagles.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Feb 1 to Sep 30

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4- week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the

week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds

across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (I)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

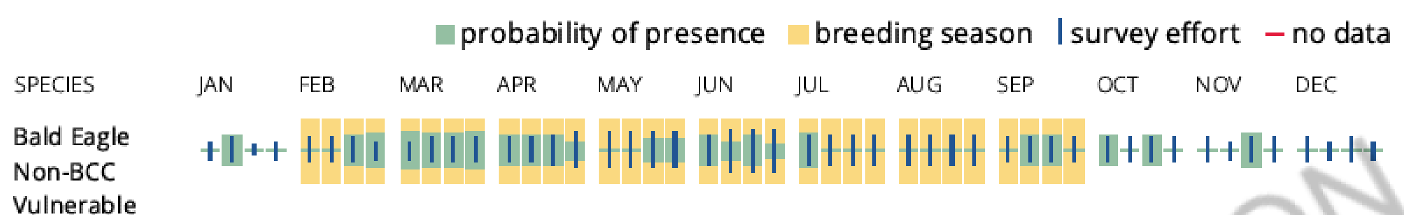
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (−)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the [Avian Knowledge Network (AKN)](). The AKN data is based on a growing collection of [survey, banding, and citizen science]()

datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Offce if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

There are migratory birds in your project area. Please refer to Alaska's Bird Nesting Season for recommendations to minimize impacts to migratory birds, including eagles.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds

https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take- migratory-birds

- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

Name	Breed Season
Aleutian Tern Sterna aleutica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9599	Breeds May 1 to Aug 31
American Golden-plover Pluvialis dominica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 15
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities	Breeds Feb 1 to Sep 30
Black Scoter Melanitta nigra This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Name	Breed Season
Black Turnstone Arenaria melanocephala This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska	Breeds May 15 to Jul 31
Black-legged Kittiwake Rissa tridactyla This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Common Loon gavia immer This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/4464	Breeds Apr 15 to Oct 31
Dunlin Calidris alpina arcticola This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 20 to Jul 20
Hudsonian Godwit Limosa haemastica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Jul 31
Long-tailed Duck Clangula hyemalis This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/7238	Breeds elsewhere
Pomarine Jaeger Stercorarius pomarinus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Name	Breed Season
Red Phalarope Phalaropus fulicarius This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-breasted Merganser Mergus serrator This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-necked Phalarope Phalaropus lobatus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-throated Loon Gavia stellata This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds Jun 1 to Aug 10
White-winged Scoter Melanitta fusca This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4- week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

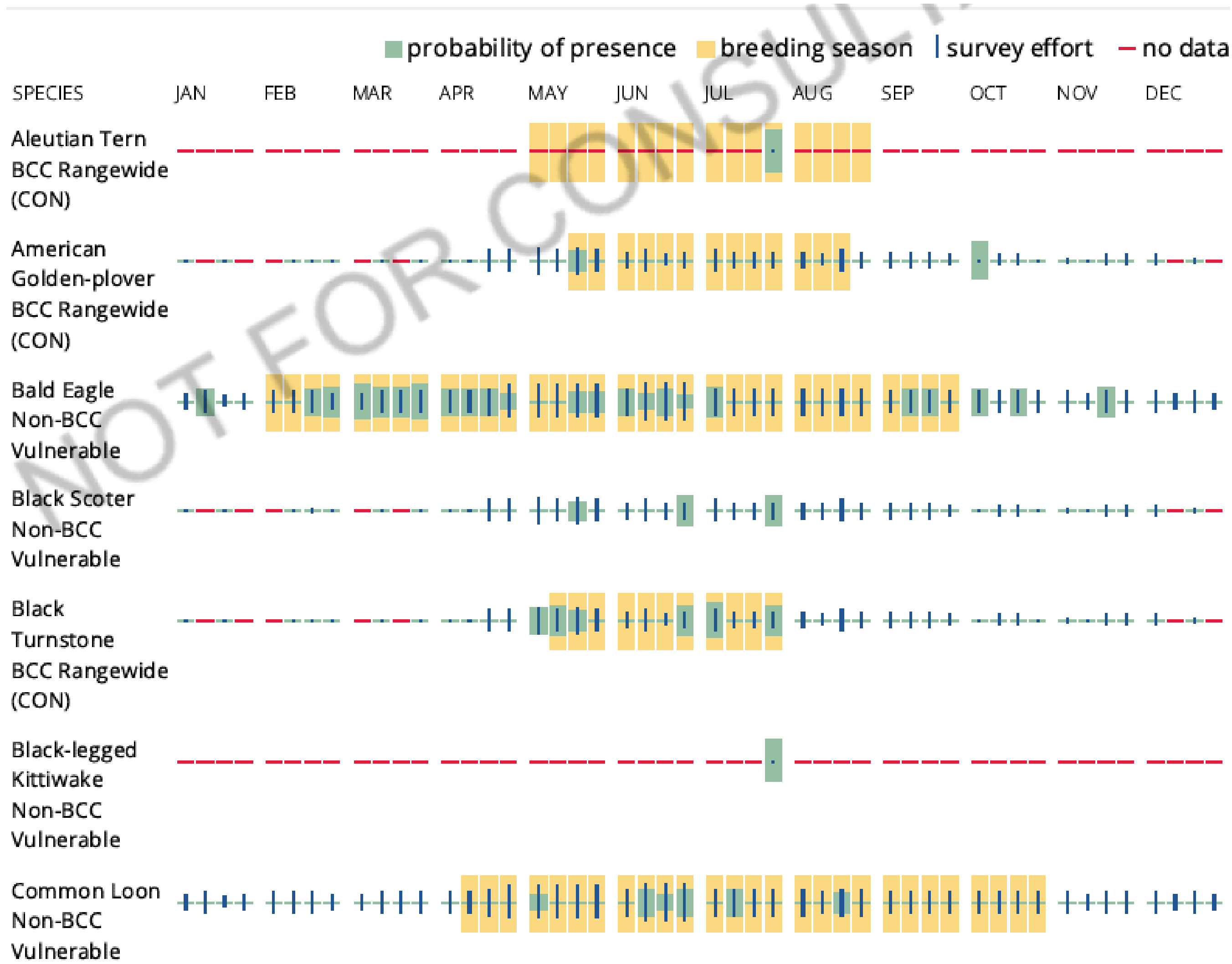
No Data (−)

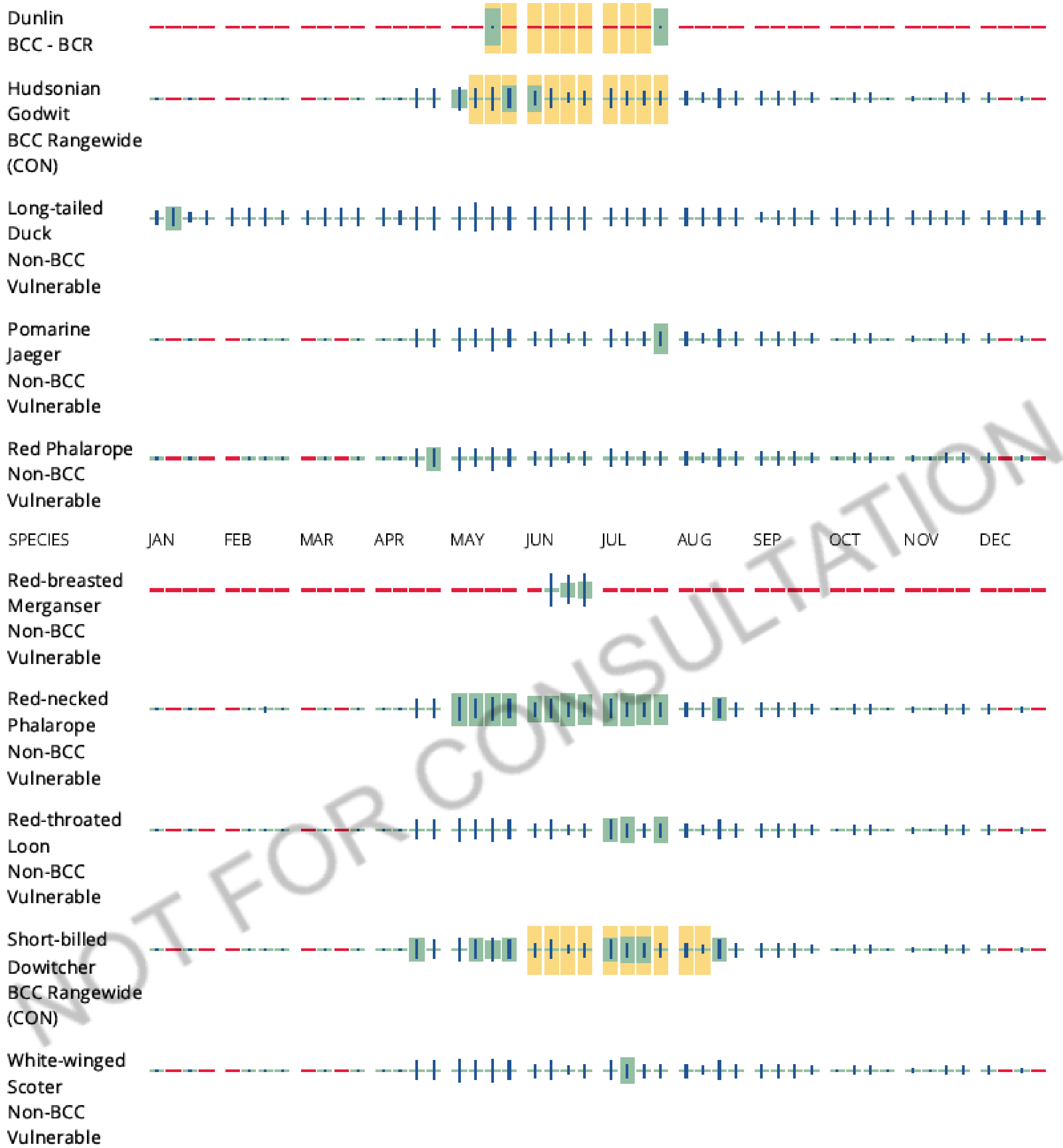
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant

information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your

list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Marine mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are not shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take (to harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill) of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an offce of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following marine mammals under the responsibility of the U.S. Fish and Wildlife Service are potentially affected by activities in this location:

NAME

Northern Sea Otter Enhydra lutris kenyoni

https://ecos.fws.gov/ecp/species/2884

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
TOGIAK NATIONAL WILDLIFE REFUGE	28,553,452.44 acres
YUKON DELTA NATIONAL WILDLIFE REFUGE	10,145,825,325.27 acres

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

NO DATA AVAILABLE - This area (or portions of it) has not been surveyed by the NWI. For more information, please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

NOTE: This initial screening does not replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the

information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies.

Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix B. Airraq Network Biological Assessment for the U.S. Fish and Wildlife Service

Airraq Network

PHASES 1 AND 2

Biological Assessment for U.S. Fish and Wildlife Service

Unicom, Inc

March 2023

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Executive Summary

Unicom, Inc., a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim Delta as part of the Airraq Network (Project). The Project will extend broadband service from Dillingham to 10 communities within the Lower Kuskokwim River Delta by placing approximately 548 miles of fiber optic cable on the ocean floor, Kuskokwim River, and terrestrial landscapes throughout the region. The cable will be trenched within the seafloor when necessary to protect it from outside aggression that could make the cable prone to fault. Terrestrial route components will take advantage of the unique landscape by laying the cable on the ground surface as much as possible, which will allow it to be overgrown by vegetation and eventually self-bury. The terrestrial route will be trenched when necessary to provide additional protections and alleviate visual concerns.

The Project has received funding through grants from the National Telecommunications and Information Administration (NTIA) and U.S. Department of Agriculture (USDA). Additionally, the Project requires a permit from the U.S. Army Corps of Engineers (USACE), Alaska District under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Under Section 7 of the Endangered Species Act (ESA), NTIA, USDA, and USACE are required to consult with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) to ensure that any federal action will not jeopardize the continued existence of any species listed or proposed under the ESA, or result in the destruction or adverse modification of designated critical habitat.

Four ESA-listed species may occur within the action area (Table ES-1). This Biological Assessment includes an analysis of potential direct, indirect, and cumulative impacts to these species as a result of the Project. The NTIA and USDA conclude and request concurrence from the USFWS that the proposed Project will have **no effect** on spectacled eider (*Somateria fischeri*), short-tailed albatross (*Phoebastria albatrus*), and the Southwest Alaska Distinct Population Segment (DPS) of northern sea otter (*Enhydra lutris kenyoni*), and that the Project **may affect, but is not likely to adversely affect**, Steller's eider (*Polysticta stelleri*). No designated critical habitat for Steller's eider, spectacled eider, or the Southwest Alaska DPS of northern sea otter is present within the action area.

Table ES-1. ESA-listed Species and Critical Habitat within the Action Area

Species	ESA Status	Effect Determination for Species	Critical Habitat within Action Area
Steller's Eider (*Polysticta stelleri*)	Threatened	May affect, not likely to adversely affect	No
Spectacled Eider (*Somateria fischeri*)	Threatened	No Effect	No
Short-tailed Albatross (*Phoebastria albatrus*)	Endangered	No Effect	No
Northern Sea Otter – Southwest Alaska Distinct Population Segment (*Enhydra lutris kenyoni*)	Threatened	No Effect	No

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Acronyms and Abbreviations

BA	Biological Assessment
BBMA	Bristol Bay Management Area
BMH	beach manhole
BSAIMA	Bering Sea Aleutian Islands Management Area
BU	branching unit
CFR	Code of Federal Regulations
CLS	Cable Landing Station
CV	Coefficient of Variation
dB	decibel
dB re 1 μPa rms	decibels referenced to a pressure of 1 microPascal root mean square
DP	dynamic positioning
DPS	Distinct Population Segment
ESA	Endangered Species Act
FOC	fiber-optic cable
FR	Federal Register
ft	foot/feet
ft^3	cubic foot/feet
FTTP	Fiber to the Premise
hr	hour(s)
HTL	high tide line
Hz	hertz
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
KMA	Kuskokwim Management Area
m	meter(s)
mi	mile(s)
mi^2	square mile(s)
MLW	mean lower low water
NAD 83	North American Datum of 1983

nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NTIA	National Telecommunications and Information Administration
OCS	Outer Continental Shelf
OHW	ordinary high water
PCE	Primary Constituent Element
PLGR	pre-lay grapnel run
Project	Airraq Network
PSO	Protected Species Observer
PTS	permanent threshold shift
ROV	remotely operated vehicle
TL	transmission loss
TTS	temporary threshold shift
Unicom	Unicom, Inc.
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
YK	Yukon-Kuskokwim

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1 Introduction

Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim (YK) Delta as part of the Airraq Network (Project). In doing so, Unicom will extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

The YK Delta is among the world's largest river deltas, with Bethel being its most populous community. The town of Bethel has a population of 6,500 individuals and lies approximately 68 river miles (mi) up the Kuskokwim River from the Kuskokwim Bay on its northern bank. The other nine communities are geographically isolated throughout the region. No roads connect the towns within the Lower YK Delta or with the rest of the state, and they are only accessible by boat or plane. All 10 communities that the Project proposes to service are home to the Yup'ik, with at least 74 percent of these communities' populations being Alaska Native.

The Project will provide a long-term solution, connecting these 10 underserviced communities within western Alaska with high-speed broadband connectivity. The Project is designed to overcome the region's harsh elements while creating a more efficient and modern way for western Alaska to connect with the rest of the world. The Project is composed of both marine and terrestrial components that have the potential to occur within habitat for Endangered Species Act (ESA) listed species managed by the U.S. Fish and Wildlife Service (USFWS).

This Biological Assessment (BA) has been prepared to address the Project's potential impacts on species listed as threatened or endangered under the ESA and is intended to fulfill the requirements for informal consultation with the USFWS under Section 7 of the ESA. The objective of this BA is to ensure that the Project, as an action authorized by the National Telecommunications and Information Administration (NTIA) and U.S. Army Corps of Engineers (USACE), does not jeopardize the continued existence of an endangered or threatened species, or adversely modify critical habitat of federally listed species.

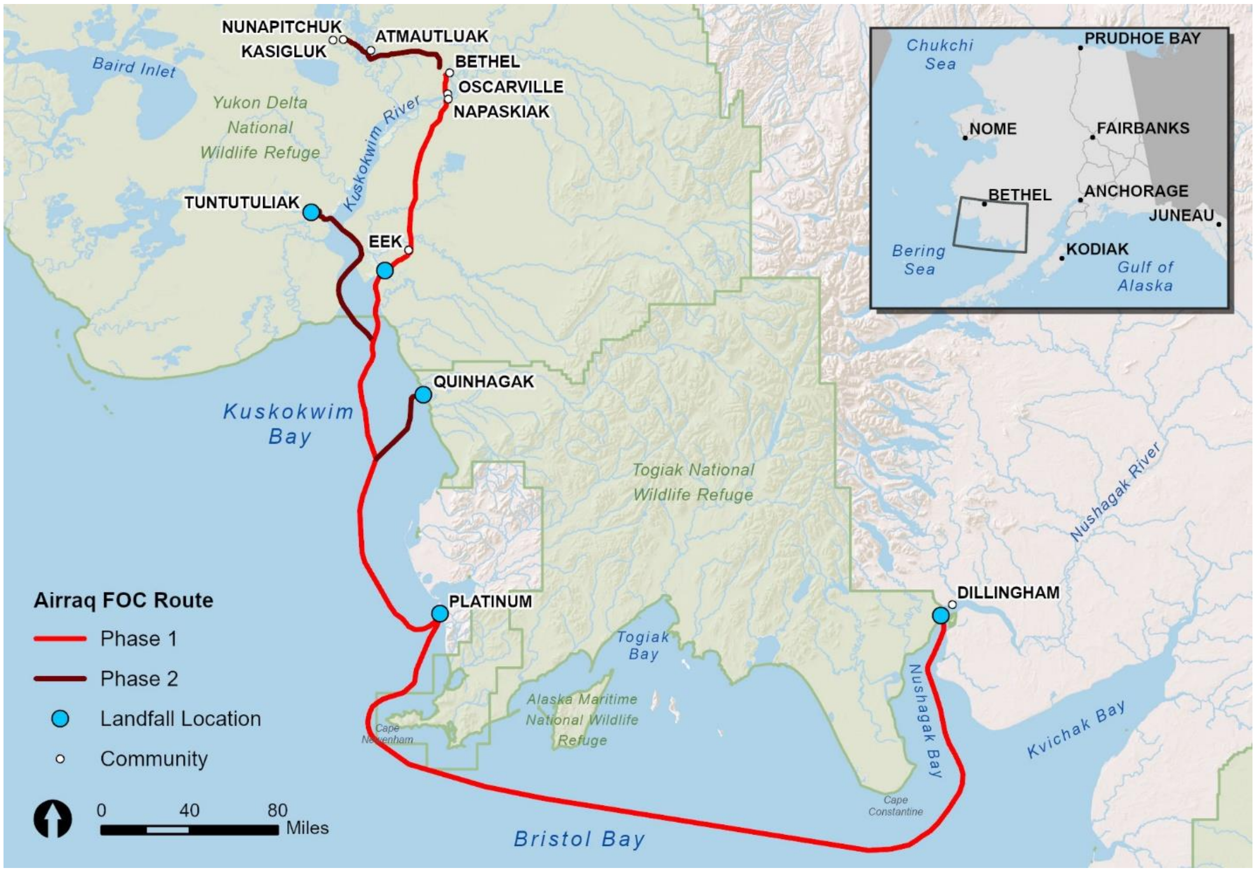
1.1 Background and Consultation History

This BA is the initial request for Section 7 ESA consultation with USFWS for this Project. A separate BA has been prepared for Section 7 ESA consultation with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS).

2 Project Description

The Project will consist of two phases. Figure 2-1 provides an overview of the full Project.

Figure 2-1. Project Vicinity



Phase 1 will combine a 443-mi FOC build and Fiber to the Premise (FTTP) last mile network[1] upgrades within five communities: Platinum, Eek, Napaskiak, Oscarville, and Bethel. For the construction of Phase 1, Unicom has partnered with Bethel Native Corporation, which has been awarded a $42 million grant from the NTIA Tribal Broadband Connectivity Program.

Using a middle mile network[2], Unicom will interconnect with an FOC and microwave network within Dillingham to begin the Project. Phase 1 has an extensive marine component, extending FOC along the ocean floor from existing Unicom facilities within Dillingham to Platinum. This segment will be a 24-strand submarine FOC with a cable landing for signal regeneration in Platinum. From Platinum, the cable will continue along the marine route, paralleling the Kuskokwim Bay shoreline until it reaches a landfall location within the Eek River, immediately upstream of its confluence with the Kuskokwim River. This will begin the overland route to Eek. From Eek, the FOC route will continue the overland route to Napaskiak, where it will cross the

[1] Last mile network refers to any broadband infrastructure that connects directly to an end-user location.
[2] Middle mile network refers to any broadband infrastructure that does not connect directly to an end-user location.

Kuskokwim River to Oscarville and end within Bethel. The Project will also establish a second FOC delivery technology, FTTP, within connected communities. FTTP local network access will provide high-speed broadband access to residences and businesses within the communities of Platinum, Eek, Napaskiak, and Oscarville. The existing hybrid fiber-coaxial access networks within Bethel will be upgraded to help facilitate broadband distribution within the community.

Phase 2 will include installation of 105 mi of FOC, which will be interconnected with Phase 1 by combining middle mile network transport segments and FTTP installation in five additional communities: Quinhagak, Tuntutuliak, Atmautluak, Kasigluk, and Nunapitchuk. This portion of the Project has been awarded federal grant funding from the U.S. Department of Agriculture through the Rural Utilities Service ReConnect Grant.

Phase 2 will build off the Phase 1 FOC route with both terrestrial and submarine components. Cable branching units (BU) originating from the Phase 1 FOC will connect the marine route within Kuskokwim Bay to the communities of Quinhagak and Tuntutuliak. A separate overland route will connect FOC from Bethel to Atmautluak and on to Nunapitchuk before it terminates in Kasigluk. Each community in Phase 2 will construct a FTTP network to bring high-speed broadband to the community.

Project activities include the following components:

- **Landfall Route:** This route involves installation of broadband submarine FOC at landfall locations between mean low water (MLW) and beach manhole (BMH) locations. BMHs are excavated manholes that provide connection points between submarine cable and either lightweight submarine or terrestrial cable. Landfall components between MLW and BMH locations are trenched.
- **Marine Route:** This route involves installation of broadband submarine FOC within marine environments below MLW, including segments extending from Kuskokwim Bay to Apogak and Tuntutuliak landfall locations. These segments are either trenched or laid on the seafloor.
- **Overland Route:** This route involves installation of broadband FOC along terrestrial landscapes, including wetlands, inland lakes, and stream crossings. Lightweight submarine cables will be used where crossing wetlands, and armored submarine cable will be used when crossing rivers. Each overland route segment will terminate at Connection Vaults (CV). CVs facilitate the splice between overland and terrestrial cable prior to connection with prefabricated Cable Landing Stations (CLSs) or existing utility poles.
- **Community Shore Route:** This route is the terrestrial FOC segment that connects BMHs or CVs with CLSs. CLSs house the infrastructure needed to convert incoming terrestrial cable to FTTP cable.
- **FTTP Route:** This route will bring cable from the CLSs, either trenched or attached to existing utility poles, to residential and commercial users. This segment will terminate the FOC route within each community.

Table 2-1 provides a Project summary. For the purposes of this BA, Phases 1 and 2 will be evaluated as a single Project.

Table 2-1. Project Summary

Project Component	Phase 1 Total Length (mi)	Phase 2 Total Length (mi)	Project Total Length (mi)	Phase 1 Associated Facilities	Phase 2 Associated facilities
Marine (below MLW)	328.4	62.1	390.5	None	None
Landfall (MLW to BMH)	0.7	0.1	0.8	BMH: 3	BMH: 2
Overland	49.2	27.7	76.9	CV: 7	CV:4
Community Shore Routes	1.2	0.4	2.0	CLS: 6	CLS: 5
FTTP	63.1	15.1	78.2	None	None
Total	**442.6**	**105.4**	**548.0**	**—**	**—**

2.1 Construction

The following sections describe the construction methods and equipment used for the Landfall Route, Marine Route, Overland Route, Community Shore Route, and FTTP. Unicom anticipates initiating terrestrial construction activities in fall 2023, conducting marine construction activities in 2024, and completing the Project in 2026. The anticipated construction schedule is provided in Section 2.2.

2.1.1 Landfall Locations

This section describes operations that occur between MLW and each landfall BMH. Landfall construction will occur concurrently with marine construction. Table 2-2 provides each Project landfall location.

Table 2-2. Project Landfall Locations

Landfall Location	Latitude (NAD 83)	Longitude (NAD 83)
Dillingham	59.003510°	-158.535688°
Platinum	59.010177°	-161.821189°
Apogak (Eek)	60.148601°	-162.183601°
Quinhagak	59.742126°	-161.929299°
Tuntutuliak	60.338149°	-162.662662°

Note: NAD 83 = North American Datum of 1983

At each landfall, the cable will be trenched within the shoreline between MLW and the BMH. A BMH is an enclosed structure that houses the splice between the incoming submarine cable and outgoing lightweight submarine or terrestrial cable that will connect to existing Unicom facilities. Each BMH will measure 3 ft by 4 ft by 4 ft, or 48 cubic ft (ft^3). Excavation dimensions may vary by shoreline, bank contour, and substrate but will not exceed 5 ft by 5 ft by 5 ft, or 125 ft^3. BMHs are positioned above the high tide line (HTL). Landfall trenching will be conducted with either a rock saw or backhoe. Rock saw trenches are typically 6 inches wide and 8 inches deep, while backhoe trenches are 3 feet (ft) wide and 3 ft deep. Excavated material from trench construction and excavation will be side cast temporarily (i.e., for less than 1 week) into wetlands and underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable.

While conducting landfall construction, care will be taken to protect the shoreline from future erosion. Additionally, best practices will be employed to address stormwater runoff concerns.

For all intertidal work (MLW to HTL), construction operations will occur only during low tide. When not constructing on shorelines with firm sediments such as large boulders, heavy equipment will be placed on mats to protect the substrate from slumping and erosion. Alterations to shorelines will be temporary.

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
- Landing craft similar to the marine vessel *Unalaq*

2.1.2 Marine Route

Marine portions of the Project route include cable-laying operations in waters below MLW. Both phases of the Project have marine components. Phase 1 will construct the primary marine cable route, while Phase 2 will build off Phase 1 with two BUs.

The path chosen for the marine routes were identified through desktop studies and a marine route benthic survey. These engineering and field practices assist in selecting routes that provide considerations for environmental and anthropogenic forms of disturbance on the cable system that may lead to cable fault. The International Cable Protection Committee has identified fishing activities as the primary cause for submarine cable faults and repairs. As such, the proposed route avoids high-impact fishing grounds where possible. When ground fishing areas cannot be avoided, the cable will be buried. Nearshore 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/turbid currents, and other geological hazards.

The marine route will rely on four or more vessels for construction operations. The vessel used for cable-laying operations will be dependent on local water depth, location, and cable-laying method. A cable ship (Figure 2-2) will be used for cable-laying operations within areas of the marine route with water depths exceeding 40 ft and will rely on dynamic positioning. Project elements in waters shallower than 40 ft will be conducted using either a tug and barge, a small landing craft stored on the cable ship, or a separate operation using an Alaska Vessel of Opportunity. Additionally, landfall locations will be assisted by a landing craft similar to the marine vessel *Unalaq*. These vessels will have a shallow draft, making shallow waters and landings accessible feasible. Segments of the cable routed into the Kuskokwim River will be laid with a cable-laying barge and tug when they reach a depth of 40 ft within Kuskokwim Bay. Tug and barge operations will continue for these segments until they reach a landfall location within

tributaries of the Kuskokwim River. The tug and barge will lay lightweight submarine cable while all other marine portions of the route will use either a single armor or double armor submarine cable. The submarine cable, measuring 1 inch in diameter, is constructed from benign materials and will not carry an electrical current.

Figure 2-2. *C.S. IT Intrepid*, Typical Cable Laying Ship

For marine components, the cable will either be laid on top of the seafloor or buried within a trench (i.e., trenching). Cable will be laid on the seafloor within areas identified as low risk to cable disturbance or when traversing seafloor substrates that do not allow for trenching. When placing cable on the seafloor, bathymetric conditions will 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, trenching will be used where there is significant risk of outside disturbance to the cable. Local reroutes or cable armoring will be implemented in high risk areas where the substrate does not allow for trenching.

Prior to trenching operations on the seabed, a pre-lay grapnel run (PLGR) will be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation will 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 along the route over the seabed. Any debris recovered by the grapnel will be discharged ashore upon completion of the operations and disposed in accordance with local regulations. If debris cannot be recovered, then a local re-route will be planned to avoid the debris. The PLGR operation will be conducted to industry standards employing towed grapnels, and the type of grapnel will be determined by the nature of the seabed.

Trench burial within waters deeper than 40 ft will be conducted using a cable plow. Trenching within deep sea segments will protect the FOC against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow

will be pulled along the seafloor by a tow wire connected to the cable ship. The cable will 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 will exit the lower aft end of the share blade, and the sediments will immediately collapse on top of the cable, behind the plow. This form of burial will eliminate side cast because the excavated substrate will be returned to the trench immediately after the cable is laid. As a result of the immediate burial, absence of side cast, and narrow excavation footprint, cable plow trenching incurs only minimal and temporary impacts.

In waters shallower than 40 ft, trenching will take place in areas where cable protection from other environmental conditions, such as surf action and ice scour, are needed. At these depths, 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 water used for jetting will be supplied from the surface by high pressure hoses. This system will allow for jetting pressure and flow rates to be manipulated based on local conditions. The pressurized water will be focused on the seafloor, liquifying the substrate. The cable will then sink within the trench without side cast. The elimination of side cast and narrow excavation footprint results in limited and temporary impacts. The jet sled will be accompanied by divers who will monitor trenching performance and assist in operations. Figure 2-3 shows a typical jet sled.

Figure 2-3. Typical Jet Sled

Phase 1 marine portions of the Project include sections of the route between the Dillingham MLW and Platinum MLW, followed by an additional segment between the Platinum MLW and MLW at the Apogak Landfall site. To reach that landing site, the cable will be routed up the Kuskokwim River and into the Eek River. The cable will be surface laid across the riverine areas so sediment transport can passively bury the cable.

Marine elements of Phase 2 consist of two BUs extending from the Phase 1 marine route. One of the BUs will supply submarine cable to Quinhagak, while the other will connect to Tuntutuliak. To reach Tuntutuliak, the cable will enter the Kuskokwim River and travel up the Kinak River. The cable will be surface laid within the thalweg of these two rivers. Sediment transport is

anticipated to self-bury the cable within the substrate. The marine portion of the BU will terminate when it reaches Tuntutuliak, above tidal influence at ordinary high water (OHW). The nearshore construction methods used at MLW at the other locations will be used at OHW adjacent to Tuntutuliak.

Upon completion of cable laying operations, a post-lay inspection and burial will be conducted using a ROVJET 207, or similar remotely operated vehicle (ROV). The purpose of the post-lay inspection and burial is to inspect portions of the cable ship route where laying operations may have encountered difficulties. These difficulties include plow failure, unplanned cable repair, uncontrolled cable payout, or other unplanned events. Where burial corrections need to be made, the ROV will use jet burial, similar to that of the jet sled, and trench the cable. The ROV will be operated remotely from the cable-laying ship; pulsed sounds will be generated from the ROV, and cameras will be used for positioning and orientation.

2.1.3 Overland Route Operations

The overland route is defined as segments of the FOC route that both begin and terminate within a BMH or CV. The overland route between Bethel and Oscarville will use pre-existing riser poles and other infrastructure; therefore, it will incur no additional surface impacts. The overland route between Nunapitchuk and Kasigluk will be conducted on existing infrastructure and will not result in surface impacts.

Inland communities not collocated with a marine landfall location will use a CV in lieu of a BMH. CVs house the splice between incoming lightweight submarine cable and outgoing terrestrial cable. Excavation dimensions and considerations for BMHs will be the same for CVs.

Overland route segments will be installed in the winter months, when the substrate is frozen, to minimize ground disturbance. The frozen ground helps protect vegetation while also being stable enough to support heavy equipment. Wetland segments will use a lightweight submarine cable provided in 20,000-foot segment spools that are towed by light tracked vehicles.

When crossing overland sections, the cable will either be laid across the ground surface or trenched. Placing the cable directly on the ground significantly reduces wetland impacts and is, therefore, the preferred installation method. The cable will be 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 riser 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 trenching activities will be conducted by a rock saw. Overland routes will be made between the locations shown in Table 2-3.

Table 2-3. Overland Route Surface Impacts

FOC Route Segment	Cable Surface Laid on Uplands (mi)	Cable Trenched in Uplands (mi)	Cable Surface Laid on Wetlands and Waterbodies (mi)	Cable Trenched in Wetlands (mi)	Cable Attached to Existing Aerials (mi)
Apogak BMH to Eek Village South CV	—	—	6.8	0.5	—
Eek Village North CV to Napaskiak CV	—	<0.1	34.9	1.3	—
Napaskiak CV to Oscarville CV	—	<0.1	0.9	0.1	—
Oscarville CV to Bethel South CV	—	—	—	—	4.7
Bethel CV to Atmautluak East CV	—	<0.1	19.7	0.6	—
Atmautluak West CV to Nunapitchuk CV	—	—	6.7	0.2	—
Nunapitchuk CV to Kasigluk CV	—	—	—	—	—
Quinhagak BMH to Quinhagak CV	—	—	—	0.5	—
Project Total	**—**	**<0.1**	**69.0**	**3.2**	**4.7**

The process of laying cable within wetlands will begin by removing deep snow from the cable route. Buried cable segments through wetlands will then be excavated and the cable laid directly within the trench. Side cast from trenching into wetlands will be underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable, and will be replaced when feasible (i.e., within less than 1 week). Trench depth will be targeted at 8 inches but will vary with the terrain. However, trench depth will always be contained within the organic vegetation mat, which balances allowing the trench to heal while providing sufficient protections for the cable.

When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface that will allow it to passively drop into the waterbody during spring break-up. When the cable sinks into the water body, the weight of the cable will allow it to self-bury within aquatic bed sediments. Submarine cable will be used to cross streams and rivers. The cable will be spliced with the overland route cable and buried into each stream bank below OHW. Best management practices will be used to avoid bank erosion and create drainage paths. Side cast will be replaced after the cable is laid (i.e., within less than 1 week).

Segments crossing major rivers (i.e., Pikmiktalik and Johnson Rivers) will use a landing craft to lay double armored submarine cable across the river. Sediment transport will passively bury the cable. Additionally, the cable will be equipped with an outer plastic covering to avoid frazil ice buildup. Care will be taken to position the crossings on stable banks to provide erosion protection.

During construction, heavy equipment will be placed on geotextile mats. The position of the laid cable will be recorded with a survey quality Global Positioning System. Post-lay inspection for terrestrial components will be conducted following snow and ice melt. Any cable left suspended after melt will be repositioned so as not to be hazardous for humans or animals. Cable

repositioning will be done manually by moving the installed slack cable accordingly. If needed, the cable can be pinned to the ground using small duckbill anchors that will be installed using a hammer and drive pin. Cable left on the vegetation will both sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Helicopter and walking inspections will be conducted on an annual basis to monitor erosion and bank failure.

In general, equipment used across overland routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Rock saw
- Chain trencher or cable plow (optional)
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Winch or turning sheave
- Small utility boat for larger rivers
- Splicing equipment, small genset, and splicing tent

2.1.4 Community Shore Routes

Community shore routes include segments of FOC between each community's BMH or CV and the CLS. The BMHs and CVs located adjacent to communities will house the splice between overland or marine route cable and terrestrial cable. The terrestrial cable will extend beyond these splicing houses to a CLS.

All cable segments within community shore routes will be trenched or attached to existing electrical distribution poles. Trenching will be excavated using backhoes and conventional trenching methods. When possible, the cable will be routed adjacent to existing roads. Excavated material will be temporarily side cast (i.e., for less than 1 week) next to the trench and used to bury the cable. Backhoes and standard trenching techniques will be used to re-grade the BMH or CV footprint as well as all trenched areas to original pre-existing contours. The trenching will employ best management practices to prevent erosion and water discharge.

Where possible, each CLS facility will be constructed adjacent to existing Unicom facilities. CLSs will be built on gravel pads that are 50 ft wide, 60 ft long, and 5 ft deep. Figure 2-4 shows a typical CLS facility.

Figure 2-4. Typical CLS Facility

In general, equipment used for community shore routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.1.5 FTTP

The way fiber is routed to the end user is dependent on what existing infrastructure is in place, if any. FTTP begins at the CLS, which houses the FTTP local access distribution equipment. FTTP is then routed throughout the community, connecting to local nodes, where splitters enable branching into feeder lines that deliver connectivity to the premise locations.

FTTP will be distributed throughout communities by trenching or attaching cable to existing utility poles. Unicom will not construct any new utility poles for the Project but will instead use existing utility poles where they are present. When utility poles are not present, the FTTP route will be trenched. When possible, this will occur along existing roads and rights-of-way. FTTP trenching will be conducted by a backhoe and standard trenching practices.

Upon construction completion, all trenched areas will be re-graded to original pre-existing contours. No excess material is anticipated to be produced that will require disposal.

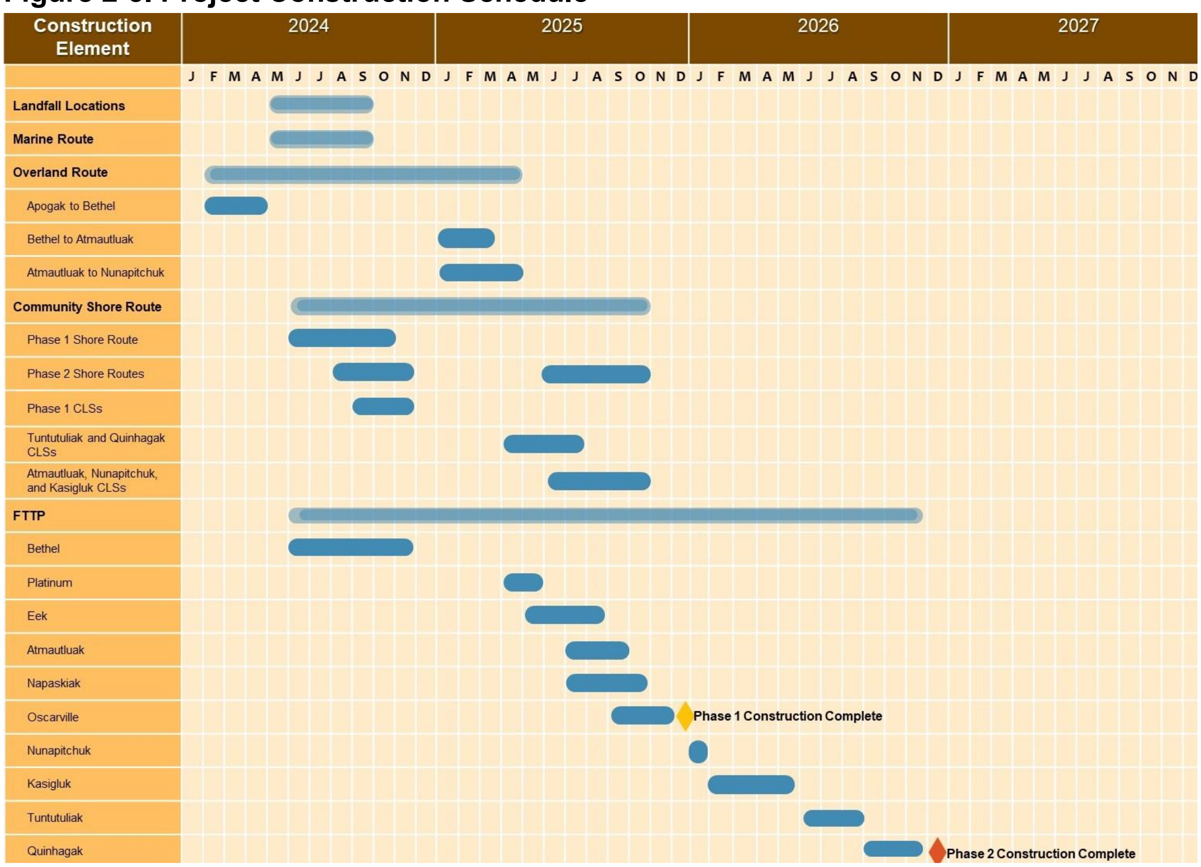
In general, equipment used for FTTP includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.2 Schedule

Project construction is anticipated to begin in 2024 and end in 2026 (Figure 2-5). It is anticipated that Phase 1 construction will be completed in winter 2024, and Phase 2 construction will be completed in spring 2026. Project construction schedule elements are detailed in Figure 2-5.

Figure 2-5. Project Construction Schedule



2.3 Avoidance and Minimization Measures

As part of the proposed Project, Unicom has committed to the following measures intended to avoid and minimize adverse impacts on ESA-listed species and their habitat:

- Vessels will be traveling at speeds less than 5 knots during cable laying operations, PLGR, and post-lay inspection and burial.
- Cable routing has been selected to avoid concentration areas where eiders and albatross occur to reduce potential behavioral or disturbance effects.
- The overland cable routes will be laid or trenched in winter, when protected bird species are not present onshore.
- Artificial lighting will be reduced or shielded so it is not projected skyward to reduce attracting birds.
- The cable-laying vessels will not discharge materials into the ocean that may attract seabirds, including short-tailed albatross.
- Bird strikes with vessels will be unlikely since marine cable-laying activities will occur in May through September, when long daylight hours occur.
- Prior to the start of cable-laying operations, Protected Species Observers (PSO) will clear the disturbance zone for a period of 30 minutes when activities have been stopped for longer than a 30-minute period. Clearing the zone means no marine mammals have been observed within the zone for that 30-minute period. If a marine mammal is observed within the zone, activities may not start until it:
    - Is visually observed to have left the zone; or
    - Has not been seen within the zone for 15 minutes in the case of pinnipeds, sea otters (*Enhydra lutris*), and harbor porpoises (*Phocoena phocoena*); or
    - Has not been seen within the zone for 30 minutes in the case of cetaceans.
- Consistent with safe navigation, Project vessels will avoid traveling within 3 nautical miles (nm; 5.6 kilometers [km]) of any of Steller sea lion (*Eumetopias jubatus*) rookeries or major haulouts (to reduce the risks of disturbance of Steller sea lions and collision with protected species).
- If travel within 3 nm (5.6 km) of major rookeries or major haulouts is unavoidable, transiting vessels will reduce speed to 9 knots (16.6 km/hour [hr]) or less while within 3 nm (5.6 km) of those locations. Vessels laying cables are already operating at speeds less than 3 knots (5.6 km/hr).
- The transit route for the vessels will avoid known Steller sea lion biologically important areas and designated critical habitat to the extent practicable. Vessels may not be operated in such a way as to separate members of a group of marine mammals from other members of the group.
- Vessels should take reasonable steps to alert other vessels in the vicinity of whale(s), and report any stranded, dead, or injured listed whale or pinniped to the Alaska Marine Mammal Stranding Hotline at 877-925-7773.
- Although take is not authorized, if a listed marine mammal is taken (e.g., struck by a vessel), it must be reported to NMFS within 24 hours. The following will be included when reporting take of a listed species:

  - Number of listed animals taken
  - Date, time, and location of the take
  - Cause of the take (e.g., vessel strike)
  - Time the animal(s) was first observed and last seen
  - Mitigation measures implemented prior to and after the animal was taken
  - Contact information for PSO, if any, at the time of the collision, ship's pilot at the time of the collision, or ship's captain.

Unicom will train crew members as PSOs on the cable-laying barge and ship to be on watch during all daylight hours when traveling at speeds greater than 5 knots (9.3 km/hr). Crew member PSOs will:

- Be trained in marine mammal identification and behaviors.
- Have no other primary duty than to watch for and report on events related to marine mammals, when observing.
- Work in shifts lasting no longer than 4 hours without breaks, and will not perform duties as a PSO for more than 12 hours in a 24-hour period (to reduce PSO fatigue).
- Have the following to aid in determining the location of observed listed species, take action if listed species enter the exclusion zone, and record these events:
  - Binoculars, range finder, Global Positioning System, and compass
  - Two-way radio communication with construction foreman/superintendent
- PSOs will record all mitigation measures taken to avoid marine mammals observed using NMFS-approved observation forms. Reported actions on sighting reports will include time, location, the vessels position, speed, and corrected bearing.
- Reports will be sent to NMFS at the end of Project activities.

Unicom has also committed to the following measures intended to reduce the potential for spills of hazardous substances and implement plans for spill response:

- All fuel and hazardous substances used by the Project will be handled and stored on site in compliance with state and federal regulatory guidance. All fuels and chemicals will be stored in appropriate primary containment areas. Secondary containment areas will be designed in compliance with all applicable permits and regulations.
- Fuels and other products will be transported to the action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.

3 Action Area

The action area defined by the ESA includes all areas directly or indirectly affected by the proposed action and not merely the immediate area involved in the action (50 Code of Federal Regulations [CFR] 402.02). The action area is based upon the maximum geographic extent of the physical, chemical, and biological effects resulting from the Project, including direct and indirect effects. The action area is defined differently for each Project component and is composed of separate underwater and in-air portions. The Project action area is shown in Figure 3-1.

Underwater sound propagation depends on many factors, including sound speed gradients in water, depth, temperature, salinity, and bottom composition. Additionally, the characteristics of the sound source such as frequency, source level, type of sound, and depth of the source, will also affect propagation. The terms in the spreading loss calculation were rearranged to estimate distances to thresholds:

$$R = D*10^{(TL/TLc)}$$

Where

- Transmission Loss (TL) is the difference between the reference sound level in decibels referenced to a pressure of 1 micro Pascal root mean square (dB re 1 µPa rms) and the harassment threshold in dB re 1 µPa rms;
- TL_c is the transmission loss coefficient;
- R is the estimated distance to where the sound level is equal to the harassment threshold; and
- D is the distance from the sound source at which the reference sound level was measured.

A cable-laying landing craft or barge and tug will be used to install cable in waters 40 ft (12 meters [m]) or shallower within Kuskokwim Bay, the Kuskokwim River, and Kuskokwim River tributaries. The distance to the 160 dB re 1 µPa rms threshold for either vessel was estimated using measurements taken from the tug, *Leo*, pushing a full barge, *Katie II*, near the Port of Alaska and recorded 149 dB re 1 µPa rms at 328 ft (100 m) when the tug was using its thrusters to maneuver the barge during docking. Assuming spherical spreading transmission loss (20 log), the distance to which noise will attenuate to ambient is calculated to be 92 ft (28 m) for the cable-laying landing craft or barge and tug.

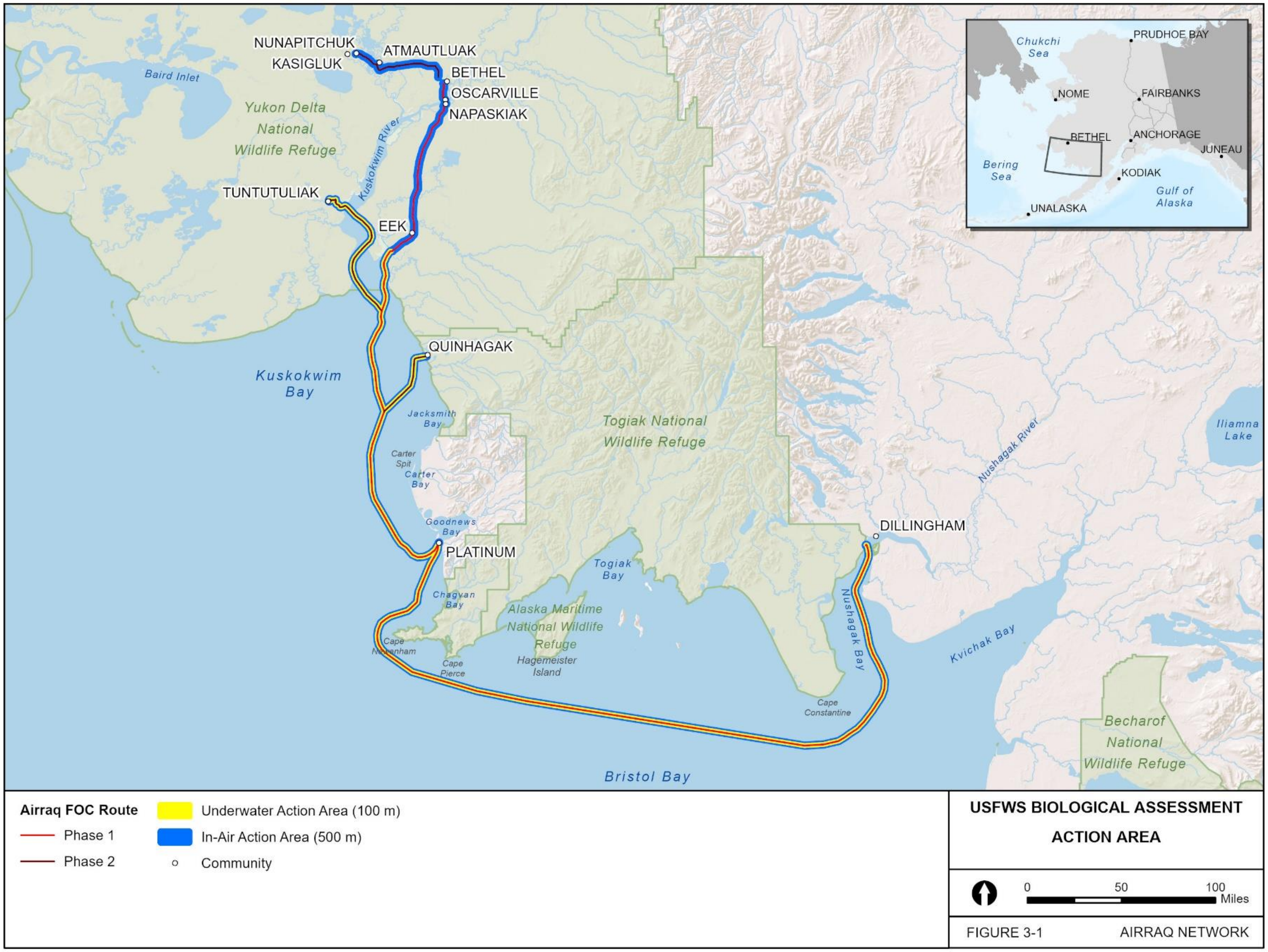
For the cable-laying ship installing cable for all waters except those listed above, the distance to the 160 dB re 1 µPa rms threshold was estimated using measurements taken from a vessel of similar size and class within the Chukchi Sea. In 2011, Statoil conducted geotechnical coring operations within the Chukchi Sea using the vessel *Fugro Synergy*. Measurements were taken using bottom founded recorders at 164 ft (50 m), 328 ft (100 m), and 0.6 mi (1 km) away from the borehole while the vessel used dynamic positioning thrusters. Sound levels measured at the recorder 0.6 mi (1 km) away ranged from 119 dB re 1 µPa rms to 127 dB re 1 µPa rms, with most acoustic energy in the 110 to 140 hertz (Hz) range (Warner and McCrodan 2011). A sound

propagation curve equation fit to the data and encompassing 90 percent of all measured values during the period of strongest sound emissions provided an estimate that sound levels will drop below 160 dB re 1 μPa rms at 20 ft (6 m).

The underwater portion of the action area is defined as the cable route plus a buffer of 328 ft (100 m) on each side of the route. This distance is conservative and, therefore, larger than the calculated distance to the potential acoustic harrassment disturbance threshold. This same rationale was used to inform tug and barge cable-laying operations within the shallow waters of Unalaska, Akutan, King Cove, Sand Point, Chignik Bay, and Larsen Bay for the Unicom AU-Aleutian Fiber Optic Cable Installation Project (USFWS Consultation #07CAAN00-2021-I-0196).

The in-air portion of the action area applies to the marine and terrestrial cable-laying route. This area is a 1,640-ft (500-m) buffer of the marine and terrestrial cable-laying route, and is the potential disturbance area due to the presence of the cable-laying vessel and terrestrial cable-laying equipment (Figure 3-1). This distance was used for the potential disturbance area from the presence of the vessel for the Unicom AU-Aleutian Fiber Optic Cable Installation Project (USFWS Consultation #07CAAN00-2021-I-0196).

Figure 3-1. Project Action Area



4 Species Descriptions

A list of ESA-listed species or populations that may be present within or near the action area was requested and received from the USFWS on February 2, 2023 (Appendix A). Species listed under the ESA that are known or suspected to occur within the action area include Steller's eider (*Polysticta stelleri*), spectacled eider (*Somateria fischeri*), short-tailed albatross (*Phoebastria albatrus*), and the Southwest Alaska Distinct Population Segment (DPS) of northern sea otter (*Enhydra lutris kenyoni*). No designated critical habitat for any of these species is located within the action area.

A summary of the existing biological information for each species is presented below, including distribution and life history, species status, presence within the action area, and critical habitat.

4.1 Steller's Eider

4.1.1 Distribution and Life History

The Steller's eider (*Polysticta stelleri*) is a sea duck and the smallest eider species, with behavioral and physical traits similar to dabbling duck species. Three breeding populations of Steller's eiders exist in the world, two of which occur within Arctic Russia, one within Alaska (USFWS 2021a). Nearly all Steller's eiders breed in eastern Russia and may number more than 128,000 individuals (ADF&G 2022, Hodges and Eldridge 2001).

Steller's eiders breed along the Arctic coast of Russia from the Yamal Peninsula to the Kolyma Delta and along the Arctic Coastal Plain of Alaska, primarily near Utqiaġvik, with a very small subpopulation also breeding on the Yukon- Kuskokwim Delta (Amundson et al. 2019, BirdLife International 2017, USFWS 2002, USFWS 2019b). Birds typically arrive to the breeding grounds by late May to June and depart in August (Fredrickson 2020, Kondratiev 1997). Eggs hatch in late June. Males typically depart from the breeding grounds beginning in late June or early July. Females that fail in their breeding attempts may remain in the Utqiaġvik area into late summer. Females and fledged young depart the breeding grounds in early to mid-September. In Alaska, Steller's eider nests on tundra habitats often associated with polygonal ground both near the coast and at inland locations (e.g., Quakenbush et al. 2004); nests have been found as far as 56 mi (90 km) inland (USFWS 2002). Emergent species of Carex and Arctophila provide important areas for feeding and cover.

After breeding, Steller's eiders move to marine waters to molt. Molting occurs throughout Southwest Alaska but is concentrated at four areas along the northern side of the Alaska Peninsula (USFWS 2002). Thousands of this species also use the Kuskokwim Shoals to molt (Martin et al. 2015, USFWS 2001a). Fall migration surveys conducted by the Bureau of Land Management have also recorded small numbers of Steller's eiders in mixed-species flocks within Carter Bay, the waters off Carter Spit, and Jacksmith Bay, to the southeast of the Kuskokwim Shoals (Seppi 1997). Individuals have also been recorded molting at St. Lawrence and Nunivak Islands, as well as along the coast of Bristol Bay (Martin et al. 2015). The estuaries and lagoons along the Alaska Peninsula are also used by this species for staging during fall migration.

The molting period occurs from approximately late July to late October (USFWS 2002). Molting areas are near breeding areas and tend to be shallow areas with eelgrass (*Zostera marina*) beds, intertidal sand flats, and mudflats (USFWS 2002). In these areas, Steller's eiders feed on marine invertebrates such as crustaceans and mollusks (e.g., Petersen 1980, 1981).

From approximately November through April, many Steller's eiders winter within the shallow, nearshore waters along the northern side of the Alaska Peninsula; however, many also disperse to the southern side of the Alaska Peninsula; the Aleutian Islands; and the western Gulf of Alaska, including Kodiak Island and Lower Cook Inlet (Martin et al. 2015, USFWS 2002). Steller's eiders, from both Alaska and eastern Russia, migrate to these areas for wintering as well as molting (Rosenberg et al. 2016). Wintering habitat includes shallow lagoons with extensive mudflats typically less than 30 ft (10 m) deep; however, satellite-tracked birds were found to frequently use deep bays and water up to 98 ft (30 m) almost exclusively at night (Fredrickson 2001; Martin et al. 2015). During winter months, this species feeds on marine invertebrates such as crustaceans, small mollusks, and gastropods that are closely associated with eelgrass, sea lettuce (*Ulva*), and brown seaweed (*Fucus)* habitat (Frederickson 2020).

Spring migration begins approximately mid to late April and typically continues into June (Fredrickson 2020). Most of the worldwide population of Steller's eider stage and migrate along the northern side of the Alaska Peninsula (Larned 2008, USFWS 2001a). They then cross western Bristol Bay and spend days to weeks staging in northern Kuskokwim Bay and small bays along its perimeter (Larned 2008, Rosenberg et al. 2016, USFWS 2001a). During this time, flocks of this species, numbering in the tens of thousands, congregate within the Kuskokwim Shoals, an extremely important staging area, prior to flying northward (USFWS 2001a). Some will also stage southeast of the Kuskokwim Shoals at Chagvan Bay, at Goodnews Bay, and within the waters offshore from Goodnews Bay northward to Jacksmith Bay (ADF&G 2020a, National Audubon Society 2023, Rosenberg et al. 2016). Flocks have also been recorded nearby within Carter Bay, the waters off Carter Spit, and Jacksmith Bay (ADF&G 2020a, Seppi 1997). Flocks of staging eiders also use the southern coast of Nunivak Island during spring migration (Larned et al. 1994, as cited in USFWS 2001a). Migrating eiders then travel northward through the Bering Strait between approximately mid-May to early June (Bailey 1943 and Kessel 1989, as cited in USFWS 2001a). Some subadults may stay behind within their wintering or migration route locations (USFWS 2001a). Staging eiders typically feed and rest within and near lagoons and shoals rich in benthic invertebrate prey and generally less than 33 ft (10 m) in depth (Larned 2012, USFWS 2002).

During the breeding season, non-breeding individuals have been documented using the nearshore waters within the Gulf of Anadyr and Amguema River (both in Russia), as well as the Kuskokwim Shoals in the eastern Bering Sea of Alaska and Hagemeister Island in northern Bristol Bay (Rosenberg et al. 2016). Non-breeding birds were found to stay for approximately 57 days on average (Rosenberg et al. 2016).

4.1.2 Species Status

The Alaska-breeding population of Steller's eider is currently listed as **threatened** under the ESA (USFWS 2022a) and was first listed in July 1997 due to the reduced number of breeding birds and suspected reduction in the breeding range in Alaska (USFWS 1997, 2019a). The

estimates of the breeding population within Alaska averaged 4,800 pairs between 1990 and 1998 (Fredrickson 2001) but is now thought to number less than 500 individuals (USFWS 2011, Stehn et al. 2013). The worldwide population of Steller's eider is thought to number approximately 130,000 to 150,000 individuals (BirdLife International 2022). Threats to the Alaska-breeding population include ingestion of lead, shooting, collisions with human structures, human disturbance in nesting areas, nest predation, and changes to the ecological community (USFWS 2021a).

4.1.3 Presence within Action Area

The Steller's eider's range overlaps with the action area (USFWS 2022b; Figure 4-1).

The in-air portion of the action area overlaps with Goodnews Bay, near the Platinum BMH. Aerial surveys conducted by USFWS from 1992 to 2012 have recorded concentrations of Steller's eiders numbering in the hundreds to thousands at Goodnews Bay during spring and summer (ADF&G 2020a, Larned 2012). Individuals staging at Goodnews Bay have been shown to stay within the area between mid-April and mid-May for approximately 8 days on average (Rosenberg et al. 2016).

Additionally, large congregations of Steller's eiders, numbering in the hundreds to thousands, have been observed in waters east of the action area, off Carter Spit northward to Jacksmith Bay (ADF&G 2020a, National Audubon Society 2023, Seppi 1997). Though records do not indicate how far offshore they tend to use this area, migrating and staging eiders are known to primarily use shallow waters less than 30 ft (10 m) in depth (Larned 2012). Coarse-scale bathymetry data (USGS 2018) indicate that the action area in this location will be in waters deeper than 49 ft (15 m); these data correlate with coarse-scale ADF&G (2020a) Steller's eider occurrence data, which indicate they are typically found closer to shore and outside the action area. During fall migration, small numbers of eiders in mixed flocks have been documented east of the action area, north of Goodnews Bay (Seppi 1997).

Steller's eiders have been recorded near Kuskokwim and Bristol Bays, but outside the action area. Birds have been recorded using Chagvan Bay, the waters off Cape Peirce, and the Kuskokwim Shoals critical habitat unit during spring and summer months (ADF&G 2020a). Non-breeding eiders have also been documented within the nearshore waters close to Hagemeister Island within Bristol Bay during summer months (Rosenberg et al. 2016), approximately 11 mi (18 km) north of the action area.

4.1.4 Critical Habitat

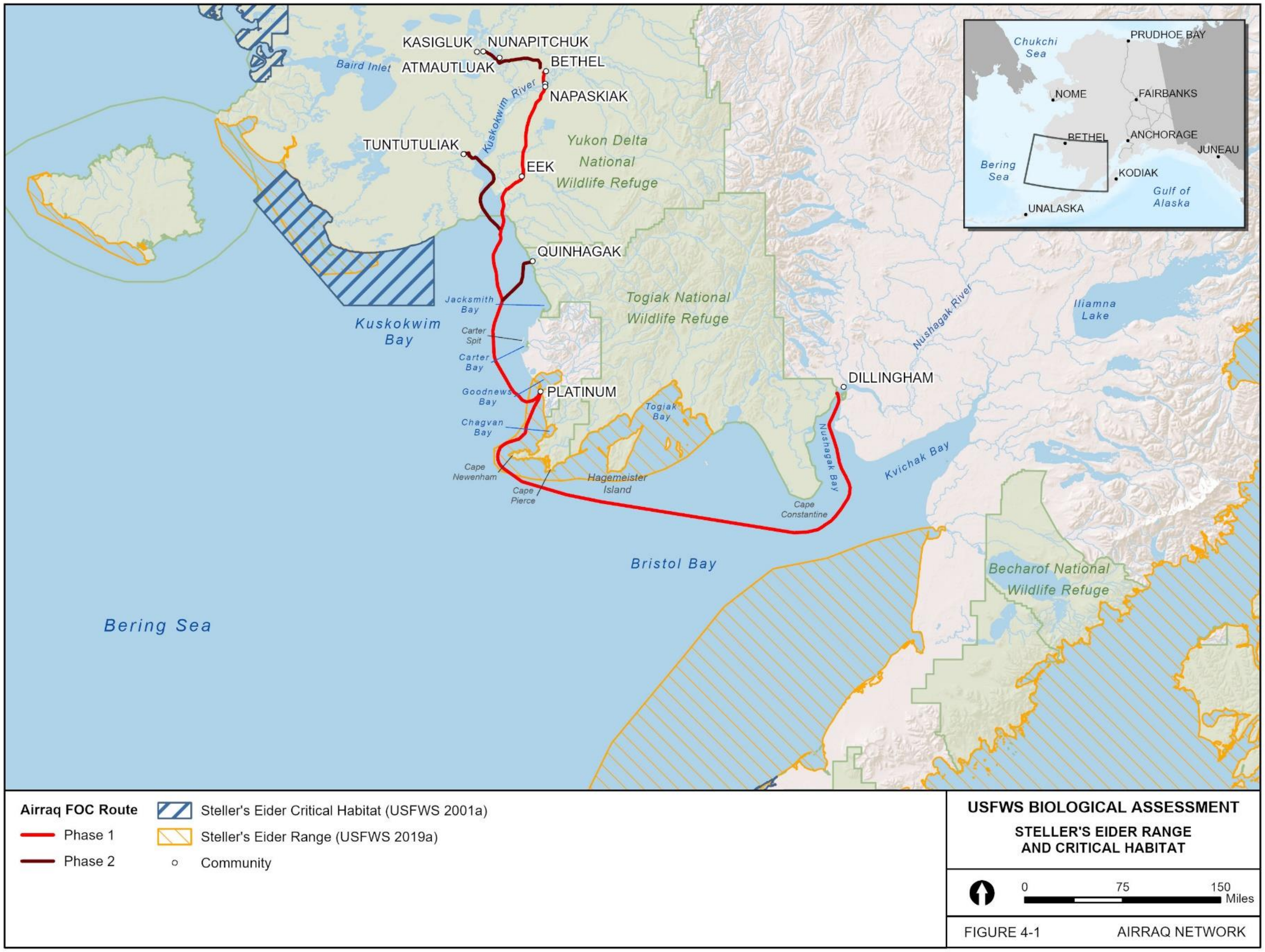
The final designation of critical habitat for the Steller's eider was issued in 2001 (USFWS 2001a). The USFWS has established Steller's eider critical habitat at the Seal Island, Nelson Lagoon, and Izembek Lagoon units on the Alaska Peninsula as well as the YK Delta nesting area and Kuskokwim Shoals unit in Southwest Alaska (USFWS 2001a; Figure 4-1). These areas were designated as critical habitat as they are used by large numbers of this species during breeding, molting, wintering, or staging for spring migration (USFWS 2002).

The YK Delta nesting area, Seal Island, Nelson Lagoon, and Izembek Lagoon units are well removed from the action area and will not be considered further. The Kuskokwim Shoals is the

only designated Steller's eider critical habitat located near the Project; however, this unit is more than 19 mi (30 km) west of the Project and outside the action area.

The Kuskokwim Shoals Steller's eider critical habitat unit covers part of northern Kuskokwim Bay from the mouth of the Kolavinarak River to near the village of Kwigillingok and extends approximately 11 to 24 mi (17 to 38 km) offshore. Approximately 1,472 square mi (mi^2; 3,813 square km [km^2]) of marine waters and approximately 115 mi (184 km) of shoreline (including the shoreline of barrier islands) are included within this unit (USFWS 2001a).

Figure 4-1. Steller's Eider Range and Critical Habitat



4.2 Spectacled Eider

4.2.1 Distribution and Life History

The spectacled eider (*Somateria fischeri*) is a large sea duck ranging from 20 to 22 inches (51 to 56 centimeters) long. They spend most of their life at sea (Peterson et al. 2020), where they forage on benthic prey by diving as well as dabbling on the surface (ADF&G 2022). In total, males spend approximately 11 months per year at sea, while females spend approximately 8 to 9 months; nonbreeding subadults are thought to remain at sea until they are 2 to 3 years old (Peterson et al. 2020).

Three distinct coastal breeding populations of spectacled eiders exist, one in Russia and two in Alaska. The Russia breeding population is much larger than the two Alaska breeding populations combined (Peterson et al. 2020). All populations winter in large, single-species flocks within the Bering Sea, south of St. Lawrence Island, using polynyas (i.e., large areas of open water surrounded by sea ice) and leads (i.e., linear areas of open water surrounded by sea ice) (Peterson et al.1999). The species only spends a few months each year on land, during the breeding season, and remains within the Bering Sea the rest of the year (Petersen et al. 2000, as cited in Flint et al. 2016).

In Alaska, spectacled eiders breed along the coast of the Arctic Coastal Plain and on the YK Delta in the western part of the state (Dau and Kistchinski 1977, Flint et al. 2016). Established pairs migrate together to their nesting grounds between May and June, generally within 12 mi (20 km) of the coast (Peterson et al. 2020, USFWS 2010a). Breeding generally lasts 4 to 5 days, and nests are built on the day the first egg is laid. The average time between arrival at the breeding grounds and nest initiation for the YK Delta population is estimated at 7.2 days (Dau 1974).

Females lay one egg per day for a clutch of three to nine oval, olive-green eggs at nest sites on tundra islands and peninsulas (ADF&G 2022, USFWS 2010a). Eggs are incubated for 24 to 28 days, and young fledge in late August (USFWS 2010a). Within a few weeks after arriving at the breeding grounds, males fly back to sea to undergo molt and will remain at sea for the rest of the year; females will remain with their young until fall migration (Peterson et al. 2020). While on land during the nesting season, they forage in ponds by diving as well as dabbling for aquatic insects, crustaceans, mollusks, and vegetation, but will also feed on arachnids, seeds, and berries (ADF&G 2022, BirdLife International 2022, Peterson et al. 2020).

During nesting, spectacled eiders disperse throughout much of their range, though they are considered semicolonial at some locations (Peterson et al. 2020). Annual surveys conducted since 1985 to assess the population status for the YK Delta breeding population have been focused on the coastal tundra habitats surrounding Hazen Bay, which is considered their core nesting area within this region (Fischer and Stehn 2015).

Following the breeding season, spectacled eiders migrate offshore along the Beaufort, Chukchi, and Bering Sea coasts to molt in the bays and other coastal areas of these waters, prior to moving to their wintering location within the Bering Sea (Peterson et al. 1999, 2020). Spectacled eiders typically spend the molting period between 1 and 28 mi (2 and 45 km) from shore

(Peterson et al. 2020). During molting, they primarily use Ledyard Bay, Mechigmenskiy Bay (in Russia), Indigirka/Kolyma River deltas (in Russia), Norton Sound, and the waters off eastern St. Lawrence Island (Petersen et al. 1999). Norton Sound is considered the primary molting location for females that breed on the YK Delta (Petersen et al. 1999).

After molting, spectacled eiders primarily winter within the Bering Sea, south of St. Lawrence Island (Peterson et al. 2020). During winter, they typically concentrate in large, dense flocks in openings in the sea ice. While at sea, they will dive down to feed on benthic mollusks and crustaceans in shallow waters (less than 262 ft [80 m] deep) or free-floating amphipods in deeper waters (ADF&G 2022).

From approximately March through May, spectacled eiders congregate in available open leads within the northern Bering Sea, Bering Strait, and Chukchi Sea for spring staging and migration (Dau and Kistchinski 1977), principally staging in Ledyard Bay and eastern Norton Sound (Petersen et al. 1999). During early May, the offshore coastal fringe of the YK Delta contains shore-fast ice connected to broken and drifting ice with open leads in it that are also used by many migrating eiders (Dau and Kistchinski 1977). In the Bering Strait, northern Bering Sea, and southern Chukchi Sea, where the May ice pack is more extensive, the periodic opening and closing of the leads dictate the location and concentration of the spring passage of eiders.

4.2.2 Species Status

The spectacled eider is currently listed as **threatened** under the ESA and was first listed in May 1993 due to the reduced number of breeding birds and reduction in the breeding range within western Alaska (USFWS 1993, 2022c). A 96 percent decline in the breeding population was documented on the YK Delta, which was thought to account for half of the world's breeding population, though the cause for the decline is still unknown. However, several threats have been identified, including lead poisoning and shooting as stressors of high concern; and collisions with human structures, human disturbance in nesting areas, nest predation, and changes to the ecological community as stressors of moderate concern (USFWS 2021a).

Since the species was listed, the YK breeding population has increased, with the population estimated to number more than 12,000 individuals (USFWS 2021b) The population in Russia, which is estimated to contain 90 percent of the breeding population, is numbered at approximately 140,000 individuals (ADF&G 2022, Warnock 2017). The species is estimated to have a worldwide population between 360,000 and 400,000 individuals (BirdLife International 2022, Wetlands International 2022).

4.2.3 Presence within Action Area

The current range of spectacled eider is shown in Figure 4-2. Based on anecdotal information, the historical breeding range for the spectacled eider was estimated to extend along the coastal areas of the YK Delta southward to the coastal areas along Kuskokwim Bay, several miles south of Tuntutuliak, and continuing south to Goodnews Bay (USFWS 1996). However, the YK Delta breeding range was drastically reduced following the species precipitous decline; in 1996, the southern limits of the YK breeding range were estimated to not extend south of roughly Nyctea Hills, approximately 50 mi (80 km) east of Tuntutuliak (USFWS 1996). Annual aerial and ground-based population surveys conducted between 1985 and 2014 by the USFWS have been

focused on the YK Delta coastal zone extending from the northern YK Delta south to areas near Kwigillingok, over 20 mi (32 km) southeast of Tuntutuliak (Fischer et al. 2018, Lewis et al. 2019). Since 2000, USFWS ground-based nesting survey efforts have shifted focus to only include the YK breeding population's "core nesting area," where it is thought that the majority of all pairs on the YK Delta nest (Fischer and Stehn 2015). The core nesting area on the YK Delta includes the coastal habitats surrounding Hazen Bay (Fischer and Stehn 2015) and is located more than 62 mi (100 km) to the northeast, and well outside the action area. The species' Recovery Plan notes that low-density breeding may still occur outside confirmed breeding pair occurrence locations (USFWS 1996); however, spectacled eider nesting within the action area will be extremely rare.

Though no records exist of spectacled eiders nesting within the action area, a record exists of a single individual crossing Kuskokwim Bay then spending a few weeks in Chagvan Bay, on the perimeter of eastern Kuskokwim Bay, during winter 2011 (USGS 2019). However, Chagvan Bay is located approximately 12 mi (20 km) east and well removed from the action area.

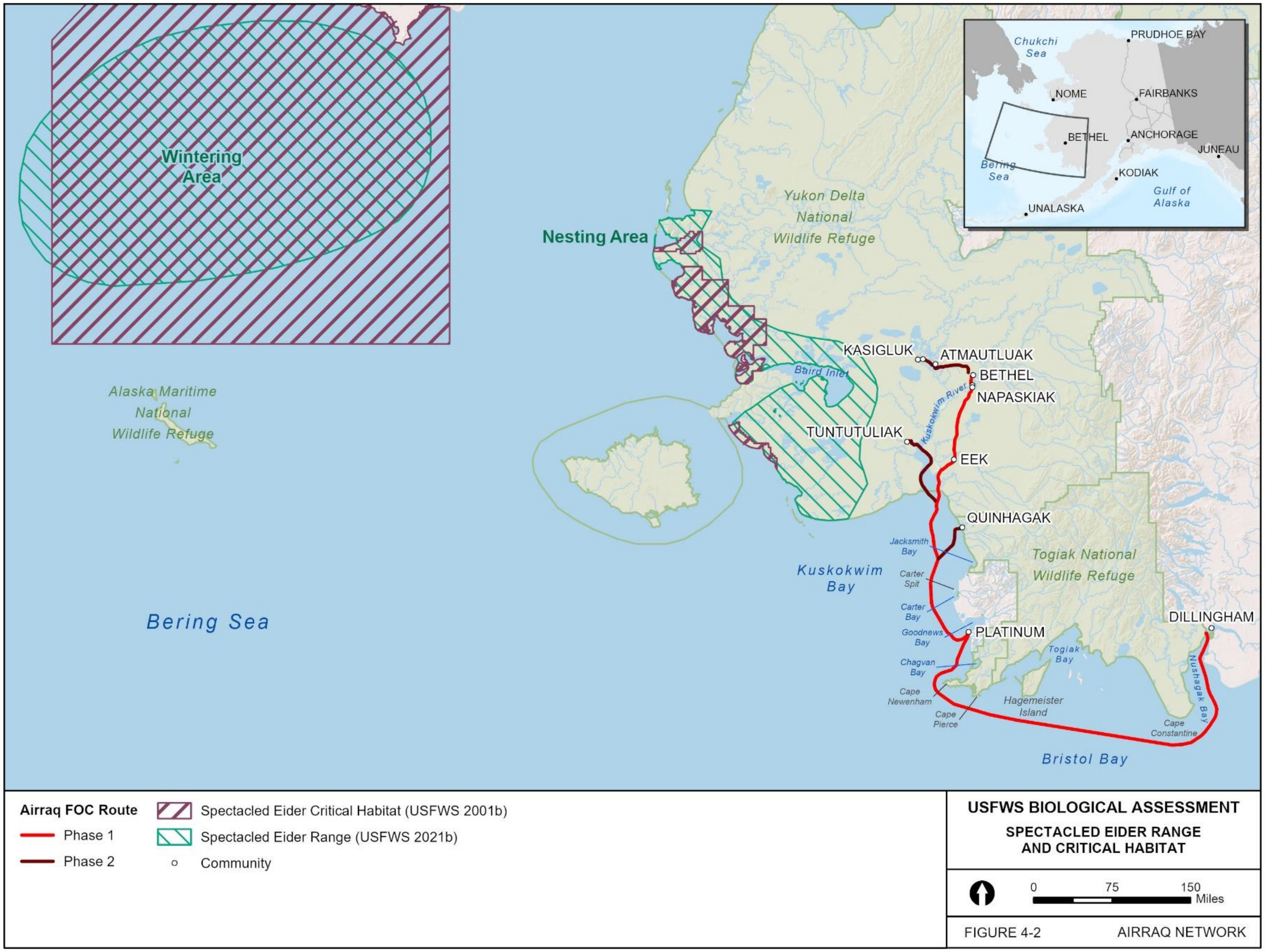
4.2.4 Critical Habitat

The final designation of critical habitat for the spectacled eider was issued in 2001 (USFWS 2001b). The USFWS has established spectacled eider critical habitat within the Central YK Delta, the Southern YK Delta, Norton Sound, Ledyard Bay, and the Wintering Area unit (Figure 4-2). The Project action area is not located within any of these critical habitat units.

The Central YK Delta, the Southern YK Delta, Norton Sound, Ledyard Bay, and the Wintering Area units are well removed from the action area and will not be considered further. The Southern YK Delta unit is approximately 62 mi (100 km) west of the action area. This critical habitat unit covers the vegetated intertidal zone along the coast from Nelson Island south to Chefornak (USFWS 2001b).

As described in Section 4.1.4, critical habitat Primary Constituent Elements (PCE) are those habitat components that are essential for the primary biological needs of feeding, nesting, brood rearing, roosting, molting, migrating, and wintering (USFWS 2001b). The PCEs for the Southern YK Delta unit include the vegetated intertidal zone and all open water inclusions within this zone; the vegetated intertidal zone includes all lands inundated often enough by tidally influenced water that it affects plant growth, habit, or community composition (USFWS 2001b). Areas within the unit boundary that are not within the vegetated intertidal zone (e.g., barren mudflats and lands that are above the highest HTL) are not considered critical habitat; nor are areas with existing human development within the unit (USFWS 2001b).

Figure 4-2. Spectacled Eider Range and Critical Habitat



4.3 Short-tailed Albatross

4.3.1 Distribution and Life History

The short-tailed albatross (*Phoebastria albatrus*) is a large, pelagic seabird with an average wingspan of 7.5 ft (2.3 m) and body length of 3 ft (1 m). They spend most of their life at sea, over the continental shelf edge foraging on squid, shrimp, crustaceans, and fish (USFWS 2008). This species forages either alone or in groups and primarily capture prey at the surface- (USFWS 2022a).

Historically, the species had 14 known breeding colonies within the northwestern Pacific and potentially within the North Atlantic. However, current breeding colonies exist primarily on two small islands within the North Pacific, with 80 to 85 percent of short-tailed albatross nesting on Torishima Island, Japan (USFWS 2008). Most of the remaining population of breeding birds are believed to use the Senkaku Islands; however, nest searches have not occurred since 2002 (USFWS 2022a). China, Japan, and Taiwan all claim ownership of the islands, which are therefore politically difficult to access. There have been early successes in establishing a colony at Mukojima in the Ogasawara (Bonin) Islands, Japan, after translocation efforts from 2008 to 2012; a breeding pair at the Midway Atoll, Hawaii, fledged a chick each in 2011, 2012, and 2014 (Deguchi et al. 2016).

Satellite tagging of breeding adults in 2006 to 2008 and juveniles in 2008 to 2012 provided marine distribution information for the species. Both adult and juvenile short-tailed albatross extensively used areas of the western Pacific east of Japan as well as the waters surrounding the Kuril Islands, Aleutian Islands, and the outer Bering Sea continental shelf (USFWS 2014a). The outer Bering Sea shelf was used most during summer and fall, moving to the northern submarine canyons in late summer and fall (USFWS 2014a). The birds moved south during winter, but continued to use the southeastern Bering Sea, Aleutian Islands, and Gulf of Alaska. Juveniles traveled much more widely throughout the North Pacific than adults, moving through nearly the entirety of the species' range and spending more time within the Sea of Okhotsk, western Bering Sea, transition zone between Hawaii and Alaska, and Arctic regions of the Bering Strait (USFWS 2014a, 2020).

Short-tailed albatross nest on isolated, windswept, offshore islands that have limited human access. Nest sites may be flat or sloped, with sparse or full vegetation. The majority of birds on Torishima Island nest on a steep site with loose volcanic ash; however, a new, growing colony on the island is situated on a gentle, vegetated slope. The vegetation consists of clump-forming grass (*Miscanthus sinensis* var. *condensatus*) that helps stabilize the soil, provides protection from the weather, and acts as a visual barrier between nesting pairs. The limited vegetation allows for safe, open takeoffs and landings (USFWS 2008). Females will lay a single egg in a nest on the ground in October or November, and eggs hatch in late December through early January. The chicks are nearly full grown by late May to early June, and the adults begin to leave the colony, with the chicks heading out to sea soon thereafter. By mid-July, the colony is empty (USFWS 2001c). Non-breeders and failed breeders disperse during late winter through spring (USFWS 2018).

The short-tailed albatross relies on waters of the North Pacific characterized by upwelling and high productivity, in particular regions along the northern edge of the Gulf of Alaska, Aleutian Island chain, and Bering Sea shelf break from the Alaska Peninsula toward St. Matthew Island. Strong tidal currents combined with the abrupt, steep shelf break promote upwelling, and primary production remains high throughout summer within these areas. Tagged adult and subadult birds frequented waters greater than 3,280 ft (1,000 m) deep more than 70 percent of the time, and juveniles spent approximately 80 percent of their time within these shallower waters (USFWS 2008). Adults spent less than 20 percent of their time over waters exceeding 9,842 ft (3,000 m) deep (USFWS 2008). Waters around the Aleutian Islands also appear to be important for feeding while the species is undergoing an extensive molt (USFWS 2020).

4.3.2 Species Status

The short-tailed albatross was listed as **endangered** as a foreign species under the ESA; on July 31, 2000, the short-tailed albatross was listed as **endangered** throughout its range under the ESA (USFWS 2014a). The biggest threat to this species is the limited breeding distribution; other threats include commercial fisheries, shipping traffic, and changes in prey distribution resulting from climate change (USFWS 2020).

Thought to be extinct in the 1940s, the species is making progress toward meeting some of the recovery criteria for delisting, with the current worldwide population (7,365 individuals) exceeding the criteria of 4,000 individuals. Following the 2018 to 2019 breeding season, their population was estimated to be increasing at an average annual rate of 8.9 percent (USFWS 2020). There is potential for the species to be down listed from endangered to threatened by 2028, if the Ogasawara Islands breeding population maintains an average annual growth rate of 8.9 percent with greater than 50 breeding pairs, and with confirmation that the population on the Senkaku Islands has met recovery criteria (USFWS 2020).

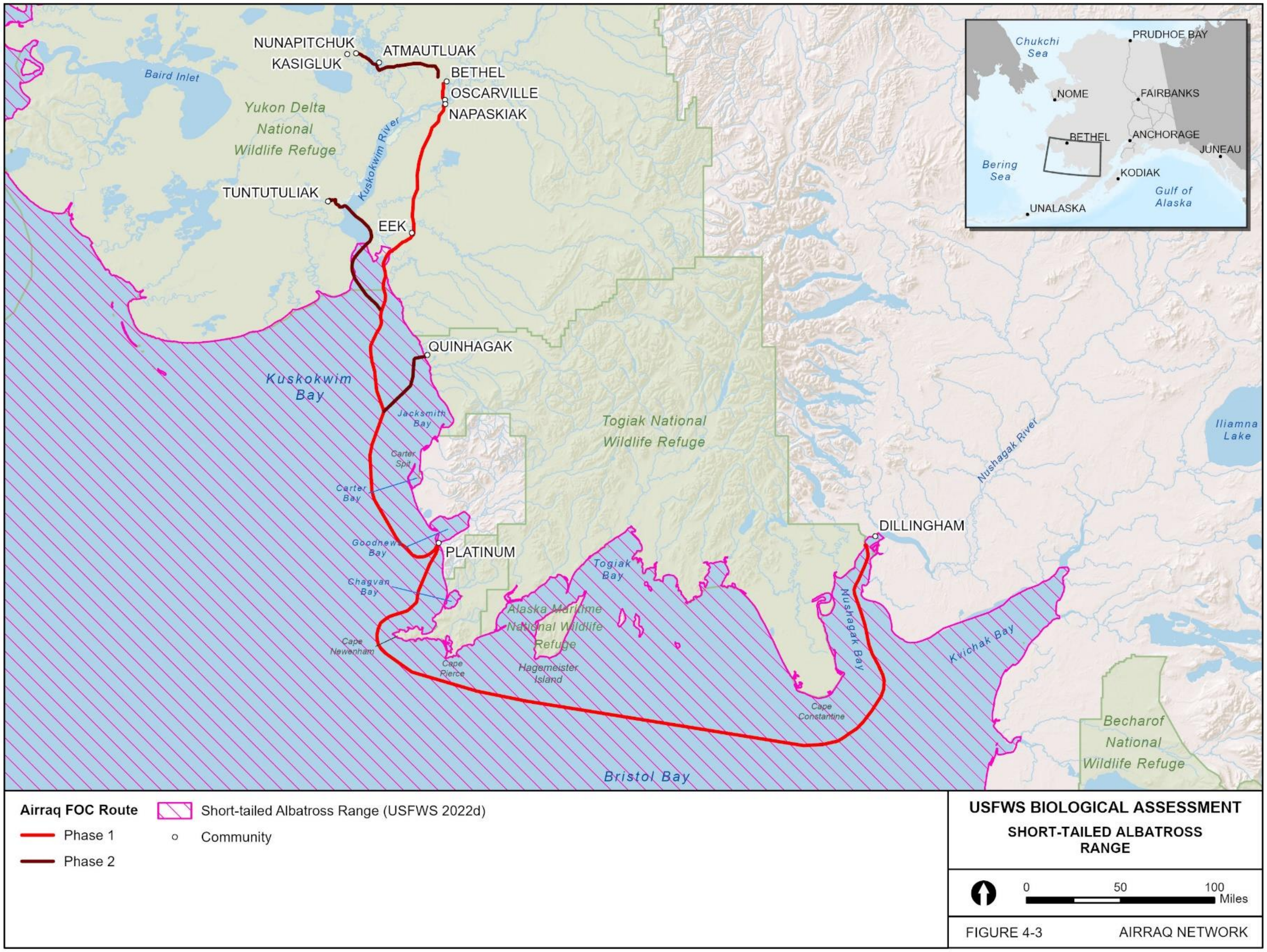
4.3.3 Presence within Action Area

The short-tailed albatross' potential range overlaps the action area (USFWS 2022d; Figure 4-3). However, review of the compiled North Pacific Pelagic Seabird Database for short-tailed albatross sightings from 1940 to 2004 did not show the species present within the action area (Hyrenbach et al. 2013, Piatt et al. 2006). As described in Section 4.3.1, this is because their preferred prey and foraging waters are deeper than available within the action area. Satellite tagging data of juveniles from 2008 to 2012 showed that individuals have been recorded within Bristol Bay, south of the action area (USFWS 2014a). The species nests far outside the action area and are likely rarely found within the action area.

4.3.4 Critical Habitat

Critical habitat has not been designated for the short-tailed albatross. The USFWS determined that it was not prudent to designate critical habitat due to the lack of habitat-related threats, areas that could be identified as meeting the definition of critical habitat within U.S. jurisdiction, and recognition or educational benefits to the American public as a result of such a designation (USFWS 2008).

Figure 4-3. Short-tailed Albatross Potential Range



4.4 Northern Sea Otter

Three stocks of northern sea otters (*Enhydra lutris kenyoni*) exist within Alaska: Southeast, Southcentral, and Southwest (USFWS 2014b). Individuals that could occur within the proposed action area are from the threatened Southwest Alaska DPS.

4.4.1 Distribution and Life History

Historic sea otter (*Enhydra lutris*) habitat ranged from the northern islands of Japan within the western Pacific; through the Kuril Islands and Kamchatka Peninsula within Russia; through the Aleutian Islands; toward the eastern Pacific; following the coast of Alaska, Canada, and the contiguous United States; to central Baja California in Mexico (Wilson et al. 1991). Following their decline, fragmented populations are present within Alaska, Russia, British Columbia, Washington, and California (Davis et al. 2019, ADF&G 2023a).

The northern sea otter (*Enhydra lutris kenyoni*) is a subspecies of sea otter whose habitat ranges from Washington in the south, north toward British Columbia, following along the coast of Southeast and Southcentral Alaska before continuing west to the Aleutian Islands (Wilson et al. 1991). The range of the Southwest Alaska DPS spans from the western edge of Cook Inlet to the Aleutian Islands, and includes the Alaska Peninsula and Bristol Bay coasts as well as the Aleutian, Barren, Kodiak, and Pribilof Islands (Figure 4-4).

Following the near extinction of sea otters, Kenyon (1969) found the Southwest Alaska DPS of northern sea otter from the central to outer Aleutians to be one of the most rapidly growing populations. Following the recovery of sea otters within the Aleutian Islands, Kenyon (1969) observed several fluxes in population due to rapid growth when resources were available, and rapid decline due to starvation and emigration. Kenyon (1969) estimated that a stable population density of sea otters is 10 to 15 individuals per square mile, and the Alaska Peninsula has the potential to support a population of 50,000 to 74,000 individuals.

Sea otters generally occur in shallow (less than 115 ft [35 m]), nearshore waters within areas with sandy or rocky bottoms, where they feed on a wide variety of slow-moving benthic invertebrates (Rotterman and Simon-Jackson 1988), including sea urchins, abalone, clams, mussels, and crabs (Riedman and Estes 1990). They can also feed on epibenthic fish within areas where otter populations are near equilibrium density (Riedman and Estes 1990). They typically forage at depths between 7 and 98 (2 and 30 m) but can dive as deep as 322 ft (100 m) (Kenyon 1969, Bodkin et al. 2004).

Sea otters in Alaska are generally not migratory and do not disperse over long distances. However, individual sea otters are capable of long-distance movements of more than 60 mi (100 km) (Garshelis and Garshelis 1984), although movements are likely limited by geographic barriers, high energy requirements of animals, and social behavior. Data within Alaska regarding sea otter movement and home ranges are limited (Gorbics and Bodkin 2001). Garshelis and Garshelis (1984) found that female sea otters within Prince William Sound had home ranges between 0.4 and 1.9 mi^2 (1.0 to 4.8 km^2), and males had much larger home ranges ranging from 1.8 to 4.2 mi^2 (4.6 to 11.0 km^2). Despite limited home ranges, male sea otters within Prince William Sound traveled up to 60 mi (100 km) to breeding areas. Gorbics and Bodkin (2001) estimated 30 mi (50 km) to be the maximum interisland distance that sea otters

will travel, but translocated sea otters have been found to travel up to 250 mi (400 km) (Monnett et al. 1990).

Sea otters do not have specific breeding and pupping habitat; rather, they appear to conduct all aspects of their life history within the same places (USFWS 2009). In Alaska, most pups are born in late spring (Bodkin and Monson 2002). Assuming a 6- to 8-month gestation, including 2 to 4 months of delayed implantation, breeding likely occurs in late summer or fall.

The energy of in-air sea otter vocalizations is concentrated at 3 to 5 kilohertz (kHz; McShane et al. 1995, Thomson and Richardson 1995). Sea otter vocalizations are considered to be most suitable for short-range communication among individuals (McShane et al. 1995). However, Ghoul and Reichmuth (2012) noted that the in-air “screams” of sea otters are loud signals (source level up to 113 dB re 20 µPa rms) that may be used over larger distances and have dominant frequencies of 4 to 8 kHz. Ghoul and Reichmuth (2012) examined the hearing abilities of sea otters using a behavioral approach. They found that the in-air upper-frequency hearing limit was at least 32 kHz, and the lower-frequency limit was less than 0.125 kHz. Ghoul and Reichmuth (2016) reported that sea otter hearing is most sensitive underwater at 8 to 16 kHz; however, their hearing is not specialized to detect sounds in background noise.

4.4.2 Species Status

Sea otter population estimates were once as high as 300,000 (Davis et al. 2019), but maritime fur trade in the eighteenth and nineteenth centuries reduced numbers to as low as 1,000 to 2,000 (Kenyon 1969). The current estimated population size for the Southwest Alaska DPS stocks of northern sea otter is 54,771 (USFWS 2014b). The Southwest Alaska DPS sea otter population has declined by 56 to 68 percent since the mid-1980s (Burn and Doroff 2005). In the Aleutian archipelago, sea otters have declined by as much as 70 percent since 1992 (Doroff et al. 2003). Unlike the declines observed within the Aleutian Islands, Shumagin Islands, and western Alaska Peninsula, other portions of the Southwest Alaska DPS stock have not shown signs of decline, including the Kodiak Archipelago, the eastern coast of the Alaska Peninsula from Castle Cape to Cape Douglas, and Kamishak Bay in Lower Cook Inlet (Burn and Doroff 2005, USFWS 2014b). Surveys conducted from 2003 to 2005 show continued declines within the Aleutian Islands (Estes et al. 2005). The main threat to sea otter recovery, and the primary reason for the decline, is likely attributable to increased predation, particularly by killer whales (*Orcinus orca*) (Estes et al. 1998, 2005; USFWS 2010b).

The first legal protections of sea otters began before most marine mammals, when the North Pacific Fur Seal Treaty of 1911 was signed (Kenyon 1969). The treaty banned commercial hunting of both sea otters and North Pacific fur seals (*Callorhinus ursinus*). Sea otters received additional protections in 1972 when the Marine Mammal Protection Act was passed. The Southwest Alaska DPS of northern sea otter was listed as **threatened** under the ESA in 2005 (71 *Federal Register* [FR] 46864).

4.4.3 Presence within Action Area

The historical range of sea otters extends into Bristol Bay; however, it does not include the action area (Figure 4-4; Davis et al. 2019). This is possibly due to the historical range of sea ice extent (Pease et al. 1982) and the unsuitability of sea ice for sea otter habitat (Schneider and

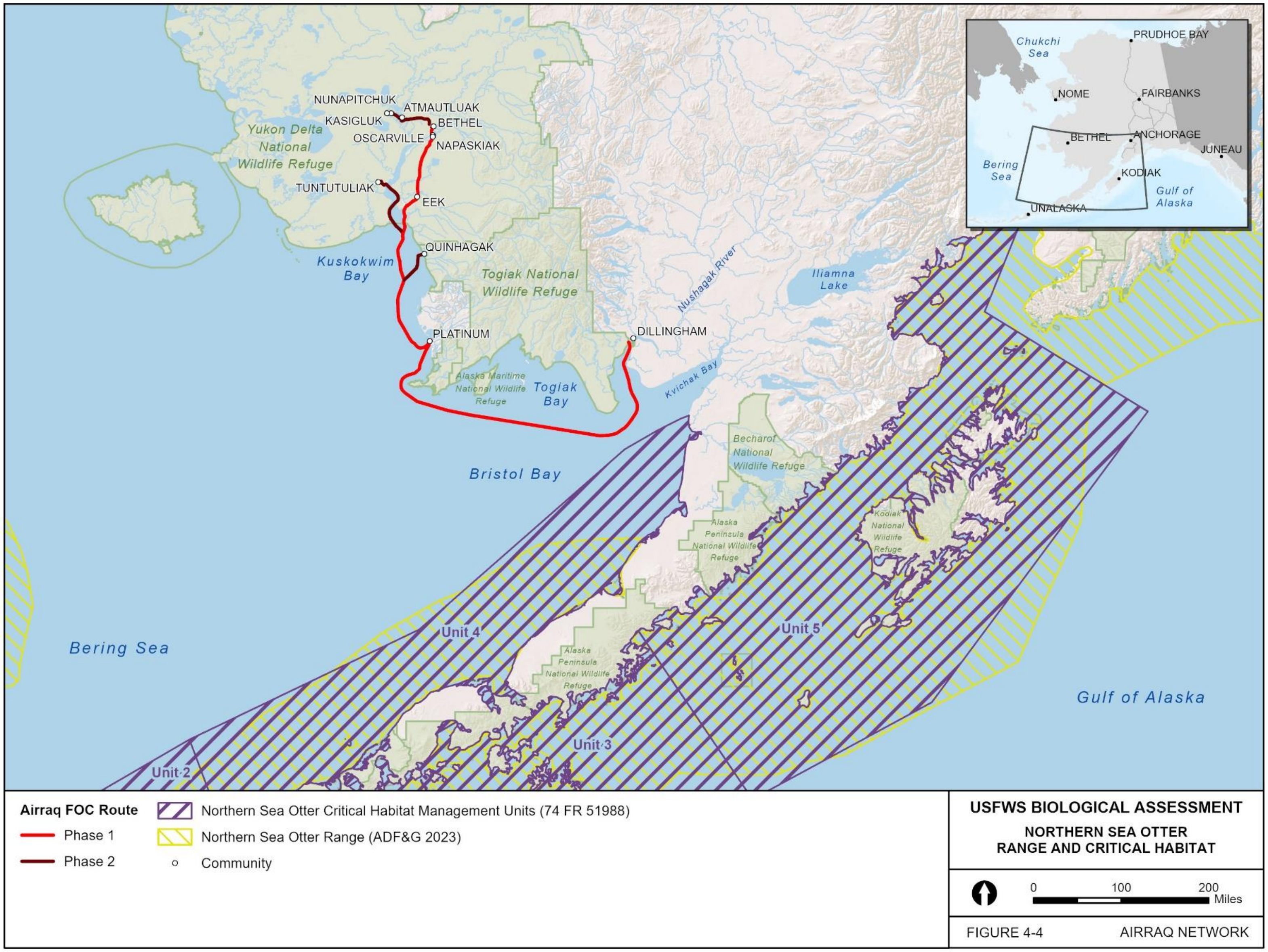
Faro 1975). The current sea otter range does not include the action area (ADF&G 2023b). Bristol Bay may provide suitable habitat for sea otters, but they do not frequently emigrate outside their home ranges (Kenyon 1969).

4.4.4 Critical Habitat

Critical habitat for the Southwest Alaska DPS of northern sea otter was designated in November 2009 and includes an area of 5,855 mi^2 (164 km^2; 74 FR 51988). The critical habitat primarily consists of shallow water areas less than 66 ft (20 m) deep and nearshore water within 328 ft (100 m) of the mean tide line (Figure 4-4). No designated critical habitat exists for the northern sea otter within the action area.

In the Northern Sea Otter Recovery Plan (USFWS 2013), the Southwest Alaska DPS of northern sea otter is divided into five management units: Western Aleutian (Unit 1); Eastern Aleutian (Unit 2); South Alaska Peninsula (Unit 3); Bristol Bay (Unit 4); and Kamishak, Kodiak, Alaska Peninsula (Unit 5). The action area does not fall into one of the management units but is closest to the Bristol Bay Management Unit.

Figure 4-4. Northern Sea Otter Range and Critical Habitat



5 Environmental Setting

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat within the action area (included in this section). The environmental baseline also includes the past and present impacts of all federal, state, or private actions and other human activities within the action area; the anticipated impacts of all proposed federal projects within the action area that have already undergone formal or early Section 7 consultation; and the impact of state or private actions that are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are also part of the environmental baseline (50 CFR 402.02).

The action area is composed of diverse marine environments, stretching from the northernmost extent of Nushagak Bay along the coast to the mouth of the Kuskokwim River. The coastline includes part of the Alaska Maritime National Wildlife Refuge, the Togiak National Wildlife Refuge, and the Cape Newenham State Game Refuge, while falling primarily within the Bering Sea and Kuskokwim Bay. The action area will reach a maximum distance of approximately 51 mi (82 km) from shore and will occur within areas up to approximately 147 ft (45 m) deep.

Flood tides influence the Bering Sea through Aleutian Island passes, creating the Aleutian North Shore Current. East of Unimak Pass, the marine current flows northeastward, composing the Bering Coastal Current along the Alaskan Peninsula and into Bristol Bay. At this point, the current creates a counterclockwise gyre (NMFS 2013). Currents then primarily flow northward and westward around Cape Newenham toward Kuskokwim Bay, while also flowing eastward to the inner bay.

Six major watersheds drain into Bristol Bay: the Togiak, Nushagak, Kvichak, Naknek, Egegik, and Ugashik River watersheds. The Nushagak and Kvichak River watersheds are the largest among them, occupying approximately 50 percent of the region’s watershed. They comprise five distinct physiographic divisions: the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak–Bristol Bay Lowland (EPA 2014). These watersheds are turbid and dominated by seasonal runoff. In summer, during periods of significant freshwater out welling, the ebb tide currents often substantially exceed the flood tides. This input keeps the Nushagak and Kvichak Bays colder in spring relative to the rest of Bristol Bay. As terrestrial waters warm later in summer with increasing ambient temperatures, so do the bays. The turbidity weakens primary production within the bay, but high nutrient levels are driven by out welling discharge from detritus, dissolved organic material, and salmon-derived nutrients (NMFS 2013). In addition to fish and invertebrates, the nutrients help support aquatic vegetation such as eel grass and kelp species. The two watersheds are composed of the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak-Bristol Bay Lowland, all of which play a major role in dividing the region’s watersheds. These features range from sea level to 9,186 ft (2,800 m) and contain more than 33,554 mi (54,000 km) of streams (NMFS 2013).

The Kuskokwim River Basin is the largest river basin providing freshwater input to Kuskokwim Bay. It is drained by the Kuskokwim River and many of its tributaries, from Cape Newenham State Game Refuge to the Ninglick River (BLM n.d.). The region is contained within the Alaska Range to the south and east, with the Kuskokwim Mountains on the north and west. The bay experiences some of the largest tides in Southwest Alaska, and it is assumed that tidal influence is present up to river mile 97 of the Kuskokwim River. Tidal amplitude begins to subside to the north and outside the bay. In winter, annual ice tends to cover Kuskokwim Bay in its entirety and includes portions of Bristol Bay. At a minimum, the sheet ice will also include the Bering Sea shelf and the entire Chukchi Sea (USFWS 2012). During this time, the Kuskokwim Bay can reach 29 degrees Fahrenheit (-2 degrees Celsius).

The Kuskokwim Bay and Bering Sea region is subject to a large number of earthquakes. This is the result of the presence of six fault systems within the area: the Tintina-Kaltag Fault, the Iditarod-Nixon Fork Fault, the Denali-Farewell Fault, the Lake Clark-Castle Mountain Fault System, the Bruin Bay Fault, and the Border Ranges Fault. Some sections along these faults are seismically active and have generated earthquakes (EPA 2014). Seasonal weather changes are often drastic within the region and have consequences for marine life. The Bering Sea is subject to circulation patterns from both the north and south. These circulation patterns bring in strong winds, which influence ice movement, but keep air temperatures relatively mild. The prevailing circulation pattern may last months to decades. Bering Sea summer weather tends to be mild. Skies remain somewhat clear for long periods, which can cause sea temperatures to rise. Additionally, occasional moderate summer storms produce winds that are responsible for ocean mixing. The state of the Bering Sea influences the YK Delta's climate, where there is a strong inland gradient in coastal temperature.

5.1 Coastal Development

At its southernmost extent, the action area includes the community of Dillingham. It then traverses through Nushagak Bay to Bristol Bay, and around Cape Newenham National Wildlife Refuge to Kuskokwim Bay. It then enters the Kuskokwim River, where it splits. Two boroughs are included within the action area: the Dillingham Census Area and Bethel Census Area. Both boroughs combined cover the Alaska coastline from Kvichak Bay in the south to the coastline directly west of Newtok in the north and include extensive inland components. Due to the region's remoteness, it is largely undisturbed from human development.

The Bethel Census Area includes 18,207 residents. Bethel is the largest community within the region, with a population of 6,500 residents. A majority of Bethel's economy originates from regional services such as government administration, transportation, freight, and social services. One of the few non-government sources of revenue for the region is commercial fisheries. The Coastal Villages Region Fund is a non-profit group that allocates revenue from fishing rights from the federal government to create jobs, build infrastructure, and fund education (Agnew Beck Consulting 2011).

The Dillingham Census Area includes 4,673 residents across 10 communities, the largest of which are Dillingham (population 2,327), Togiak (population 873), Manokotak (population 483), New Stuyahok (population 476), and Aleknagik (population 208) (Robinson et al. 2020). The region's economy is predominately seasonal employment and composed of the harvesting and

processing of local salmon fisheries. Each year, 70 percent of the fish returning to the Bristol Bay area are harvested. In addition to fisheries, tourism plays a part in the local economy as Dillingham provides an entry point to Togiak National Wildlife Refuge and Wood-Tikchik State Park. Table 5-1 provides a summary of regional economic expenditures, expressed in 2009 dollars.

Table 5-1. Summary of Regional Economic Expenditures Based on Salmon Ecosystem Services

Economic Sector	Estimated Direct Expenditure (sales per year, in $ millions)
Commercial Fisheries, Wholesale Value	300.2
Sport Fisheries	60.5
Sport Hunting	8.2
Wildlife Viewing/Tourism	104.4
Subsistence Harvest	6.3
Total	**479.6**

Source: EPA 2014

5.2 Transportation

None of the communities serviced by the Project are accessible to the rest of the state by road. The existing road network is discontinuous and limited to the areas surrounding a few communities; therefore, water and air are the primary modes of inter-community transportation. The Alaska Marine Highway System does not serve the communities within or near the action area. Aviation is the principal means of transporting people to communities throughout the region. Except Oscarville, each serviced community has an Alaska Department of Transportation and Public Facilities or other government-controlled public airport, as well as numerous additional Federal Aviation Administration-registered public and private runways (DOT&PF 2017).

Marine waters within the action area experience varying levels of marine-based vessel traffic. Marine vessels are typically associated with freight, fishing, transportation, and fuel delivery (USACE 2008). In particular, Nushagak Bay experiences very high vessel traffic from spring through fall during the commercial salmon fishing season. Due to a lack of interconnecting roads, the region’s local communities rely on barges for local commerce and shipment of items not feasible to transport by air (USACE 2009).

5.3 Fisheries

Both state and federally managed fisheries occur within the action area. Two state fishery management areas overlap the action area: the Kuskokwim Management Area (KMA) and Bristol Bay Management Area (BBMA) (Smith and Gray 2022, Tiernan et al. 2022). Within these management areas are sport, commercial, subsistence, and personal use fisheries. Additionally, federally managed fisheries within the action area supply subsistence and commercial opportunities.

Alaska Statute 16.05.258, *Subsistence Use and Allocation of Fish and Game*, establishes the subsistence use priority for reasonable harvest opportunity consistent with sustained yield when resources are not abundant enough to provide for all consumptive uses (Smith and Gray 2022). The Alaska National Interest Lands Conservation Act of 1980 provided a priority for rural Alaska

residents for taking fish and wildlife on federal public lands and called for creation of regional advisory councils to provide rural residents' input into the Federal Subsistence Program. These policies have made subsistence user groups the priority in management throughout the State of Alaska. For the KMA, 2010 to 2014 surveys identified that salmon contributed 40 percent of the total subsistence resource harvest within Kuskokwim River communities, broken up as 65 percent within middle and upper river communities and 25 percent within lower river communities (Smith and Gray 2022).

Fishing efforts in state fisheries are primarily focused on salmon. The BBMA supports the largest wild sockeye salmon (*Oncorhynchus nerka*) fishery in the world, providing approximately 46 percent of the average global abundance of wild sockeye salmon (EPA 2023). Within the BBMA, one of the five commercial salmon districts occur within the action area, the Nushagak District. Fishing gear types within the Nushagak District include set gillnet and drift gillnet. Harvest diversity includes sockeye, Chinook (*O. tshawytscha*), chum (*O. keta*), pink (*O. gorbuscha*), and coho (*O. kisutch*) salmon. Sockeye salmon are the most harvested salmon within the district and provide significant economic benefits to the region. Between 2018 and 2022, three of the largest sockeye salmon harvests ever recorded for the district occurred, and its systems repeatedly ranked among the highest recorded for escapement numbers. Due to dwindling Chinook salmon returns for the district, the Alaska Department of Fish and Game is recommending it be listed as a stock of concern within the Nushagak District (Tiernan et al. 2022).

The KMA is composed of three active commercial salmon fishing districts, all of which occur within the action area: District 1, District 4, and District 5. Sockeye, Chinook, chum, pink, and coho salmon have been harvested within the KMA. In recent years, Chinook and chum salmon returns within the Kuskokwim River have been inconsistent. Chinook salmon runs in 2012, 2013, and 2014 were the lowest three on record. Escapement made a slight rebound, reaching a nearly average run total in 2019, only to significantly decline again in 2020 and 2021. Chum salmon return numbers remained near average between 2007 and 2019. However, 2020 numbers were well below average, and 2021 was the lowest on record. Sockeye salmon abundance in 2021 was mixed throughout the Kuskokwim River drainage and ranged from average to below average. Reliable coho salmon return numbers are not available for the region, but available data suggests that returns have been average to below average since 2016 (Smith and Gray 2022).

Other state-managed fisheries within the KMA include subsistence herring, while the BBMA includes a herring sac roe fishery, which is composed of seine, gillnet, and hand harvests (Tiernan et al. 2022). The Bering Sea Aleutian Islands Management Area (BSAIMA), a state-managed area for shellfish, has several registration areas overlapping the action area that target tanner (*Chionoecetes bairdi*), snow (*C. opilio*), Dungeness (*Metacarcinus magister*), and king (Lithodidae) crabs as well as scallops (Pectinidae) (Nichols and Shaishnikoff 2022). Federal subsistence and commercial fisheries also occur off the western coast of Alaska, along the action area. These fisheries occur within the federally managed BSAIMA, which are both commercial and subsistence groundfish fisheries. Commercial opportunities include trawl, longline, jig, and pot fisheries. These fisheries have 19 different target species, with walleye pollock (*Gadus chalcogrammus*) being the most popular among them. Walleye pollock account

for a majority of the harvest in terms of both metric tons and ex-vessel value. Subsistence harvests are very small relative to that of commercial harvests and target cod, halibut, rockfish, and other species in nearshore waters (NPFMC 2020). These commercial fisheries have the potential to compete with marine mammals for resources.

5.4 Tourism

The recreational tourism economy provides significant benefits for residents of the Bristol Bay region. In addition to being a source of employment, it helps support an economy that provides essential goods to Bristol Bay residents. Recreational tourism is responsible for 15 percent of jobs within the region (EPA 2014). In addition to tourism related to the local salmon ecosystem, access to the Nushagak and Kvichak River watersheds as well as the Togiak National Wildlife Refuge and Cape Newenham State Park via air, boat, snowmachine, and foot are largely regulated by the local tourism industry (USFWS 2009).

Tourism within the YK Delta is limited. This is partially due to high costs associated with transportation as well as limited accommodations and tourism-centric infrastructure, and inconsistent and unreported weather that can restrict air travel. Despite this, the region offers many forms of recreation and ecotourism, including access to the Yukon Delta National Wildlife Refuge, the largest wildlife refuge in the United States; fishing; and events such as the Kuskokwim 300 sled dog race (Agnew Beck Consulting 2011).

5.5 Vessel Traffic

Vessel traffic within the action area is closely linked to commercial fisheries. The average number of salmon permit holders fishing in District 4 within the KMA since 1980 is 223. Participation has ranged between 67 and 408 during this time. In 2021, participation was the lowest on record, with 74 individual permit holders. The only season with lower participation was 2020 (Smith and Gray 2022). A significant decrease in participation has been mirrored across all KMA districts. Permit registration within the BBMA has been more consistent and significantly exceeds that within the KMA. Participation in the salmon fisheries for both management areas is shown in Table 5-2.

Passenger water transportation services are limited within the action area and are largely related to sightseeing, guiding services, and general transportation support.

Table 5-2. Permits Fished by District and Gear Type within the KMA and BBMA, 2001–2021

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2001	412	159	32	1,566	834
2002	318	114	30	1,183	680
2003	359	114	34	1,389	714
2004	390	116	29	1,426	797
2005	403	145	29	1,526	829
2006	373	132	24	1,567	844
2007	366	125	28	1,621	836
2008	374	146	25	1,636	850
2009	342	179	39	1,642	855
2010	433	241	48	1,731	861
2011	413	219	48	1,747	878

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2012	379	179	58	1,740	883
2013	378	197	71	1,709	854
2014	358	194	61	1,751	881
2015	283	189	61	1,744	885
2016	—[b]	—[b]	—[b]	1,715	858
2017	—[b]	—[b]	—[b]	1,728	881
2018	—[b]	—[b]	—[b]	1,735	879
2019	—[b]	—[b]	—[b]	1,767	893
2020	—[b]	67	17	1,724	841
2021	—[b]	74	13	1,753	870
2001–2011 Average	**380**	**153**	**33**	**1,529**	**82**
2011–2021 Average	**140**	**90**	**28**	**1,736**	**90**
Average	**265**	**123**	**31**	**1,632**	**86**

Source: Smith and Gray 2021, Tiernan et al. 2022
[a] Two drift permit holders may concurrently fish from the same vessel.
[b] Confidential due to three or fewer permits fished, processors, or buyers. Included as 0 in averages.

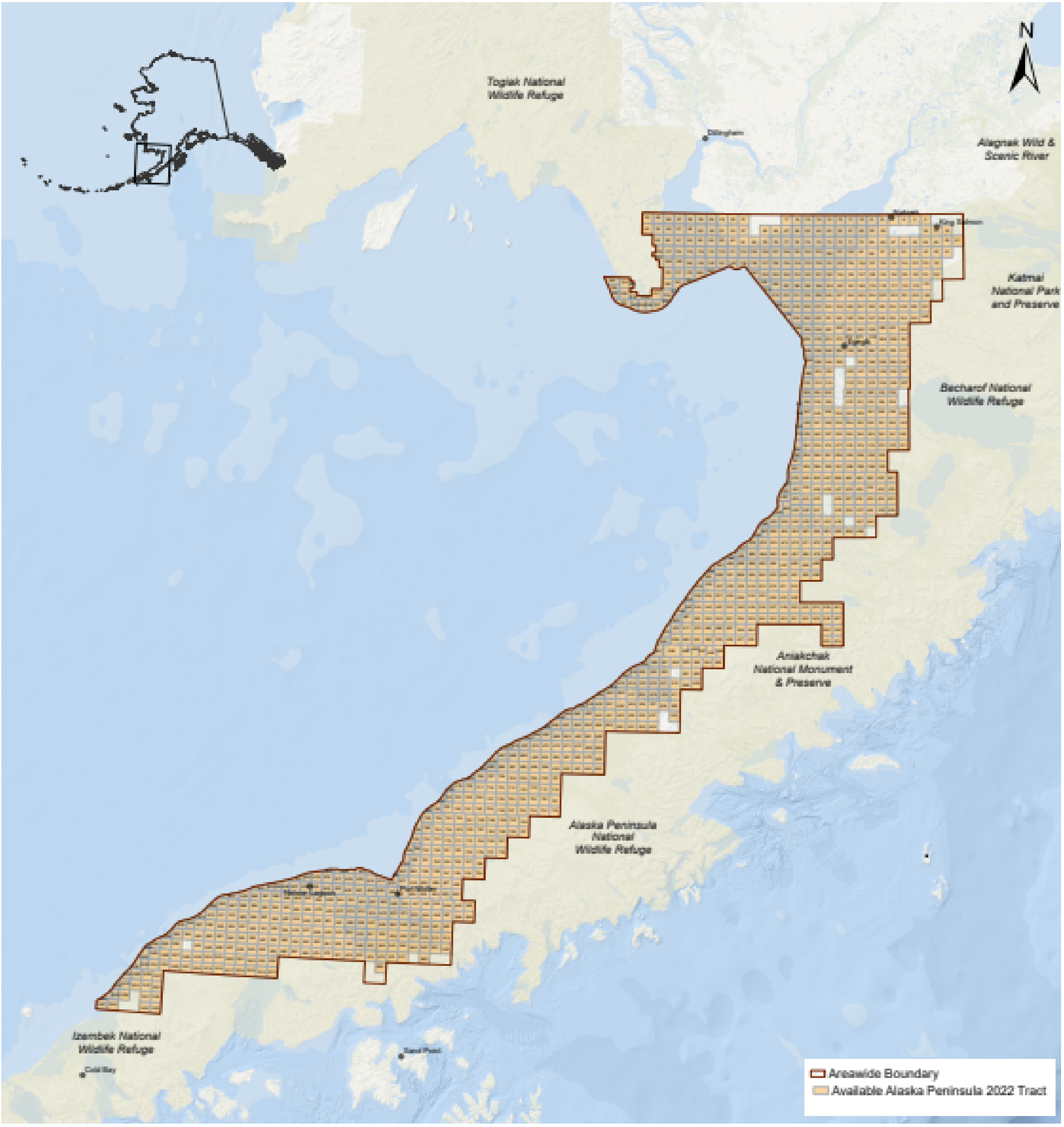
5.6 Resource Extraction

The Bristol Bay area contains significant mineral deposits, which creates mining potential for the region. The most popular among these deposits are porphyry copper and gold (EPA 2014). The only mining project currently within the Bristol Bay watershed is the Pebble Project. On January 30, 2023, the U.S. Environmental Protection Agency issued a Final Determination under its Clean Water Act Section 404(c) authority to limit actions related to the development of the Pebble Deposit in order to protect salmon resources (EPA 2023). Other large potential mine operations within the Bristol Bay region include Big Chunk South, Big Chunk North, Groundhog, Audn/Iliamna, and Humble (EPA 2014).

The only current project within the Kuskokwim River Watershed is Donlin Gold. Donlin Gold is pursuing an open pit gold mine 10 mi (16 km) north of Crooked Creek (ADNR 2023). Crooked Creek is approximately 190 mi (307 km) from the mouth of the Kuskokwim River. To meet project energy demands, a 312-mi (502-km) long pipeline is proposed to be buried to bring natural gas from Cook Inlet to the mine site. Historically, the Kuskokwim River Basin has been an active mining region. Platinum placer mines have occurred intermittently within the area surrounding Goodnews Bay since the 1920s. Platinum mining has ceased within the Goodnews Bay area since 2012. The most recent platinum mine within the region was shut down due to the misuse of wastewater ponds and pollution of nearby waters.

The North Aleutian Basin Outer Continental Shelf (OCS) overlaps the eastern portion of the action area. Within the OCS, oil and gas leases exist, beginning on the western side of Nushagak Bay, east around Bristol Bay, and south to the Alaskan Peninsula (Figure 5-1). Past exploration has not yielded any commercial production within the region (ADNR 2014). Additionally, no bids on leases have occurred within the region in recent years.

Figure 5-1. Alaska Peninsula Oil and Gas Lease Tract Map



Source: ADNR 2022

Oil and gas exploration within the western and northern portions of the action area have been primarily focused on the Bethel and Holitna Basins. With the exception of deep well exploration near Bethel in the 1980s, the region has not focused on subsurface exploration. Additionally, research suggests a very low probability for the occurrence of conventional, economically recoverable oil resources within the region (Nuvista 2015).

6 Effects of the Action

Effects of the action are all consequences, including those from other activities, to listed species or critical habitat that are caused by the proposed action. A consequence is caused by the proposed action if it will not occur but for the proposed action and 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, as amended by 83 FR 35178).

Effects that are common to seabirds generally are described in Section 6.1. Effects that pertain to a particular seabird species are described in Sections 6.2, 6.3, and 6.4. Effects on northern sea otters are described in Section 6.5. Indirect effects for all species included in this BA are described in Section 6.6.

6.1 Seabirds

6.1.1 Noise

Very little information is available about the underwater hearing of seabirds; to date only studies on great cormorants (*Phalacrocorax carbo*) have been published. Great cormorants were found to respond to underwater sounds and may have special adaptations for hearing underwater (Hansen et al. 2016, Johansen et al. 2016). The in-air hearing of a number of seabirds (including loons, scaups, gannets, and ducks) has been investigated by Crowell (2016), and the peak hearing sensitivity was found to be between 1.5 and 3 kHz. The best hearing frequency for the common eider (*Somateria mollissima*) was 2.4 kHz (Crowell 2016).

The effects of underwater noise on birds in general have not been well studied, but could include masking, behavioral disturbance, and hearing impairment. One study on the effects of underwater seismic survey sound on molting long-tailed ducks (*Clangula hyemalis*) within the Beaufort Sea showed little effect on their behavior (Lacroix et al. 2003). However, the study did not consider potential physical effects on the ducks. The authors suggested caution in interpreting the data because of their limited utility to detect subtle disturbance effects, and recommended studies on other species to better understand the effects of seismic airgun sound on seabirds. Stemp (1985) conducted opportunistic observations on the effects of seismic exploration on seabirds; he did not observe any effects of seismic testing but warned that his observations should not be extrapolated to areas with large concentrations of feeding or molting birds.

Seabirds are not known to communicate underwater or use underwater hearing during feeding activities. Therefore, masking from underwater noise is unlikely to be a concern, but research on this issue is lacking. No data is available about the physiological effects of underwater noise on birds (e.g., temporary threshold shifts [TTS] or permanent threshold shifts [PTS]). However, comparative studies of in-air hearing of many bird species have shown that TTS may occur when exposed to continuous noise (12 to 24 hours) between 93 and 110 dB re 20 μPa rms (Dooling and Popper 2016); this will roughly translate to 119 to 136 dB re 1 μPa rms as measured underwater. In air, PTS occurred when birds were exposed to continuous noise above 110 dB re 20 μPa rms or to single impulse sounds above 140 dB re 20 μPa rms (Dooling and Popper 2016). Underwater, those limits will be approximately 136 dB re 1 μPa rms for

continuous noise and 176 dB re 1 μPa rms for single impulse sounds. However, it is not clear if values determined from in-air studies can be applied to seabirds in the water, especially given that they spend only a small portion of their time underwater.

6.1.2 Vessel Traffic

Investigations into the effects of disturbance by vessel traffic on birds are limited. Schwemmer et al. (2011) examined the effects of disturbance by ships on seabirds in Germany. In areas with vessel traffic channels, sea ducks appeared to habituate to vessels. Four species of sea ducks examined had variable flushing distances, which was related to flock size; common eiders had the shortest flush distance. Flushing distances varied for the common scoter (*Melanitta nigra*), with larger flocks flushing at distances of 0.6 to 1.2 mi (1 to 2 km), and smaller flocks flushing at 0.6 mi (less than 1 km). Loons were found to avoid areas with high vessel traffic (Schwemmer et al. 2011). During boat surveys, Steller's eiders flushed when approached by a small skiff at distances between 328 and 656 ft (100 and 200 m) in January and 984 ft (300 m) in March (LGL 2000, HDR 2004).

Speckman et al. (2004) reported that marbled murrelets (*Brachyramphus marmoratus*) appeared to habituate to small boat traffic during surveys, with only a few birds flying away when approached by a skiff; most birds merely paddled away, while others dove and resurfaced before moving away. However, fish-holding murrelets were found to swallow the fish when approached by a boat, a behavior that could have consequences for the chicks the prey was intended for (Speckman et al. 2004). Lacroix et al. (2003) noted that molting, flightless ducks frequently dove and swam away short distances when approached by a small research vessel but resurfaced quickly after the vessel passed. Even when long-tailed ducks were experimentally disturbed by a small research vessel doing transits every other day, they showed relatively high site fidelity; however, all ducks showed a disturbance response at distances less than 328 ft (less than 100 m; Flint et al. 2004).

Lacroix et al. (2003) did not detect any effects of nearshore seismic exploration on molting long-tailed ducks within the inshore lagoon systems of Alaska's North Slope. Both aerial surveys and radio-tracking indicated the proportion of ducks that stayed near their marking location from before to after seismic exploration was unaffected by proximity to seismic survey activities. No large-scale movement from the seismic area occurred, even though the vessel transited the same area numerous times throughout the survey over the course of approximately 3 weeks. Nonetheless, several studies have shown that some bird species avoid areas with high levels of disturbance. Kaiser et al. (2006) reported that common scoters avoided areas with high levels of shipping traffic. Similarly, Johnson (1982 in Lacroix et al. 2003) reported that long-tailed ducks moved from one habitat to another in response to vessel disturbance. Similarly, Thornburg (1973), Havera et al. (1992), and Kenow et al. (2003) reported that staging waterfowl were displaced from foraging areas by boating, but some of these areas had high levels of boating activity. Merkel et al. (2009) showed reduced feeding and increased movement by common eiders when disturbed by fast-moving, open boats. The degree of disturbance was related to the number of boats within the area. However, the eiders did attempt to compensate for lost feeding opportunities by feeding at different, perhaps less favorable, times of the day (Merkel et al. 2009).

Similar results were obtained by Velando and Munilla (2011), who found that foraging by European shags (*Phalacrocorax aristotelis*) was reduced by boat disturbance. Agness et al. (2008) suggested changes in behavior of Kittlitz's murrelets (*Brachyramphus brevirostris*) in the presence of large, fast-moving vessels, and the possibility of biological effects because of increased energy expenditure by the birds. In contrast, Flint et al. (2003) reported that boat disturbance did not affect the body condition of molting long-tailed ducks.

6.1.3 Artificial Lighting

Artificial lighting will be used on the cable-laying vessel for routine vessel safety and navigation purposes. Several bird species are attracted to bright lights on ships at night and collide with the ship (e.g., Ryan 1991, Black 2005, Merkel and Johansen 2011). Birds that spend most of their lives at sea are often highly influenced by artificial light (Montevecchi 2006, Montevecchi et al. 1999, Gauthreaux and Belser 2006, Ronconi et al. 2015). In Alaska, crested auklets (*Aethia cristatella*) mass-stranded on a crab fishing boat. An estimated 1.5 tons of crested auklets either collided with or landed on the brightly lit fishing boat at night (Dick and Donaldson 1978).

It has also been noted that seabird strandings seem to peak around the time of the new moon, when moonlight levels are lowest (Telfer et al. 1987, Rodríguez and Rodríguez 2009, Miles et al. 2010). Birds are more strongly attracted to lights at sea during fog and drizzle conditions (Telfer et al. 1987, Black 2005). Moisture droplets in the air refract light, increasing illumination and creating a glow around vessels at sea. Birds may be confused or blinded by the contrast between a vessel's lights and the surrounding darkness. During the confusion, a seabird may collide with the vessel's superstructure, resulting in injury or death. They may also fly at the lights for long periods and tire or exhaust themselves, decreasing their ability to feed and survive (Ryan et al. 2021).

Many seabirds have great difficulty becoming airborne from flat surfaces. Once on a hard surface, stranded seabirds tend to crawl into corners or under objects, such as machinery, to hide. While there, they may die from exposure, dehydration, or starvation over hours or days. Once stranded on a deck, a seabird's plumage is prone to oiling from residual oil often present in varying degrees on ship decks. Even a dime-sized spot of oil on a bird's plumage is sufficient to breach the thermal insulation essential for maintaining vital body heat. Therefore, even if rescued and released over the side of the vessel, a bird may later die from hypothermia (Ryan et al. 2021, Howard 2021).

6.1.4 Spills

The vessels that will be used for the cable-laying operations will have hazardous chemicals, including hydrocarbons, present. If petroleum or other hazardous material were to spill during Project activities, the level of impact on seabirds will depend on the size of the spill, location, time of year, and number of seabirds present. As noted in Section 6.1.3, even a very small amount of oil on a bird's plumage can result in injury or mortality. Oil spills can be lethal to waterbirds, particularly divers, which spend a lot of time sitting on the surface of the water where the oil floats (International Bird Rescue 2023). Eiders are especially vulnerable to oil spills due to their large flock sizes, distance to shore, and use of moderate ice areas (Smith et al. 2017). Persistent oil contamination is a major threat for eiders within areas near shipping lanes, such

as the Aleutian Islands, Bering Sea and Strait, and Chukchi and Beaufort Seas (Smith et al. 2017).

However, hazardous chemicals associated with the Project will be in small quantities and properly contained, following all regulations, so the occurrence of a spill or leak from Project vessels will be very unlikely. If a spill occurred, it will likely be of a low volume and quickly contained.

6.1.5 Habitat Disturbance

This Project will cause some disturbance to the benthic community through seafloor clearing, plowing, and trenching to bury the cable. Trawling and dredging are known to reduce habitat complexity and reduce productivity. The benthic community can recover from these disturbances, but recovery times could range from a few months to several decades depending on the location, substrate, original ecosystem, and scale of the disturbance (National Academy of Sciences 2002). In one Alaska example, it took the benthic community 4 years to recover after underwater mining in Norton Sound (Jewett and Naidu 2000).

Overland cable-laying activities will result in minor, temporary, tundra habitat disturbance. These activities will take place in winter using vehicles that will not cause surface damage to the tundra, and all trenched segments will be backfilled with native soil. Cable laid directly on the tundra surface or within waterbodies will not preclude the use of these habitats for any birds, including ESA-listed species.

6.2 Steller's Eider

The Steller's eider is known to occur within a portion of the action area, near Goodnews Bay, as well as the waters off Carter Spit northward to Jacksmith Bay, located easterly adjacent to the action area. The potential for Project activities to cause behavioral disturbance or displacement, injury or mortality, or habitat disturbance is described in the following sections.

6.2.1 Behavioral Disturbance and Displacement

Steller's eiders stage in Goodnews Bay and have been recorded there in large numbers during spring and summer months (ADF&G 2020a, Larned 2012). Additionally, Steller's eiders, numbering in the hundreds to thousands, have been observed within waters easterly adjacent to the action area offshore of Carter Spit northward to Jacksmith Bay during summer, as well as in small numbers in fall (ADF&G 2020a, National Audubon Society 2023, Seppi 1997). There is also potential that some non-breeding birds may stay behind at stopover locations (USFWS 2001a).

The in-air portion of the action area overlaps with Goodnews Bay. The cable-laying route is located west of the waters off Carter Spit and Jacksmith Bay, and will not run through the shallower nearshore waters that is likely be preferred by Steller's eiders (i.e., typically less than 32 ft [10 m] in depth; Larned 2012).

If eiders remain within the action area, in Goodnews Bay or nearby waters, during spring and summer months, disturbance due to vessel traffic will occur. Behavioral disturbances resulting from vessel traffic will likely occur at relatively short distances from the vessel. As described in

Section 6.1.2, Steller's eiders may flush within 656 ft (200 m) of a fast-moving skiff. However, the cable-laying vessels will be operating at slow speeds (typically 0.5 to 2 knots [1 to 4 km/hr]) and are therefore much less likely to cause a flushing response. Disturbance to staging or non-breeding Steller's eiders is unlikely given the short duration of cable-laying activities within their potential summer range. Any disturbance will only be temporary, given the continual movement of Project activities along the cable route; therefore, potential effects from disturbance caused by the vessel are discountable.

Intertidal cable-laying activities near Goodnews Bay will occur near a previously developed area within the village of Platinum. Disturbance or displacement caused by equipment noise and the presence of humans within the area will only occur temporarily during Project activities and will be of short duration. Therefore, the Steller's eider is not expected to be affected by intertidal cable-laying activities.

The overland cable installation activities will occur during winter months, when the species will not occur within the action area or use terrestrial habitat. Therefore, the overland route is not expected to result in behavioral disturbance or displacement.

6.2.2 Injury or Mortality

Although the effect of underwater sound on eiders has not been studied, noise produced by the proposed Project activities could affect the behavior of the Steller's eider along the cable-laying route. However, masking and hearing impairment are unlikely during the proposed activities because the continuous sound sources (e.g., dynamic positioning [DP] thrusters) have lower frequencies than the range of peak hearing sensitivity for seabirds, and the impulse sounds (e.g., echosounders) have most of their energy at frequencies well above the range of peak hearing sensitivity for seabirds. Additionally, the duration of potential exposure to these low-level sounds will be insufficient to affect hearing abilities.

The Steller's eider is not expected to be affected by artificial lighting on vessels. Eiders are primarily diurnal (McNeil et al. 1992), although they may feed at night when disturbed during the day or in winter when daylight is limited (Merkel et al. 2009, Merkel and Mosbech 2008). In a study of the effects of artificial lighting from gas-flaring at Northstar Island in the Alaska Beaufort Sea, only one eider flock was observed, and they showed no reaction to the flaring (Day et al. 2015). Though collisions with fishing vessels resulting in mortality to eiders, including Steller's eiders, have been anecdotally reported on numerous occasions within Alaska; nearly all these documented strikes with eiders occurred during hours of complete darkness in late winter and early spring, and involved bright lighting (Funk 2008).

The Steller's eider is not expected to be impacted by spills. As described above in Section 6.1.4, eiders are particularly vulnerable to oil spills, and even a very small amount has the potential to result in injury or mortality. However, the likelihood of a spill resulting from Project activities will be extremely low and of small quantity.

6.2.3 Habitat Disturbance

The Steller's eider is primarily a benthic feeder, with most of its diet composed of small bivalves, gastropods, and crustaceans (Bustnes and Systad 2001, Fredrickson 2001). Some disturbance

to the benthos from cable-laying activities will occur along the area that will be dragged or trenched; this may, in turn, affect food supply over a very small area. However, given that this will be a one-time action along a relatively narrow strip and well away from critical habitat areas, it will likely have little impact on eider feeding efficiency.

The action area for this proposed Project does not occur within designated critical habitat of Steller's eider; therefore, it will not impact any defined PCEs.

As described in Sections 6.1.5 and 6.6.1, potential adverse effects on Steller's eider prey species from Project activities are very unlikely.

6.3 Spectacled Eider

Although the action area is within the historical breeding range of the spectacled eider, the species has not been observed within the action area in surveys performed by USFWS between 1985 and 2014 (Fischer and Stehn 2015). Current breeding activity within the region is concentrated along the coastal portions of the YK Delta, near Hazen Bay (Fischer and Stehn 2015), located well outside the action area. However, the possibility exists for low-density breeding to occur outside confirmed breeding pair occurrence locations, though it would be extremely rare. During the non-breeding seasons, spectacled eiders are found within the Bering Sea, far from the action area. The potential for Project activities to cause behavioral disturbance or displacement, or habitat disturbance is described in the following sections.

6.3.1 Behavioral Disturbance and Displacement

If spectacled eiders nested within the action area, behavioral disturbance or even displacement from overland Project activities could occur. However, overland activities for the Project will only occur in winter when eiders will not be nesting or located near the action area. Therefore, the spectacled eider is not expected to be affected by overland Project activities.

6.3.2 Habitat Disturbance

During nesting, the spectacled eider typically forages within ponds by diving and dabbling for aquatic insects, crustaceans, mollusks, and vegetation. Ground disturbance from overland cable installation could impact potential nesting habitat within the action area near Tuntutuliak, which is several miles north of the spectacled eider's historical breeding range. However, overland cable installation through potential nesting habitat will occur in winter months, when spectacled eiders will not be present. Installation of cable in winter will minimize impacts to vegetation. Additionally, the action area is outside the historical and current breeding range for the YK Delta nesting population; therefore, nesting by this species within the action area will be extremely rare. As such, impacts to spectacled eider nesting habitat are not expected.

The action area does not occur within designated critical habitat for the spectacled eider; therefore, the Project will not impact any defined PCEs.

6.4 Short-tailed Albatross

The short-tailed albatross forages widely across the North Pacific, and the species may move through the action area, though it would be rare. The potential for Project activities to cause behavioral disturbance or displacement, injury or mortality, or habitat disturbance is described in the following sections.

6.4.1 Behavioral Disturbance and Displacement

Noise produced by the proposed Project activities could affect the behavior of short-tailed albatross along the cable-laying route, should they move through the action area. However, masking and hearing impairment are unlikely during the proposed activities because the continuous sound sources (e.g., DP thrusters) have lower frequencies than the range of peak hearing sensitivity for seabirds, and the impulse sounds (e.g., echosounders) have most of their energy at frequencies well above the range of peak hearing sensitivity for seabirds. Additionally, the duration of potential exposure to these low-level sounds will be insufficient to affect hearing abilities.

If short-tailed albatross occur within the action area, behavioral disturbance or displacement due to vessel traffic could occur, although at relatively short distances from the vessel, which may cause birds to move to less ideal habitats to travel and forage. However, this disturbance will only be temporary, given the continual movement of Project activities along the cable route. The slow operating speeds of the vessel (typically 0.5 to 2 knots [1 to 4 km/hr]) will also be less likely to disrupt behavior.

The short-tailed albatross primarily hunts by seizing prey from the water surface (USFWS 2022a). Therefore, the likelihood of underwater impacts from Project activities resulting in disturbance to feeding abilities is extremely low.

6.4.2 Injury or Mortality

The short-tailed albatross is generally more active during the day, and birds within the action area are not expected to be affected by artificial lighting on the vessels (USFWS 2008). Additionally, injury or mortality of this species resulting from artificial lighting is unlikely, given the rarity of this species within the action area, the reduction in the outward radiation from artificial lighting, and slow operating speeds of the vessel (typically 0.5 to 2 knots [1 to 4 km/hr]).

6.4.3 Habitat Disturbance

The short-tailed albatross feeds primarily on squid, shrimp, and crustaceans. These birds are very strong, wide-ranging fliers that are not restricted to a limited foraging area (USFWS 2008). The species is considered a continental shelf-edge specialist and is well documented along the Bering Sea shelf edge, although historical accounts suggest the species may have been relatively common nearshore, including near Kodiak, the Aleutians, and St. Lawrence Islands during conditions of highly productive upwellings (Piatt et al. 2006). Therefore, given the mobility and preferred foraging habitat of this species, vessel traffic and cable-laying activities within the action area are unlikely to impact albatross feeding. Cable laying activities will disturb the benthos along the seafloor that is dragged or trenched, which has the potential to affect a small portion of prey species within that area. However, this is a one-time action along a relatively

narrow strip of water outside of prime foraging habitat along the Bering Sea shelf edge (Piatt et al. 2006, USFWS 2022a).

As described below in Section 6.6.1, potential adverse effects on short-tailed albatross prey species from Project activities would be extremely limited given their large range.

6.5 Northern Sea Otter

The Southwest Alaska DPS of northern sea otter's range does not encompass the action area, and their use of the action area during the single marine cable-laying season is unlikely. However, since potential suitable habitat exists within the action area, a small number of sea otters could experience behavioral disturbance and displacement, injury or mortality, and habitat disturbance.

6.5.1 Behavioral Disturbance and Displacement

Vessels will use main drive propellers and/or DP thrusters to maintain position or move slowly during cable-laying operations. During these activities, non-impulse sounds will be generated by the collapse of air bubbles (cavitation) created when propeller blades move rapidly through the water. Several acoustic measurements of vessels conducting similar operations using these types of propulsion have been made within Alaska waters in previous years. While sea otters are not likely to be exposed to these sounds within the action area, general information on the effects of vessel noise on marine mammals is provided in this section.

Project activities may also include the production of pulsed sounds from single-beam navigational echo sounders and positioning beacons (transceivers and transponders) used to determine the location of trenching or ROV equipment on or near the seafloor. These acoustic sources typically produce pulsed sounds at much higher frequencies than those produced by vessel thrusters; in narrow frequency bands; and in some cases (e.g., navigational echosounders), with narrow downward directed beamforms. For example, positioning beacons measured within the Chukchi Sea operated with center frequencies of 27 kHz (most energy between 26 and 28 kHz), 32 kHz (most energy between 25 and 35 kHz), and 22 to 23 kHz or 21 to 21.5 kHz (most energy between 20 and 25 kHz). For directional sources, the difference between in-beam and out-of-beam sound pressure levels at the same distance ranged from 5 to 15 dB re 1 μPa rms. Because high-frequency sounds attenuate more quickly within water, distances to threshold levels that may elicit behavioral responses in marine mammals were in the teens to several tens of meters, even within the narrow in-beam sound fields (Warner and McCrodan 2011). For this reason, and because the species considered in this BA have less sensitive hearing at these higher frequencies, potential impacts from non-impulsive vessels sounds are likely to subsume potential impacts from these sonar sources, and they are not addressed further below.

Marine mammals, including sea otters, rely heavily on the use of underwater sounds to communicate and gain information about their surroundings. Experiments and monitoring studies also show that they hear and may react to many types of anthropogenic sounds (e.g., Richardson et al. 1995, Gordon et al. 2004, Nowacek et al. 2007, Tyack 2008).

The effects of sound from vessel noise on marine mammals are highly variable, and can be generally categorized as follows (adapted from Richardson et al. 1995):

- The sound may be too weak to be heard at the animal's location (i.e., lower than the prevailing ambient sound level, the hearing threshold of the animal at relevant frequencies, or both).
- The sound may be audible but not strong enough to elicit any overt behavioral response (i.e., the animal may tolerate it, either without or with some deleterious effects such as masking or stress).
- The sound may elicit behavioral reactions of variable conspicuousness and variable relevance to the wellbeing of the animal; these can range from subtle effects on respiration or other behaviors (detectable only by statistical analysis) to active avoidance reactions.
- Upon repeated exposure, the animal may exhibit diminishing responsiveness (habituation/sensitization), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics, unpredictable in occurrence, and associated with situations that the animal may perceive as a threat.
- Any anthropogenic sound that is strong enough to be heard has the potential to reduce (mask) the ability of marine mammals to hear natural sounds at similar frequencies, including calls from conspecifics, echolocation sounds of odontocetes, and environmental sounds due to wave action or (at high latitudes) ice movement. Marine mammal calls and other sounds are often audible during the intervals between pulses, but mild to moderate masking may occur during that time because of reverberation.
- Very strong sounds have the potential to cause temporary or permanent reduction in hearing sensitivity (temporary and permanent threshold shift), or other physical or physiological effects. Received sound levels must far exceed the animal's hearing threshold for any temporary threshold shift to occur. Received levels must be even higher for a risk of permanent hearing impairment.

It is very unlikely that sea otters will be found within the action area. However, if present, some sea otters may exhibit minor, short-term disturbance responses to underwater sounds from cable-laying activities. Based on expected sound levels produced by the activity, any potential impacts on otter behavior will likely be localized to within an area around the vessels in use.

6.5.2 Injury or Mortality

Due to the low-intensity and non-impulsive nature of sounds produced by cable-laying activities, strandings or mortality resulting from acoustic exposure is highly unlikely. Any potential effects of this nature are more likely to come from ship strikes (e.g., Redfern et al. 2013). Areas where high densities of marine mammals overlap with frequent transits by large and fast-moving ships present high-risk areas. Wiley et al. (2016) concluded that reducing ship speed is one of the most reliable ways to avoid ship strikes. The collision risk of a cable-laying vessel with marine mammals exists but is extremely unlikely because of the relatively slow operating speed (typically 0.5 to 2 knots [1 to 4 km/hr]) of the vessel and the generally straight-line movement (Laist et al. 2001, Vanderlaan and Taggart 2007). For these reasons, collisions are unlikely between sea otters and vessels proposed for use during Project activities. Additionally, sea otters generally respond to an approaching vessel by swimming away from the area, further

reducing the risk of collision. According to the USFWS (2013), injury by vessel strikes is likely to be rare within areas with limited boat traffic.

6.5.3 Spills

The vessels that will be used for the cable-laying operations will have hazardous chemicals, including hydrocarbons, present. If petroleum or other hazardous materials spilled during Project activities, the level of impact on northern sea otters will depend on the size of the spill, location, time of year, and number of sea otters present.

Sea otters are particularly vulnerable to oil spills, and even a small amount has the potential to result in injury or mortality. Unlike many other marine mammals, sea otters do not rely on blubber for insulation, but rather on their fur and a high metabolism to thermoregulate. Fur contaminated by oil loses its ability to properly insulate, resulting in increased metabolic rates in the sea otter. Additionally, detergent used to wash sea otters after oil contamination also temporarily (minimum 8 days) reduces the water repellency feature of sea otter fur, compounding the energy expense for the otter.

The acute effects of oiling on sea otters can result in death from causes such as hypothermia and pneumonia (Costa and Kooyman 1982). For months following the *Exxon Valdez* oil spill in 1989, sea otter deaths from acute effects ranged from 1,000 to several thousands (Ballachey et al. 2014). Sea otter recovery following the spill was delayed due to continued reduction in sea otter survival rates. A study conducted by Bodkin et al. (2012) found that sea otters in Prince William Sound were still being exposed to oil from the *Exxon Valdez* oil spill on a weekly to monthly basis nearly two decades after the spill occurred. According to Ballachey et al. (2014), it took 24 years for sea otter populations in western Prince William Sound to recover from this oil spill. Sea otters are not expected to be impacted by spills caused by the proposed action. Hazardous chemicals associated with the Project will be in small quantities and properly contained, following all regulations, so the occurrence of a spill or leak from Project vessels is unlikely. If a spill occurred, it will be of a low volume and quickly contained.

6.5.4 Habitat Disturbance

Sea bottom disturbance from cable installation activities, route clearance, and plowing could affect sea otters if they are present within the action area. A brief and limited increase in turbidity from suspension of sediments is expected to have minimal effect on sea otters. Cable laying may also disturb the benthic community, which could, in turn, affect food supply over a small area. Sea otters feed on a wide variety of benthic invertebrates (Rotterman and Simon-Jackson 1988), including sea urchins, abalone, clams, mussels, and crabs (Riedman and Estes 1990). The disturbance effects on the benthos will be localized, short-term, and likely indistinguishable from naturally occurring disturbances. Given the brief duration of this activity, likelihood of no sea otters being present, and relatively small area impacted, no impact on sea otter feeding efficiency is anticipated.

No designated critical habitat for the Southwest Alaska DPS of northern sea otter occurs within the action area.

6.6 Indirect Effects of the Action

The proposed activities will result in primarily temporary indirect impacts to the listed species through their food sources. Although activities affect individual prey species, it is not expected that prey availability for the Steller's eider, spectacled eider, short-tailed albatross, and northern sea otter will be significantly affected.

Potential effects of the noise and bottom disturbance produced by Project activities on fish and invertebrates are summarized below. Any effects on these potential prey species could indirectly affect listed species within the action area.

6.6.1 Impacts to Prey Species

Exposure to anthropogenic underwater sounds has the potential to cause physical and behavioral effects on marine invertebrates and fish. Studies that conclude physical and physiological effects occur typically involve captive subjects that are unable to move away from the sound source and are, therefore, exposed to higher sound levels than they will be under natural conditions. Comprehensive literature reviews related to auditory capabilities of fish and marine invertebrates as well as the potential effects of noise include Hastings and Popper (2005), Popper and Hastings (2009a, 2009b), and Hawkins et al. (2015).

6.6.1.1 INVERTEBRATES

The sound detection abilities of marine invertebrates are the subject of ongoing scientific inquiry. Aquatic invertebrates, except aquatic insects, do not possess the equivalent physical structures present in fish and marine mammals that can be stimulated by the pressure component of sound. It appears that marine invertebrates respond to vibrations (i.e., particle displacement) rather than pressure (Breithaupt 2002).

Among the marine invertebrates, decapod crustaceans and cephalopods have been the most intensively studied in terms of sound detection and the effects of exposure to sound. Crustaceans appear to be most sensitive to low-frequency sounds (i.e., less than 1,000 Hz) (Budelmann 1992, Popper et al. 2001). Both cephalopods (Packard et al. 1990) and crustaceans (Heuch and Karlsen 1997) have been shown to possess acute infrasound (i.e., less than 20 Hz) sensitivity. Some studies suggest that invertebrate species, such as the American lobster (*Homarus americanus*), may also be sensitive to frequencies greater than 1,000 Hz (Pye and Watson 2004). A recent study concluded that planktonic coral larvae can detect and respond to sound, the first description of an auditory response in the invertebrate phylum Cnidaria (Vermeij et al. 2010).

Currently, no studies suggest that invertebrates are likely to be harmed by, or show long-term responses to, brief exposures to vessel sounds similar to those that will occur during this Project.

6.6.1.2 FISH

Marine fish are known to vary widely in their abilities to detect sound. Although hearing capability data only exist for fewer than 100 of the 27,000 fish species (Hastings and Popper 2005), current data suggest that most fish species detect sounds with frequencies less than 1,500 Hz (Popper and Fay 2010). Some marine fish, such as shad and menhaden, can detect sound at frequencies greater than 180 kHz (Mann et al. 1997, 1998, 2001).

Numerous papers about the behavioral responses of fish to marine vessel sounds have been published in the primary literature. They consider the responses of small pelagic fish (e.g., Misund et al. 1996, Vabo et al. 2002, Jørgensen et al. 2004, Skaret et al. 2005, Ona et al. 2007, Sand et al. 2008), large pelagic fish (Sarà et al. 2007), and groundfish (Engås et al. 1998, Handegard et al. 2003, De Robertis et al. 2008). Generally, most studies indicate fish typically exhibit some level of reaction to the sound of approaching marine vessels, the degree of reaction being dependent on a variety of factors, including fish activity at the time of exposure (e.g., reproduction, feeding, migration), vessel sound characteristics, and water depth. Simpson et al. (2016) found that vessel noise and direct disturbance by vessels raised stress levels and reduced anti-predator responses in some reef fish and, therefore, more than doubled mortality by predation. This response has negative consequences for fish but could be beneficial to marine mammals that prey on fish.

However, given the routine presence of other vessels within the region and the lack of significant effects on fish species from their presence, indirect effects to listed species from exposure of fish to Project vessel sounds is expected to be very unlikely.

7 Cumulative Effects

Cumulative effects are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.2). Since the Determination of Effects for each species is either no effect or not likely to adversely affect (see Section 8), cumulative effects are not described in this BA.

8 Determination of Effects

This BA evaluates the potential impacts of the Project on Steller's eider, spectacled eider, short-tailed albatross, and Southwest Alaska DPS of northern sea otter. To reach a conclusion, Project impacts are not considered in isolation, but are placed in the context of the current status of the species and critical habitat, the environmental baseline, and cumulative effects. Consistent with ESA guidance, a "may affect, but is not likely to adversely affect" determination means that all effects are beneficial, insignificant, or discountable. For purposes of this BA, "may affect, but is not likely to adversely affect" suggests that any potential effects are highly unlikely; will be of short duration; will not have any adverse effects to the species or critical habitat; and will not be measurable, or are considered insignificant or discountable. A "may affect, and is likely to adversely affect" determination means that listed resources are likely to be exposed to the action or its environmental consequences, and may respond in a negative manner to this exposure. After considering these aggregate effects on the species, the recommended effect determinations are described in the following sections.

8.1 Steller's Eider

The Project **may affect, but is not likely to adversely affect** Steller's eider. A **may affect** determination is warranted because the action area is located within the species' range, and Steller's eiders have been observed within the action area in the past. A **not likely to adversely affect** determination is warranted because the low levels and low frequency of the noise associated with construction is not likely to result in disturbance or injury. The eiders are unlikely to be disturbed by the presence of vessels due to their slow speeds. The artificial lighting on the vessels is unlikely to disturb eiders because marine-based cable laying will occur during summer. The short-term disturbance of the benthic habitat in which eiders may feed will have an insignificant impact on eider foraging ability or efficiency.

8.2 Spectacled Eider

While the historical range of the spectacled eider has been observed within the action area in the past, a **no effect** determination is warranted because the probability of spectacled eiders occurring within the action area is so low as to be discountable.

8.3 Short-tailed Albatross

A **no effect** determination is warranted because the probability of short-tailed albatross occurring during cable-laying activities between May and June is so low as to be discountable.

8.4 Southwest Alaska DPS of Northern Sea Otter

A **no effect** determination is warranted because the action area is not within the current known range of the Southwest Alaska DPS of northern sea otter, so the probability of this species occurring within the action area is so low as to be discountable.

9 References

ADF&G (Alaska Department of Fish and Game)

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Appendix A. ESA-listed Species/Populations Present within/near the Action Area (USFWS, February 2, 2023)

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IPaC

U.S. Fish & Wildlife Service

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS offce(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

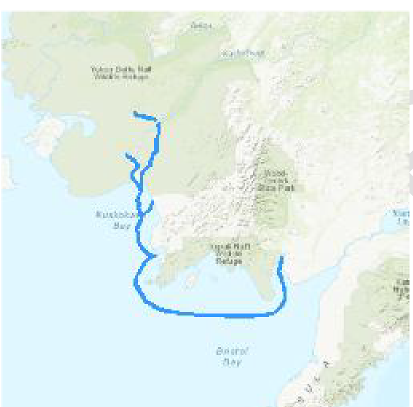
Project information

NAME

Airraq Phase 1 and 2

LOCATION

Bethel and Dillingham counties, Alaska



DESCRIPTION

None

Local office

Anchorage Fish & Wildlife Field Office

Phone (907) 271-2888

Fax (907) 271-2786

4700 Blm Road

Anchorage, AK 99507

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local offce and a species list which fulfills this requirement can only be obtained by requesting an offcial species list from either the Regulatory Review section in IPaC (see directions below) or from the local field offce directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an offcial species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are not shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Sea Otter Enhydra lutris kenyoni There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2884	Threatened Marine mammal
Wood Bison Bison bison athabascae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8362	Threatened

Birds

NAME	STATUS
Short-tailed Albatross Phoebastria (=Diomedea) albatrus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/433	Endangered
Spectacled Eider Somateria fischeri Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/762	Threatened
Steller's Eider Polysticta stelleri There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1475	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing

appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take- migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation- measures.pdf

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

Please refer to Alaskas Bird Nesting Season for recommendations to minimize impacts to migratory birds, including eagles.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Feb 1 to Sep 30

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4- week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the

week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds

across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

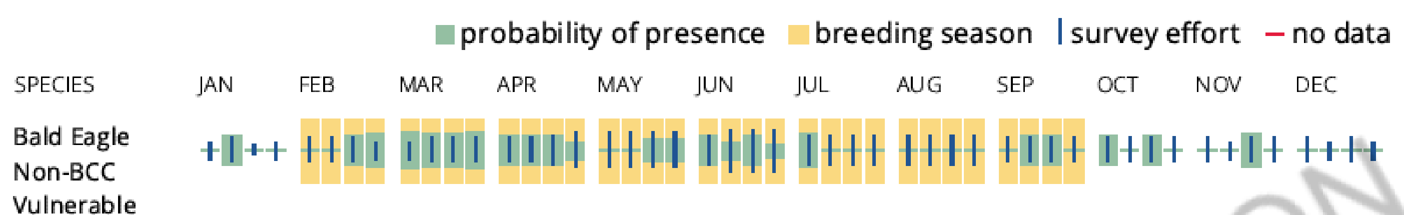
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science

datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Offce if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

There are migratory birds in your project area. Please refer to Alaska's Bird Nesting Season for recommendations to minimize impacts to migratory birds, including eagles.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds

https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take- migratory-birds

- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

Name	Breed Season
Aleutian Tern Sterna aleutica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9599	Breeds May 1 to Aug 31
American Golden-plover Pluvialis dominica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 15
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities	Breeds Feb 1 to Sep 30
Black Scoter Melanitta nigra This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Name	Breed Season
Black Turnstone Arenaria melanocephala This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska	Breeds May 15 to Jul 31
Black-legged Kittiwake Rissa tridactyla This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Common Loon gavia immer This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/4464	Breeds Apr 15 to Oct 31
Dunlin Calidris alpina arcticola This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 20 to Jul 20
Hudsonian Godwit Limosa haemastica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Jul 31
Long-tailed Duck Clangula hyemalis This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/7238	Breeds elsewhere
Pomarine Jaeger Stercorarius pomarinus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Name	Breed Season
Red Phalarope Phalaropus fulicarius This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-breasted Merganser Mergus serrator This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-necked Phalarope Phalaropus lobatus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-throated Loon Gavia stellata This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds Jun 1 to Aug 10
White-winged Scoter Melanitta fusca This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4- week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

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2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

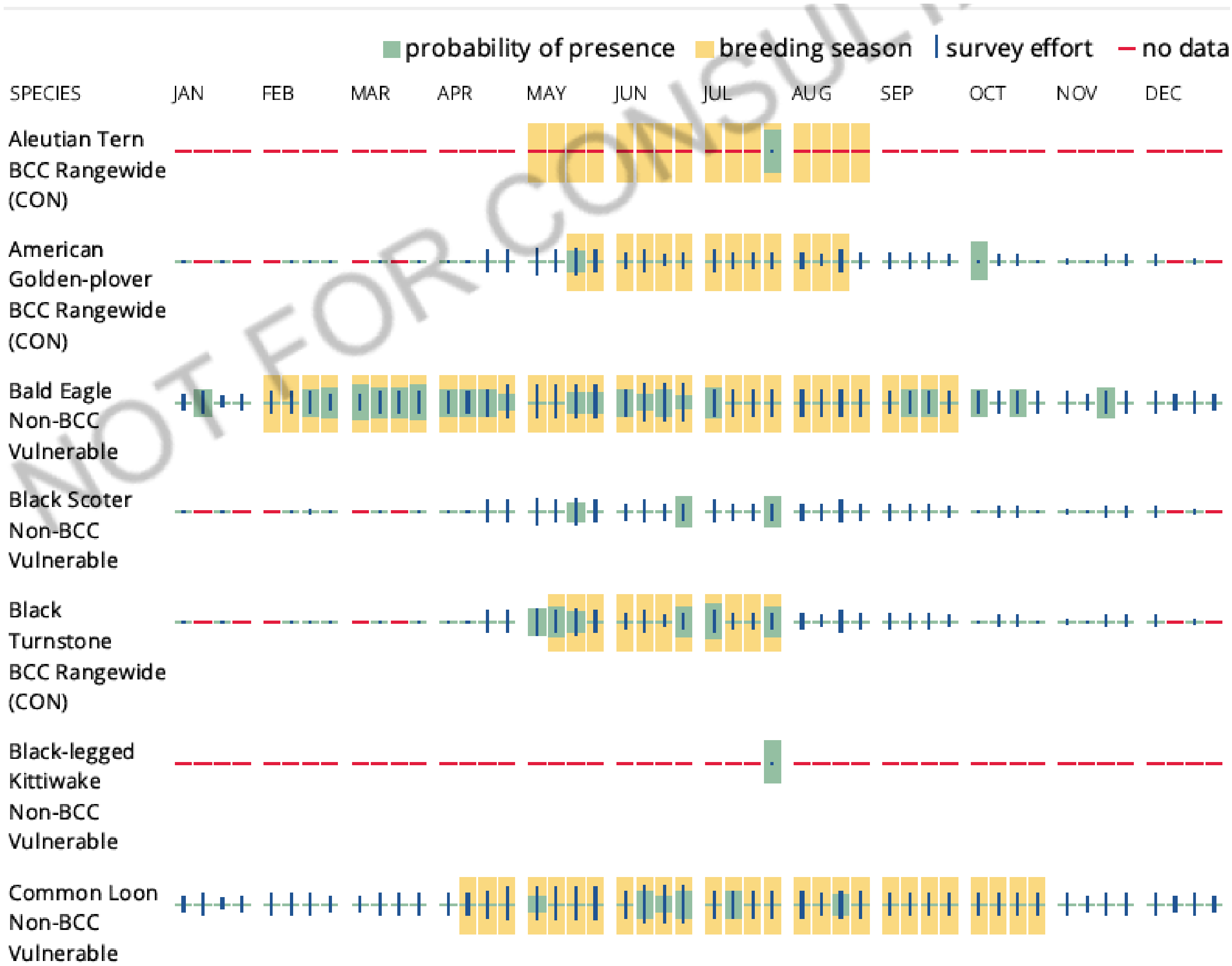
No Data (−)

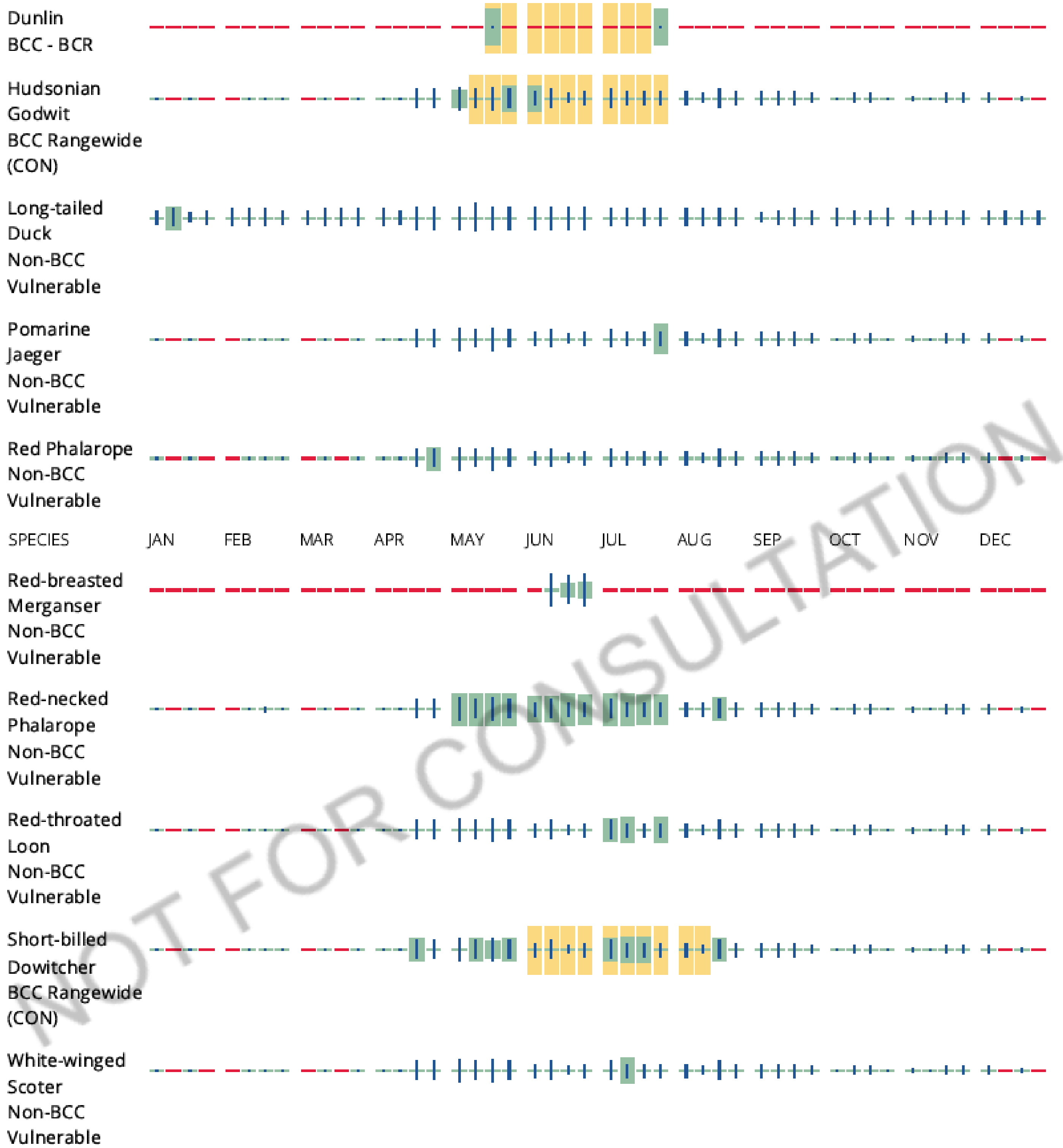
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant

information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your

list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Marine mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are not shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take (to harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill) of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an offce of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following marine mammals under the responsibility of the U.S. Fish and Wildlife Service are potentially affected by activities in this location:

NAME

Northern Sea Otter Enhydra lutris kenyoni

https://ecos.fws.gov/ecp/species/2884

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
TOGIAK NATIONAL WILDLIFE REFUGE	28,553,452.44 acres
YUKON DELTA NATIONAL WILDLIFE REFUGE	10,145,825,325.27 acres

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

NO DATA AVAILABLE - This area (or portions of it) has not been surveyed by the NWI. For more information, please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

NOTE: This initial screening does not replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the

information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies.

Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

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Appendix C. Airraq Network Cultural Resources Data Gap Analysis Report

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Appendix C. Drinking Water Protection Area Maps

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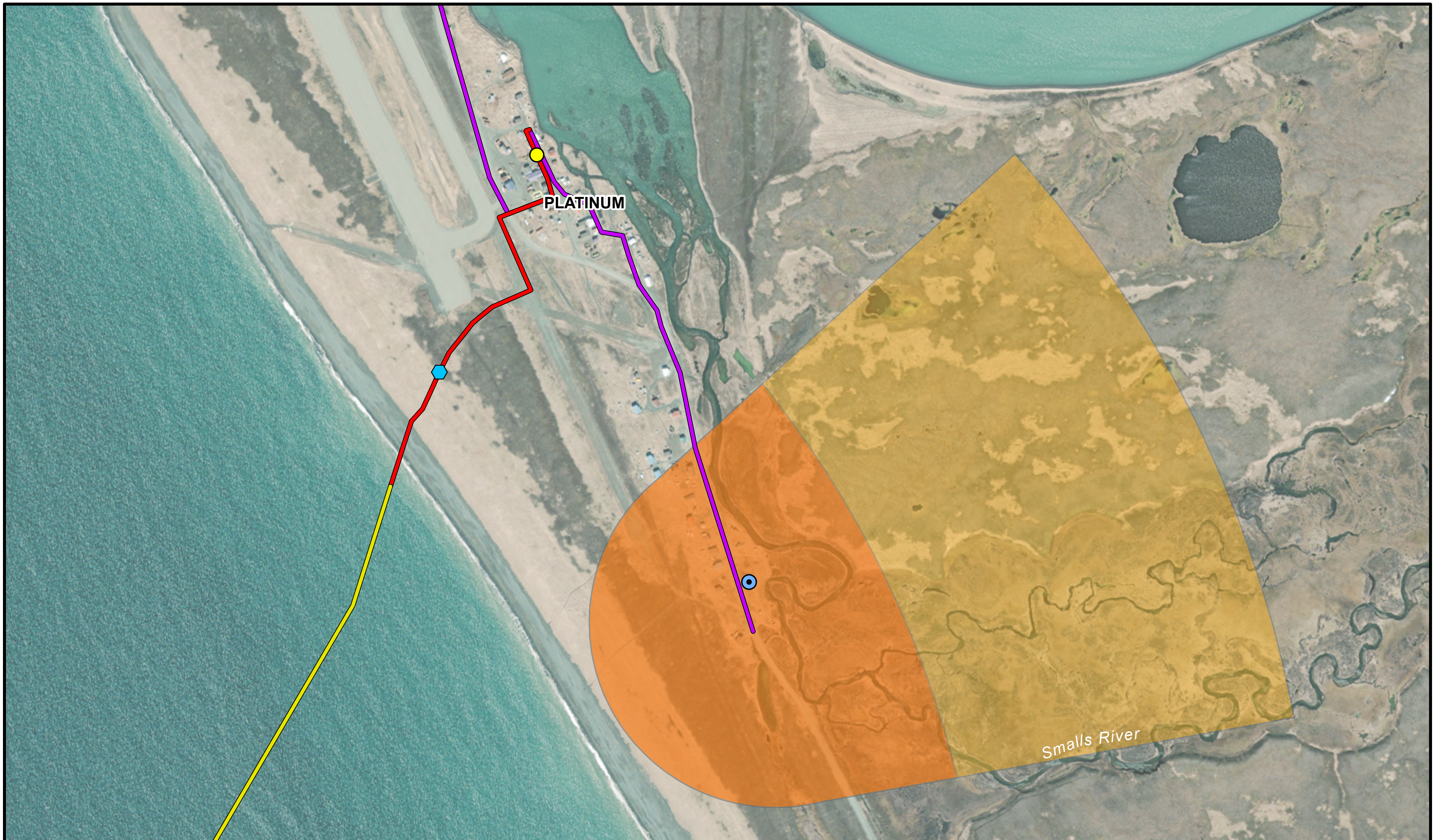


Airraq Network
Drinking Water Protection Areas

Platinum

0 430 860 Feet
HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Project Activities
- Beach Manhole
- Cable Landing Station

FOC Construction Methods
- Jet Trench
- Standard Trench
- FTTP (Buried Path)

Public Water System Source

Drinking Water Protection Area
- Zone A
- Zone B

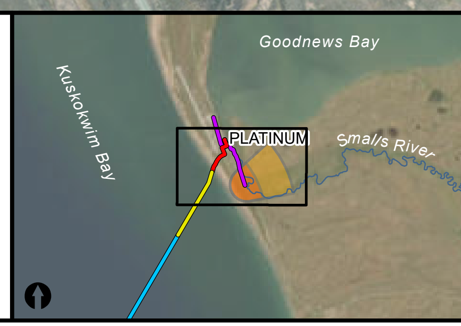


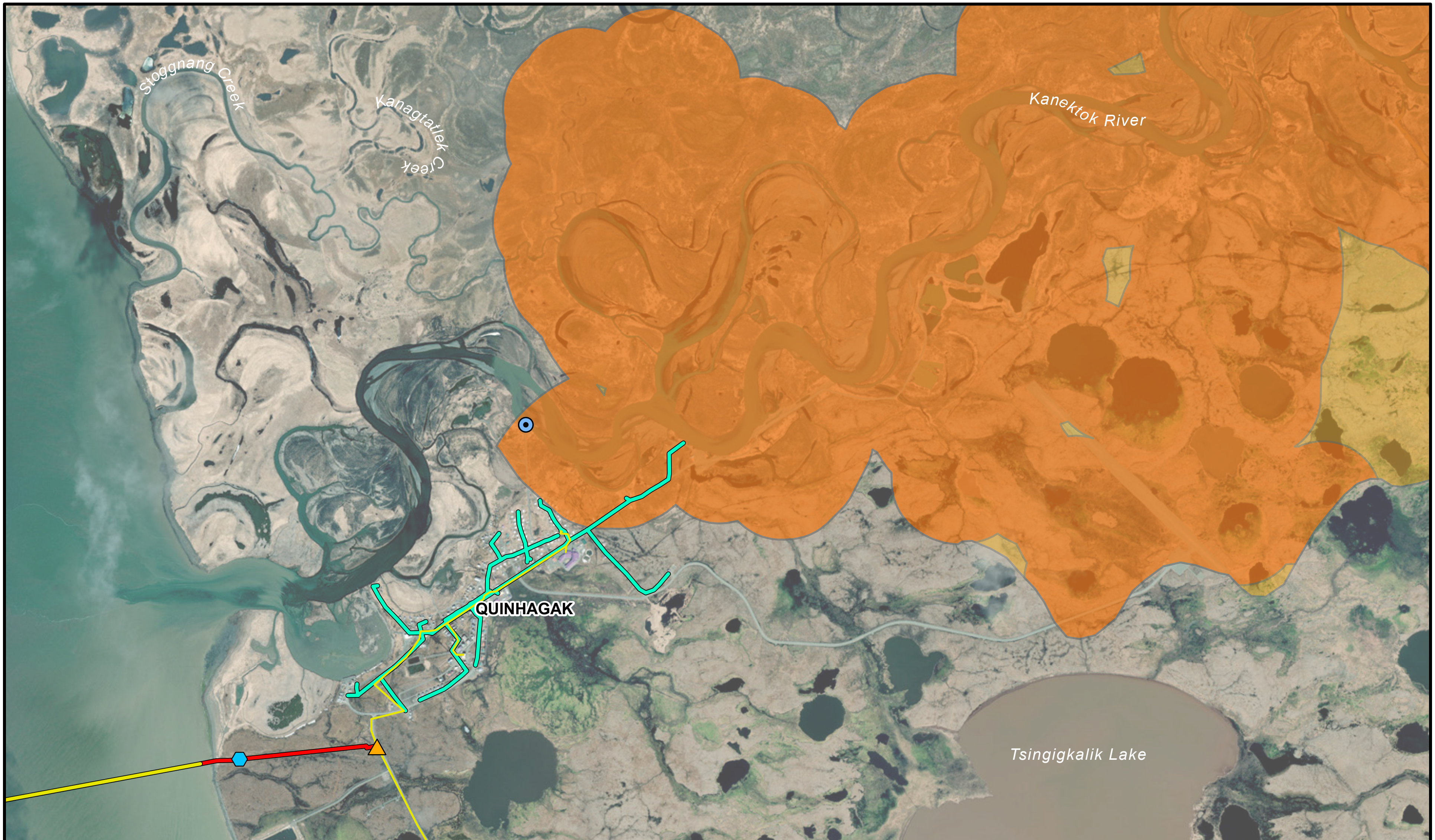
Figure 1

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Quinhagak

0 0.25 0.5 Miles

HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Existing Fiber (no new construction)

Project Activities

- Beach Manhole
- Connection Vault

FOC Construction Methods

- Jet Trench
- Standard Trench
- FTTP (Aerial Path)

Public Water System Source

Drinking Water Protection Area

- Zone A
- Zone B

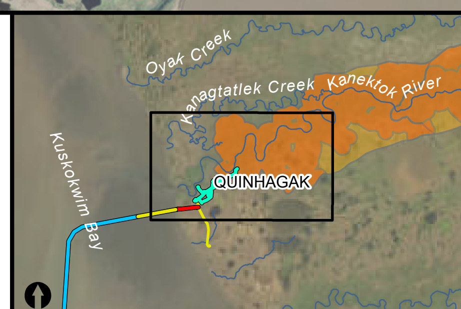


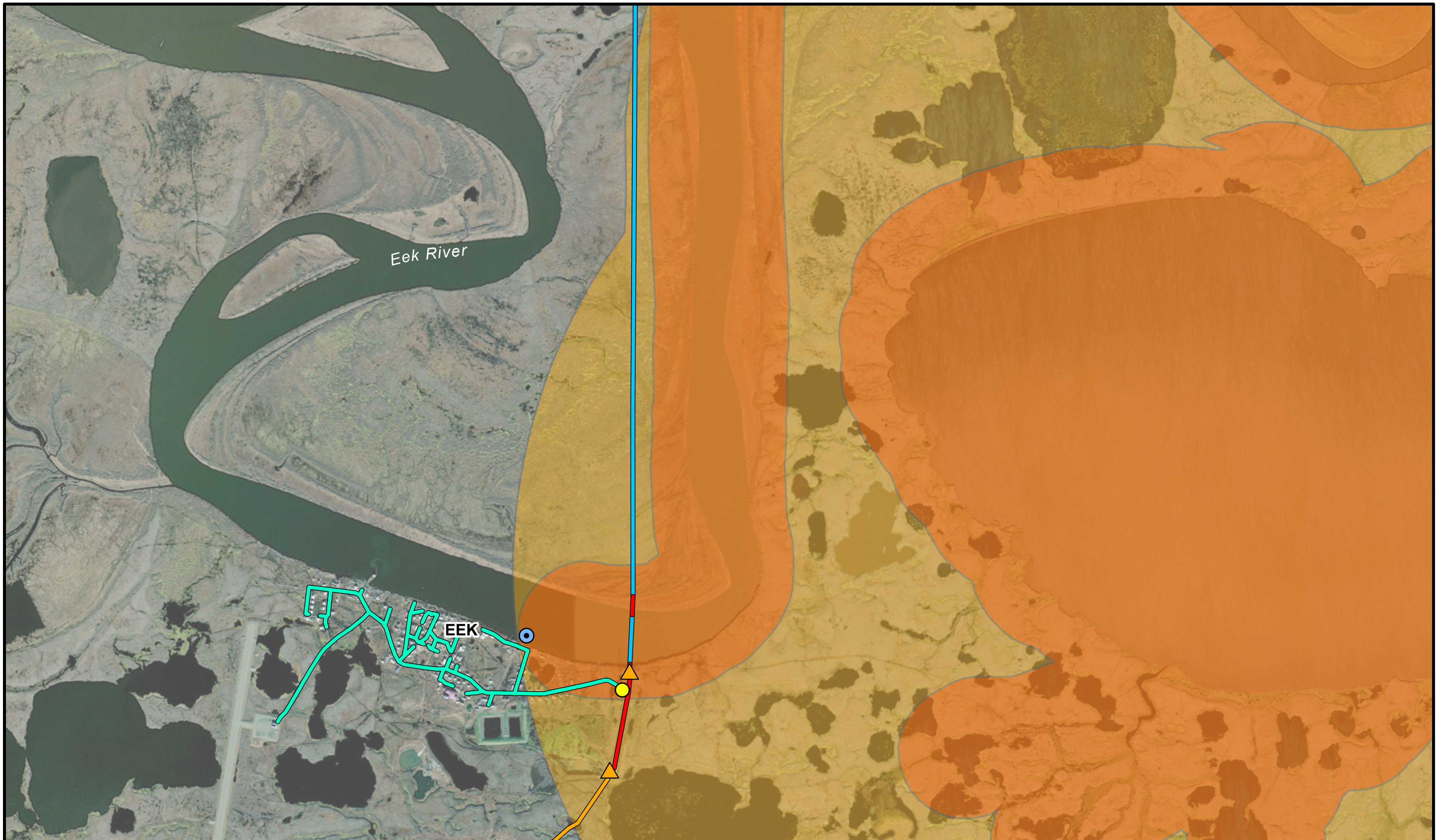
Figure 2

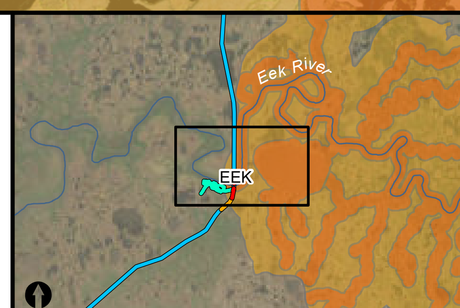
October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake





Airraq Network
Drinking Water Protection Areas

Eek

0 0.2 0.4 Miles
HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Project Activities
Cable Landing Station
Connection Vault
FOC Construction Methods
Standard Trench
Trench - Rock saw
Surface Lay
FTTP (Aerial Path)

Public Water System Source
Drinking Water Protection Area
Zone A
Zone B

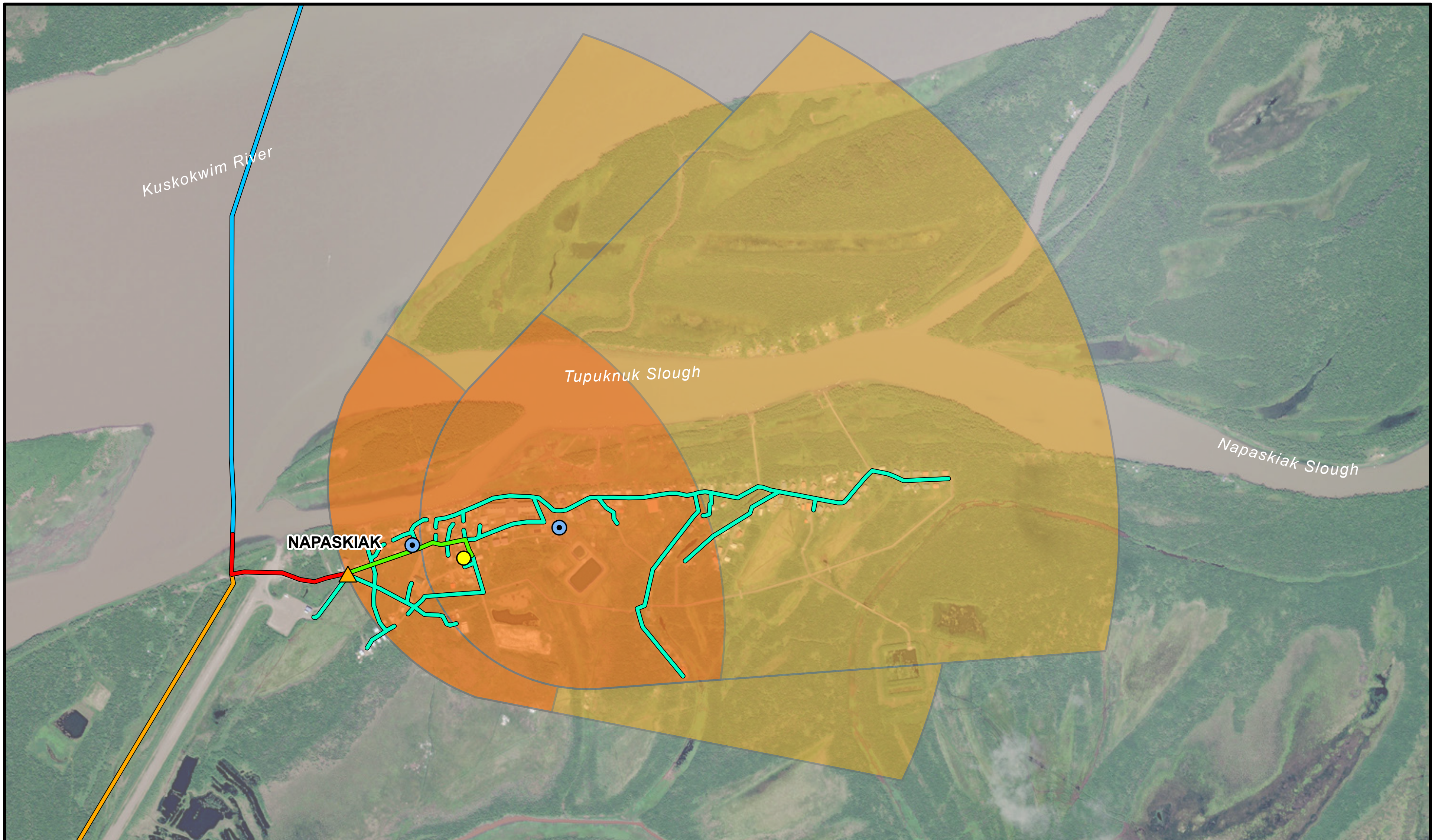
Figure 3

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Napaskiak

0 660 1,320 Feet

HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Project Activities
- Cable Landing Station
- Connection Vault

FOC Construction Methods
- Attach to Existing Aerial Poles
- Standard Trench
- Trench - Rock saw
- Surface Lay
- FTTP (Aerial Path)

- Public Water System Source

Drinking Water Protection Area
- Zone A
- Zone B

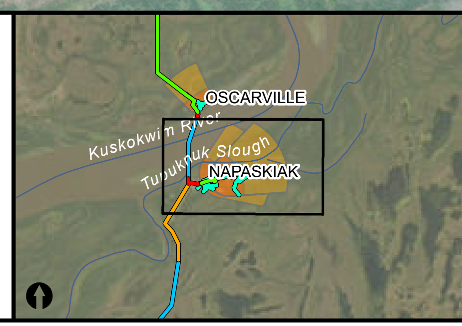


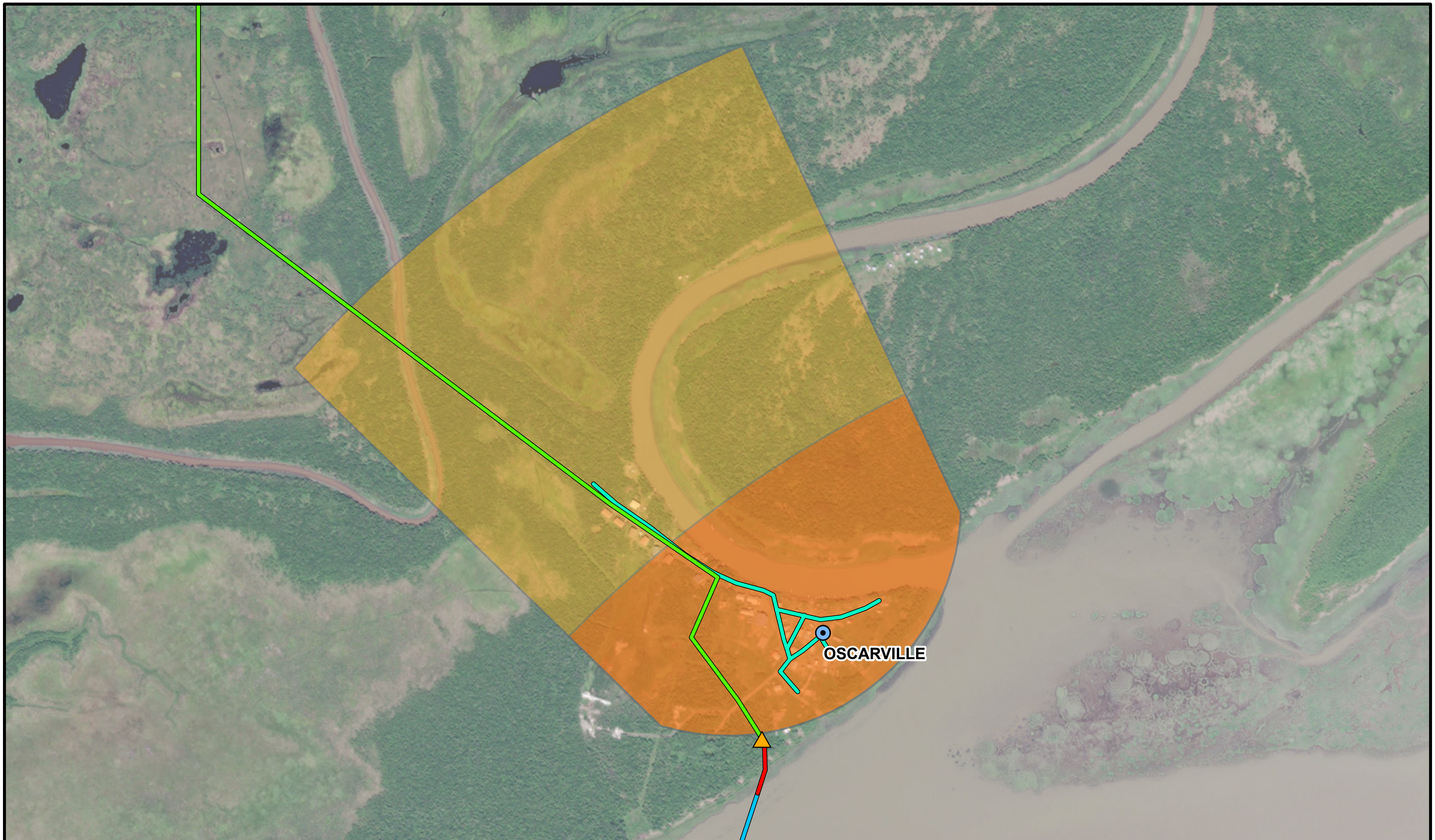
Figure 4

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Oscarville

0 425 850 Feet
HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Project Activities
Connection Vault
FOC Construction Methods
Attach to Existing Aerial Poles
Standard Trench
Surface Lay
FTTP (Aerial Path)

Public Water System Source
Drinking Water Protection Area
Zone A
Zone B

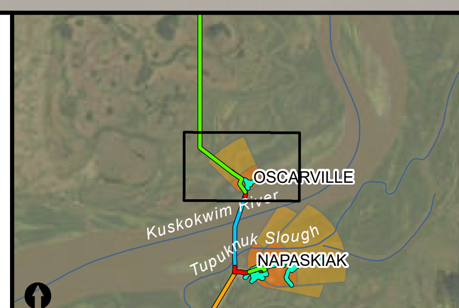


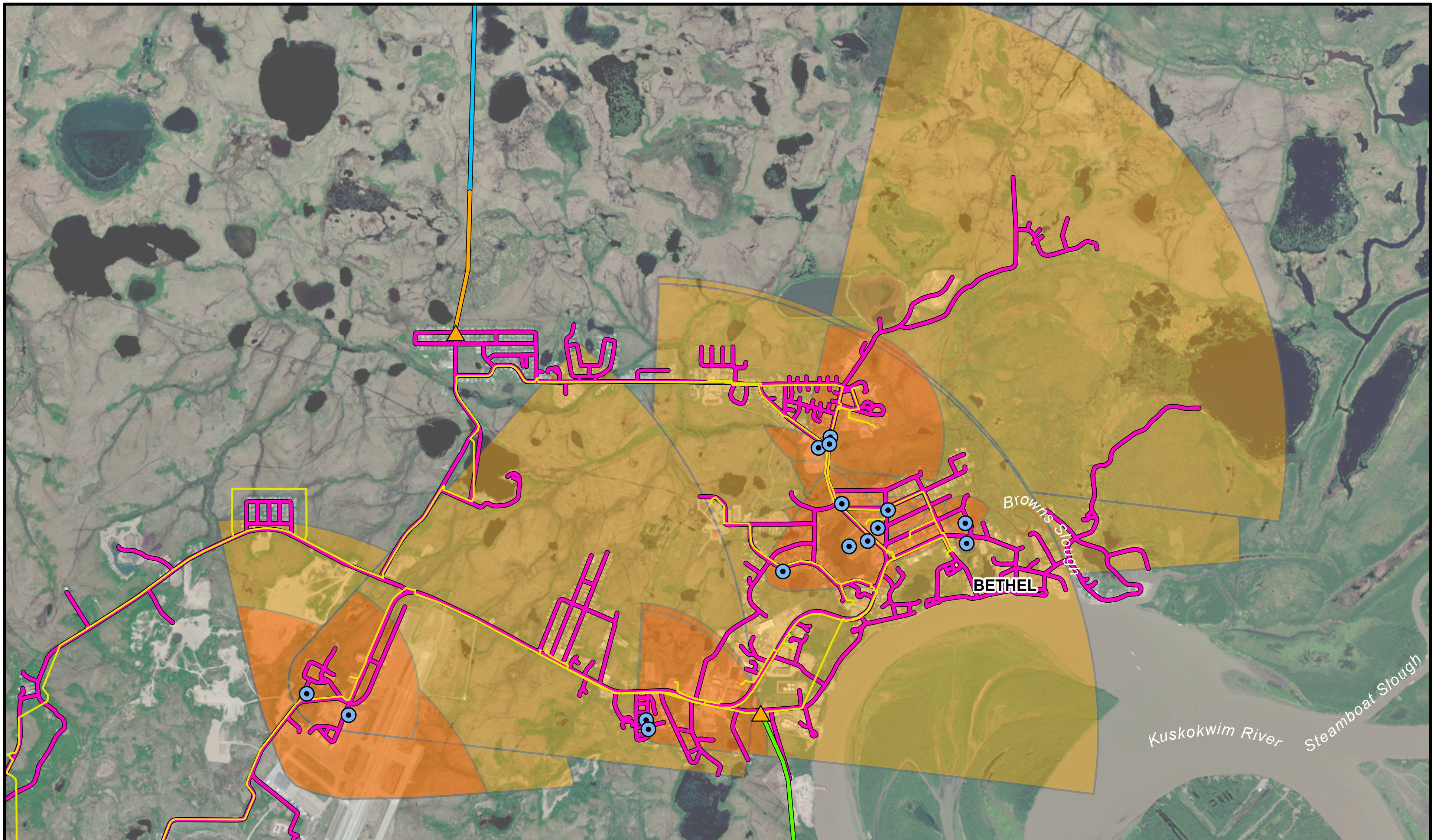
Figure 5

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Bethel

0 0.3 0.6 Miles

HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Existing Fiber (no new construction)

Project Activities

Connection Vault

FOC Construction Methods

Attach to Existing Aerial Poles

Trench - Rock saw

Surface Lay

Hybrid Fiber-coaxial Upgrades (attached to existing utility poles)

Public Water System Source

Drinking Water Protection Area

Zone A

Zone B

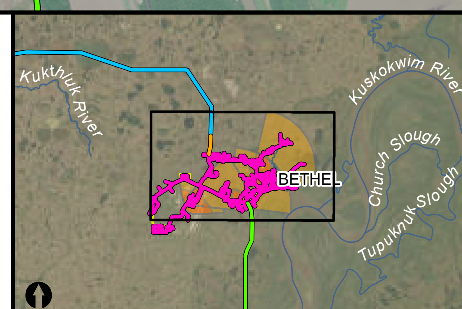


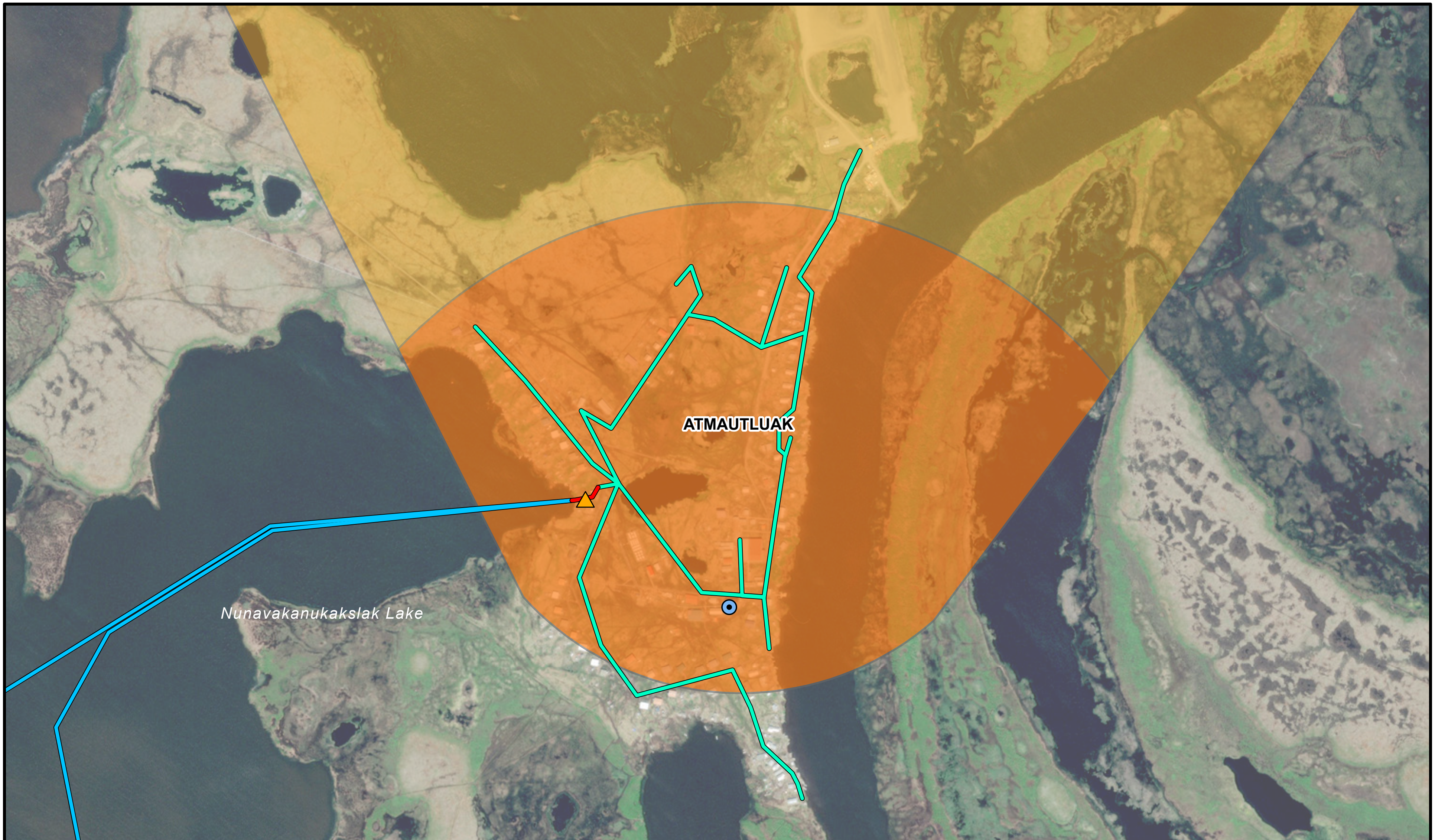
Figure 6

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Atmautluak

0 425 850
Feet
HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Project Activities
Connection Vault
FOC Construction Methods
Standard Trench
Surface Lay
FTTP (Aerial Path)

Public Water System Source
Drinking Water Protection Area
Zone A
Zone B

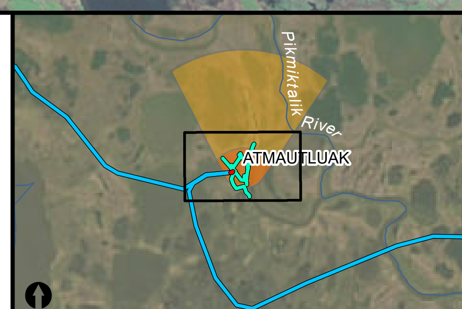


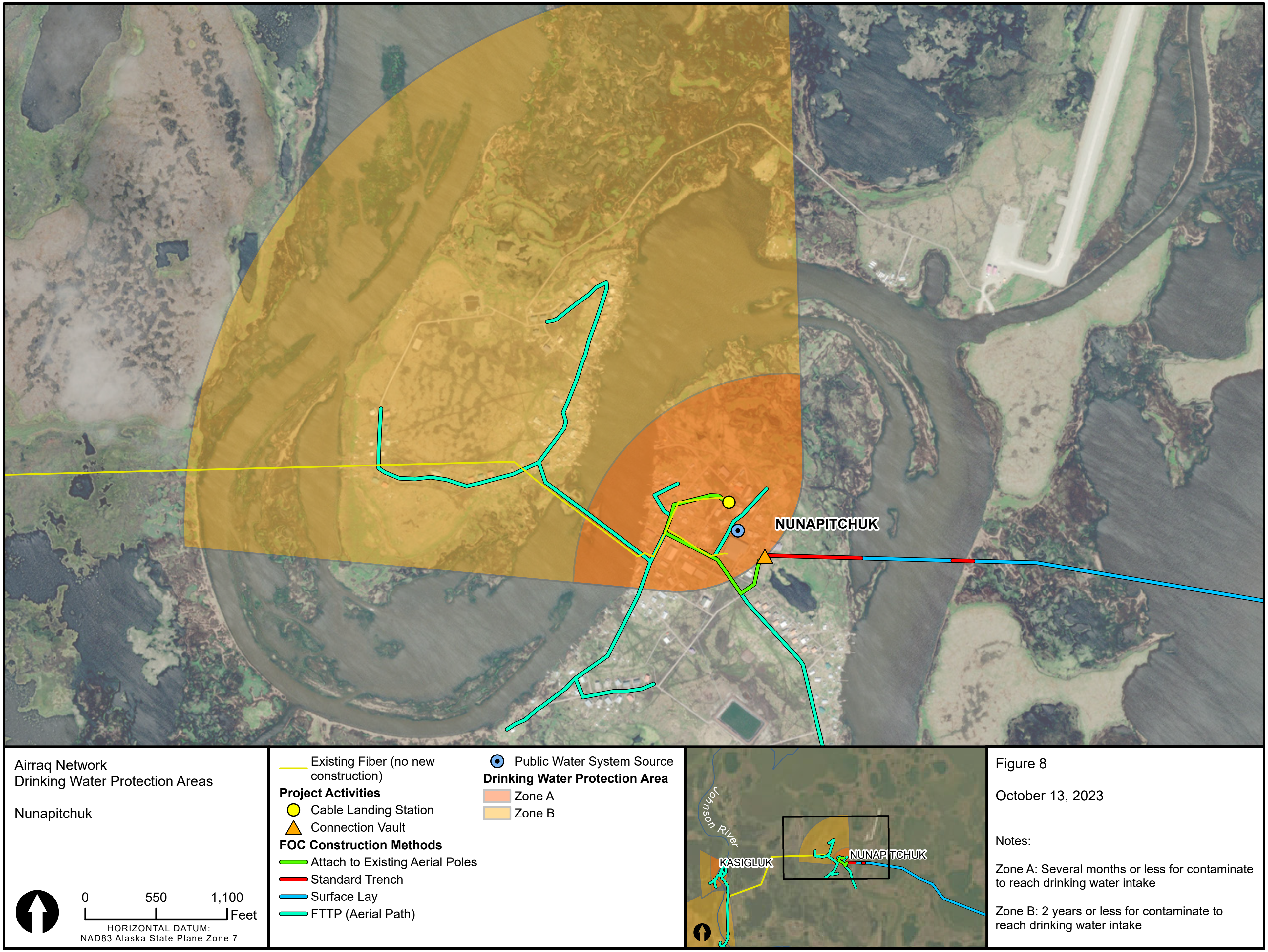
Figure 7

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Nunapitchuk

Existing Fiber (no new construction)

Project Activities

Cable Landing Station

Connection Vault

FOC Construction Methods

Attach to Existing Aerial Poles

Standard Trench

Surface Lay

FTTP (Aerial Path)

Public Water System Source

Drinking Water Protection Area

Zone A

Zone B

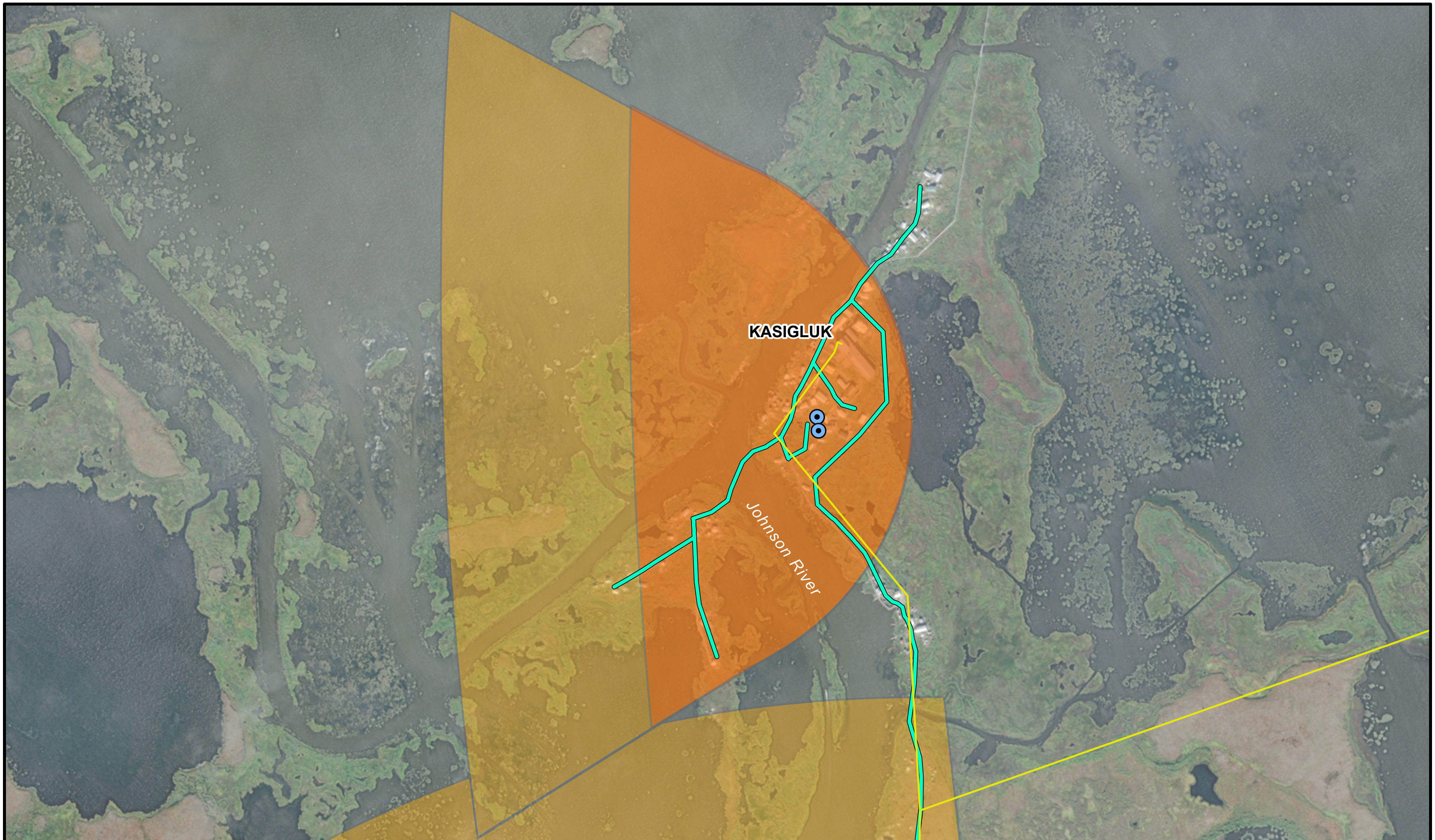
Figure 8

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Kasigluk

0 440 880 Feet

HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Existing Fiber (no new construction)

FOC Construction Methods

FTTP (Aerial Path)

Public Water System Source

Drinking Water Protection Area

Zone A

Zone B

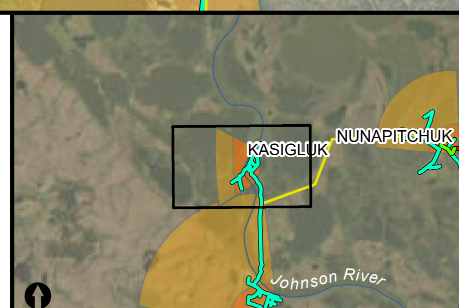


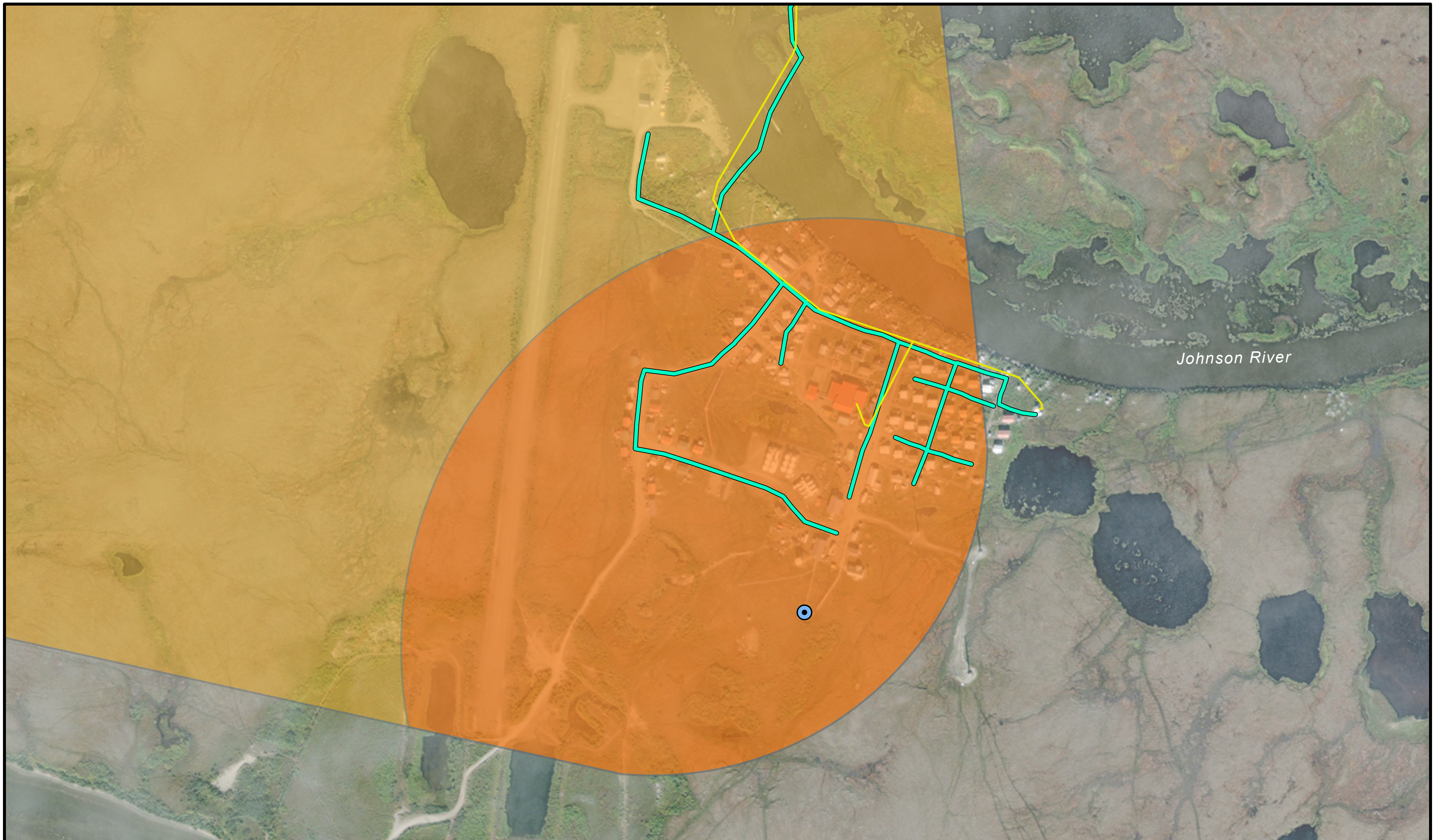
Figure 9

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Kasigluk

0 370 740
Feet
HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Existing Fiber (no new construction)

FOC Construction Methods

FTTP (Aerial Path)

Public Water System Source

Drinking Water Protection Area

Zone A

Zone B

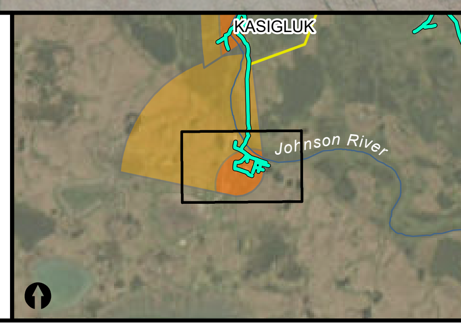


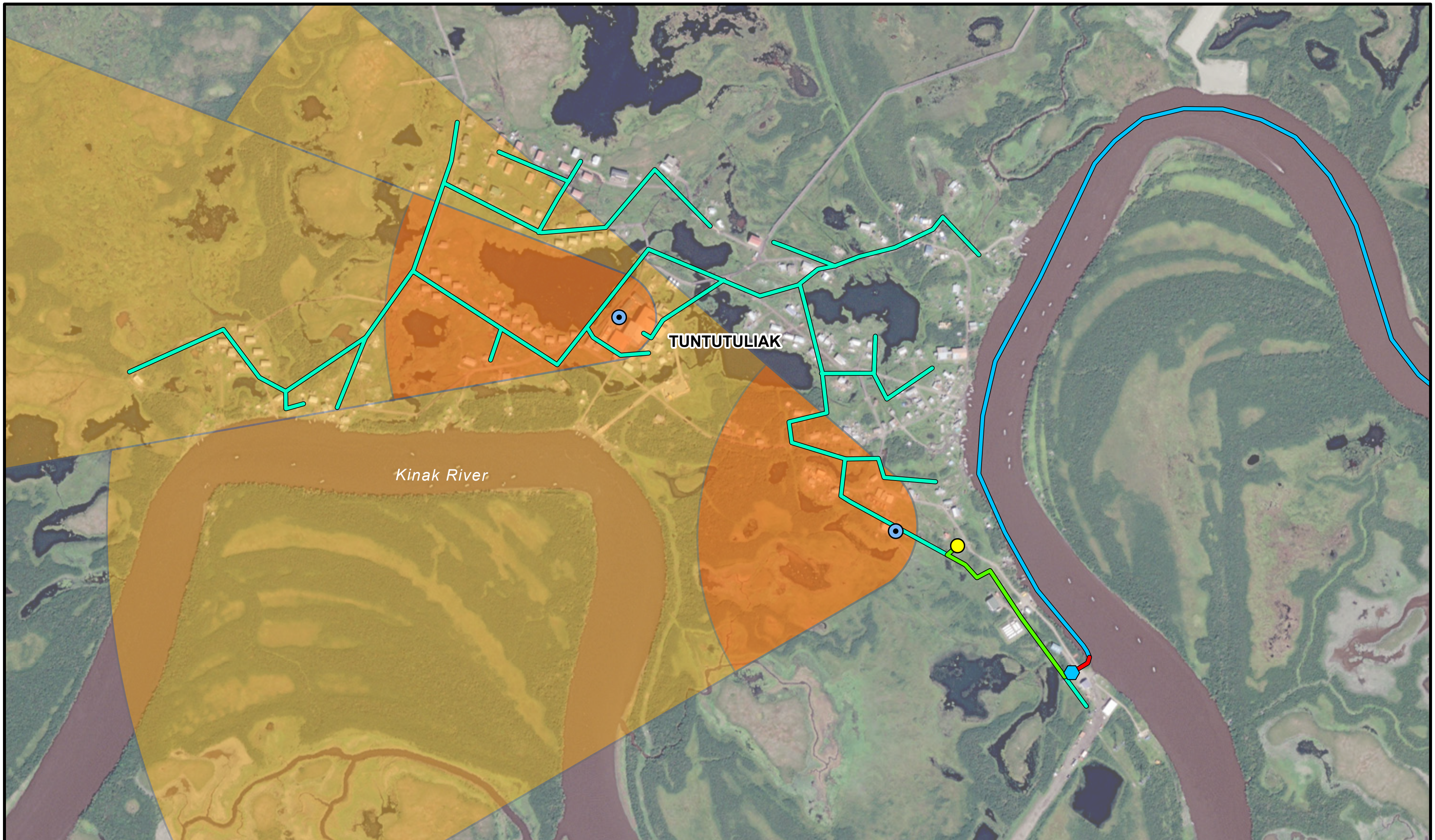
Figure 10

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake



Airraq Network
Drinking Water Protection Areas

Tuntutuliak

0 430 860 Feet

HORIZONTAL DATUM:
NAD83 Alaska State Plane Zone 7

Project Activities
- Beach Manhole
- Cable Landing Station

FOC Construction Methods
- Attach to Existing Aerial Poles
- Standard Trench
- Surface Lay
- FTTP (Aerial Path)

- Public Water System Source

Drinking Water Protection Area
- Zone A
- Zone B

Figure 12

October 13, 2023

Notes:

Zone A: Several months or less for contaminate to reach drinking water intake

Zone B: 2 years or less for contaminate to reach drinking water intake

Appendix D. NMFS ESA Section 7 Consultation

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UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, DC 20230

March 14, 2023

Mr. Jon Kurland, Regional Administrator
NOAA Fisheries, National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802

Subject: Non-Federal Designation for National Marine Fisheries Service Consultation

Dear Mr. Kurland,

This letter is regarding the AIRRAQ network project, which will bring broadband service to 10 rural Alaska villages in the Yukon-Kuskokwim Delta. The National Telecommunications and Information Administration (NTIA) has awarded a Tribal Broadband Connectivity Program grant to Bethel Native Corporation, who is partnered with Unicom to design, construct, and manage the project. Additionally, the U.S. Department of Agriculture (USDA) Rural Utilities Service (RUS) has awarded a grant to Unicom to support the project. The project will involve work in both marine and terrestrial environments.

While federal funding for the project is provided by NTIA and RUS, both agencies have agreed to partner to implement the National Environmental Policy Act with NTIA as the lead federal agency and RUS acting as a cooperating agency. This lead- and cooperating agency designation is extended to consultations with your agency. NTIA believes consultation under Section 7 of the Endangered Species Act (ESA) is required for species under your jurisdiction. Pursuant to 50 CFR §402.08, we designate Unicom (a wholly owned subsidiary of GCI Communications Corporation) and Unicom's consultant HDR Engineering, Inc. (HDR) as our non-Federal representatives to conduct Section 7 consultation using the following actions:

- Informal consultation and technical conversation with your agency for listed species
- Preparation of a Biological Assessment (subject to NTIA review and concurrence)

NTIA is also planning informal consultation under Section 7 of the ESA with the U.S. Fish & Wildlife Service and appreciates coordination between both federal agencies with jurisdiction over species in the project area.

Mr. Brett Carrothers is HDR's primary point of contact for consultation for this project and can be reached via email at brett.carrothers@hdrinc.com and by phone at 907-644-2121.

NTIA remains responsible for the content of the Biological Assessment to include an action area determination and findings of effect for listed species and/or critical habitat. If required, NTIA will be responsible for initiating formal consultation.

If you have questions or need any additional information, please contact me at apereira@ntia.gov or 202-834-4016.

Sincerely,

AMANDA PEREIRA

Digitally signed by AMANDA PEREIRA
Date: 2023.03.14 17:31:05 -04'00'

Amanda Pereira
Environmental Program Officer
National Telecommunications and Information Administration
Department of Commerce

April 6, 2023

Jon Kurland
Regional Administrator
NOAA Fisheries, National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802

RE: Section 7 Endangered Species Act Informal Consultation Request for the Airraq Network Project

Dear Mr. Kurland,

On behalf of Unicom, Inc. (Unicom), the National Telecommunications and Information Administration (NTIA), and the U.S. Department of Agriculture (USDA) Rural Development (RD) Rural Utilities Service (RUS), HDR Engineering, Inc. (HDR) requests to initiate informal consultation with the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act (ESA) for the Airraq Network Project (Project). Table 1 shows the listed species within the Project's action area.

Unicom is proposing to construct the Project to extend broadband service from Dillingham to 10 communities within the Lower Kuskokwim River Delta by placing approximately 548 miles of fiber optic cable (FOC) on the ocean floor, in the Kuskokwim River, and on terrestrial landscapes throughout the region (Figure 2-1 in Attachment 1). Approximately 391 miles of FOC will be laid within the marine environment, with landfall at Dillingham, Platinum, Quinhagak, Apogak, and Tuntutuliak (Table 2 and Table 3). Construction operations are expected to begin in May 2024 and be finished prior to September 10, 2024.

The federal action triggering this consultation request is funding of the Project through grants from NTIA and RUS. As such, NTIA and RUS are required to ensure that the Project will not result in a significant environmental effect. Additionally, the Project requires a permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act from the U.S. Army Corps of Engineers. The information contained in this letter and the Biological Assessment (Attachment 1) includes an analysis of potential direct, indirect, and cumulative impacts to ESA-listed species as a result of the Project. NTIA and USDA conclude and request concurrence from NMFS that the proposed Project **may affect, but is not likely to adversely affect** Beringia Distinct Population Segment (DPS) of bearded seal (*Erignathus barbatus*), fin whale (*Balaenoptera physalus*), Western North Pacific DPS of gray whale (*Eschrichtius robustus*), Mexico DPS of humpback whale (*Megaptera novaeangliae*), Western North Pacific DPS of humpback whale (*Megaptera novaeangliae*), North Pacific right whale (*Eubalena japonica*), Arctic subspecies of ringed seal

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(*Pusa hispida*), sperm whale (*Physeter microephalus*), and Western DPS and Critical Habitat of Steller sea lion (*Eumetopias jubatus*) (Table 1). Critical habitat for the Western DPS of Steller sea lion is present within the action area.

Table 1. ESA-listed Species and Critical Habitat within the Action Area

Species	ESA Status	Critical Habitat in Action Area	Effect Determination for Species	Effect Determination for Critical Habitat
Bearded Seal Beringia DPS (*Erignathus barbatus*)	Threatened	No	May affect, not likely to adversely affect	—
Fin Whale (*Balaenoptera physalus*)	Threatened	No	May affect, not likely to adversely affect	—
Gray Whale Western North Pacific DPS (*Eschrichtius robustus*)	Threatened	No	May affect, not likely to adversely affect	—
Humpback Whale Mexico DPS (*Megaptera novaeangliae*)	Threatened	No	May affect, not likely to adversely affect	—
Humpback Whale Western North Pacific DPS (*Megaptera novaeangliae*)	Threatened	No	May affect, not likely to adversely affect	—
North Pacific Right Whale (*Eubalena japonica*)	Threatened	No	May affect, not likely to adversely affect	—
Ringed Seal Arctic Subspecies (*Pusa hispida*)	Threatened	No	May affect, not likely to adversely affect	—
Sperm Whale (*Physeter macrocephalus*)	Threatened	No	May affect, not likely to adversely affect	—
Steller Sea Lion Western DPS (*Eumetopias jubatus*)	Endangered	Yes	May affect, not likely to adversely affect	May affect, not likely to adversely affect

Table 2. Marine Route Summary

FOC Route Segment	Cable Installed by Cable Ship[a] (mi)	Cable Installed by VOO, Tug and Barge, or Landing Craft[b] (mi)	Total Length (mi)
Dillingham MLW to Platinum MLW	178.7	52.5	231.2
Platinum MLW to Apogak Landing MLW	50.0	47.3	97.3
Quinhagak BU – Phase 1 Route to Quinhagak MLW	0.0	20.0	20.0
Tuntutuliak BU – Phase 1 Route to Kinak River OHW at Tuntutuliak	0.0	42.1	42.1
Project Total	**228.7**	**161.9**	**390.6**

Notes: VOO= Vessel of Opportunity, mi = mile; MLW= Mean Low Water, BU= Branching Unit, OHW= Ordinary High Water
[a] Waters deeper than 40 feet, cable may be surface laid or trenched with a cable plow
[b] Waters shallower than 40 feet, cable may be surface laid or trenched with a jet sled

Table 3. Project Landfall Locations

Landfall Location	Latitude (NAD 83)	Longitude (NAD 83)
Dillingham	59.003510°	-158.535688°
Platinum	59.010177°	-161.821189°
Apogak (Eek)	60.148601°	-162.183601°
Quinhagak	59.742126°	-161.929299°
Tuntutuliak	60.338149°	-162.662662°

Note: NAD 83 = North American Datum of 1983

Avoidance and Minimization Measures

Project vessels will implement the following procedures:

- During marine operations where travel speed is less than 5 knots (9.3 km/hr), it is unsafe to stop activities, so there are no shut down procedures for this Project. However, where travel speeds are greater than 5 knots (9.3 km/hr), vessel crew trained as Protected Species Observers (PSOs) will monitor the appropriate disturbance zones for marine mammals and help perform mitigation measures when needed.
- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 miles (mi; 800 meters [m]) from North Pacific right whales and 328 feet (ft; 100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and dynamic positioning [DP]) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.
- Prior to the start of cable-laying operations, crew members trained as PSOs will clear the disturbance zone for a period of 30 minutes when activities have been stopped for longer than a 30-minute period. Clearing the zone means no marine mammals have been observed within the zone for that 30-minute period. If a marine mammal is observed within the zone, activities may not start until the marine mammal:
  - Is visually observed to have left the disturbance zone; or
  - Has not been seen within the zone for 15 minutes in the case of pinnipeds, sea otters (*Enhydra lutris*), and harbor porpoises (*Phocoena phocoena*); or
  - Has not been seen within the zone for 30 minutes in the case of cetaceans.
- Consistent with safe navigation, Project vessels will avoid traveling within 3 nautical miles (nm; 5.6 kilometers [km]) of Steller sea lion rookeries or major haulouts (to reduce the risks of disturbance of Steller sea lions and collision with protected species).

- If travel within 3 nm (5.6 km) of major rookeries or haulouts is unavoidable, transiting vessels will reduce speed to 9 knots (16.6 km/hour [hr]) or less while within 3 nm (5.6 km) of those locations. Vessels laying cables are already operating at speeds less than 3 nm (5.6 km).
- The transit route for the vessels will avoid known Steller sea lion Biologically Important Areas (BIAs) and designated critical habitat to the extent practicable.
- Vessels and barges will not allow tow lines to remain within the water when not in use, and no trash or other debris will be thrown overboard, reducing the potential for marine mammal entanglement.
- Where possible, FOC will be laid on the seafloor, reducing impact on marine mammal habitat.
- Vessels will take reasonable steps to alert other vessels in the vicinity of whale(s), and report any stranded, dead, or injured listed whale or pinniped to the Alaska Marine Mammal Stranding Hotline at 877-925-7773.
- Although take is not authorized, if a listed marine mammal is taken (e.g., struck by a vessel), it must be reported to NMFS within 24 hours. The following will be included when reporting take of a listed species:
  - Number of listed animals taken
  - Date, time, and location of the take
  - Cause of the take (e.g., vessel strike)
  - Time the animal(s) was first observed and last seen
  - Mitigation measures implemented prior to and after the animal was taken
  - Contact information for the PSO, if any, at the time of the collision; ship's pilot at the time of the collision; or ship's captain

Unicom will train crew members as PSOs on the cable-laying barge and ship to be on watch during all daylight hours when traveling at speeds greater than 5 knots (9.3 km/hr). Crew member PSOs will:

- Be trained in marine mammal identification and behaviors
- Have no other primary duty than to watch for and report on events related to marine mammals when observing
- Work in shifts lasting no longer than 4 hours without breaks and not perform duties as a PSO for more than 12 hours in a 24-hour period (to reduce PSO fatigue)
- Have the following to aid in determining the location of observed listed species, take action if listed species enter the exclusion zone, and record these events:
  - Binoculars, range finder, Global Positioning System, and compass
  - Two-way radio communication with construction foreman/superintendent
- PSOs will record all mitigation measures taken to avoid marine mammals observed using NMFS-approved observation forms. Reported actions on sighting reports will include time, location, vessel position, speed, and corrected bearing.
- Reports will be sent to NMFS at the end of Project activities.

Listed Species and Determination of Effects

The determination of effects on listed species are described below.

Bearded Seal

The Project **may affect, but is not likely to adversely affect** bearded seals. A **may affect** determination is warranted because these seals are known to occur within the action area and could detect noise associated with cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Bearded seals are highly associated with pack ice and are unlikely to be observed during installation.
- Bearded seals are more highly associated with deeper waters within the Bering Sea than where Project construction will occur.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

Fin Whale

The Project **may affect, but is not likely to adversely affect** fin whales. A **may affect** determination is warranted because these whales are known to occur within the action area and could detect noise associated with subsea cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Fin whales are associated with deeper waters within the Bering Sea and are very unlikely to be observed during the installation.
- Noise associated with cable installation is unlikely to harass marine mammals .

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

Gray Whale (Western North Pacific DPS)

The Project **may affect, but is not likely to adversely affect** the Western North Pacific DPS of gray whale. A **may affect** determination is warranted because the Western North Pacific DPS may occur within the action area. A **not likely to adversely affect** determination is warranted because:

- The Western North Pacific DPS of gray whale that migrates across the southern Bering Sea area is likely to remain south of the Aleutian Islands and is not likely to occur within the action area.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

Humpback Whale (Western North Pacific DPS and Mexico DPS)

The Project **may affect, but is not likely to adversely affect** the Western North Pacific and Mexico DPSs of humpback whale. A **may affect** determination is warranted because the Western

North Pacific and Mexico DPSs may occur within the action area. A **not likely to adversely affect** determination is warranted because:

- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

North Pacific Right Whale

The Project **may affect, but is not likely to adversely affect** North Pacific right whales. A **may affect** determination is warranted because these whales may occur within the action area. A **not likely to adversely affect** determination is warranted because:

- North Pacific right whales have not been recently or historically sighted near the action area and are therefore unlikely to occur within the action area.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

Ringed Seal

The Project **may affect, but is not likely to adversely affect** ringed seals. A **may affect** determination is warranted because these seals are known to occur within the action area and could detect the noise associated with cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Ringed seals are associated with pack ice and are unlikely to be observed during installation.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

Sperm Whale

The Project **may affect, but is not likely to adversely affect** sperm whales. A **may affect** determination is warranted because these whales are known to occur within the action area and could detect the noise associated with subsea cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Sperm whales are associated with deeper waters within the Bering Sea and are very unlikely to be observed during the cable installation.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;

- Avoid multiple changes in direction when marine mammals are present near the vessel;
- Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
- Not separate individuals from a group or pod; and
- Avoid disrupting normal behaviors.

Steller Sea Lion

The Project **may affect, but is not likely to adversely affect** Steller sea lions. A **may affect** determination is warranted because Steller sea lions are known to occur within the action area and could detect the noise associated with cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

Steller Sea Lion Critical Habitat

The Project **may affect, but is not likely to adversely affect** designated Steller sea lion critical habitat. A **may affect** determination is warranted because designated critical habitat is located within the action area, and temporary habitat modifications will result from cable-laying activities. A **not likely to adversely affect** determination is warranted because:

- Subsea installation activity will be short-term and localized.
- To reduce the potential for acoustic disturbance and to the extent it is practicable and safe, vessel operators will be instructed to operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work.
- Where possible, FOC will be laid on the seafloor, reducing impact on marine mammal habitat.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- Vessels will be operated at a slow, safe speed.
- Consistent with safe navigation, Project vessels will avoid traveling within 3 nm (5.6 km) of Steller sea lion rookeries or major haulouts (to reduce the risks of disturbance of Steller sea lions and collision with protected species).
- If travel within 3 nm (5.6 km) of major rookeries or haulouts is unavoidable, transiting vessels will reduce speed to 9 knots (16.6 km/hr) or less while within 3 nm (5.6 km) of those locations. Vessels laying cables are already operating at speeds less than 3 nm (5.6 km).
- The transit route for the vessels will avoid known Steller sea lion BIAs and designated critical habitat to the extent practicable.

We look forward to working with you on this important Project to support broadband connectivity in Western Alaska. If you have any questions or need additional information, please contact me via phone at (907) 644-2121 or email (brett.carrothers@hdrinc.com).

Sincerely,

Brett Carrothers
Marine Scientist
HDR

Enclosures:	Attachment 1: Biological Assessment Attachment 2: Non-Federal Designee Letter from NTIA
cc w/enclosures:	Valerie Haragan, GCI, Permitting Lead Keja Whiteman, NTIA, Program Manager Amanda Pereira, NTIA, Program Officer James Wetherington, USDA RD, Environmental Lead

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802-1668

August 21, 2023

Amanda Pereira
Environmental Program Officer
National Telecommunications and Information Administration
United States Department of Commerce
Washington, DC 20230

Re: Airraq Network Submarine Fiber Optic Cable Laying Project Letter of Concurrence, POA-2023-00207; AKRO-2023-01785

Dear Ms. Pereira:

The National Marine Fisheries Service (NMFS) has completed informal consultation under section 7(a)(2) of the Endangered Species Act (ESA) regarding the proposed vessel transit and submarine fiber optic cable laying project from Dillingham to Bethel, Alaska (Figure 1). On behalf of Unicom, Inc. (Unicom), the National Telecommunications and Information Administration (NTIA), and the U.S. Department of Agriculture (USDA) Rural Development (RD) Rural Utilities Service (RUS), HDR Engineering, Inc. (HDR) requested written concurrence that the proposed action may affect, but is not likely to adversely affect, Beringia Distinct Population Segment (DPS) bearded seals *(Erignathus barbatus)*, Arctic ringed seals *(Pusa hispida)*, Mexico DPS humpback whales *(Megaptera novaeangliae)*, Western North Pacific DPS humpback whales *(Megaptera novaeangliae)*, Western North DPS gray whales *(Eschrichtius robustus)*, North Pacific right whale *(Eubalena japonica)*, sperm whales *(Physeter macroephalus)*, fin whales *(Balaenoptera physalus)*, or Western DPS Steller sea lions *(Eumetopias jubatus)* and Western DPS Steller sea lion critical habitat. Based on our analysis of the information you provided to us, and additional literature cited below, NMFS concurs with your determination.

On July 5, 2022, the U.S. District Court for the Northern District of California issued an order vacating the 2019 regulations that were revised or added to 50 CFR part 402 in 2019 ("2019 Regulations," see 84 FR 44976, August 27, 2019) without making a finding on the merits. On September 21, 2022, the U.S. Court of Appeals for the Ninth Circuit granted a temporary stay of the district court's July 5 order. On November 14, 2022, the Northern District of California issued an order granting the government's request for voluntary remand without vacating the 2019 regulations. The District Court issued a slightly amended order two days later on November 16, 2022. As a result, the 2019 regulations remain in effect, and we are applying the 2019 regulations here. For purposes of this consultation and in an abundance of caution, we considered whether the substantive analysis and conclusions articulated in the letter of concurrence would be any different under the pre-2019 regulations.

We have determined that our analysis and conclusions would not be any different. New proposed rules were published in the Federal Register on June 22, 2023 (88 FR 40753).

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.

GCI/Unicom determined that this project will have no effect on the sunflower sea star or its critical habitat because sunflower sea stars are not known to occur in the waters that will be affected by this cable (Gravem et al. 2021). Therefore, the sunflower sea star will not be discussed further in this consultation.

Consultation History

NMFS received your request for consultation on April 6, 2023, and your correspondence identifying HDR as your non-Federal representative for this project on April 6, 2023. NMFS requested more information about the project via email on April 14, 2023. On April 26, 2023, HDR provided NMFS with additional information regarding the project details and proposed mitigation measures. After several email correspondences, meetings, and phone calls between NMFS, HDR, and GCI, additional information was requested and revisions to mitigation measures. NMFS initiated consultation on August 1, 2023.

Description of the Proposed Action

GCI Communication Corporation is proposing to bring broadband internet service via approximately 548 miles of one-inch diameter subsea fiber optic cable (FOC) to 10 communities within the Lower Kuskokwim River Delta from Dillingham to Bethel, Alaska. The project will consist of two phases: Phase 1 will include installation of 443 miles of FOC and phase two will include installation of 105 miles of FOC that will build off phase 1. The project will take place between May and September 2024.

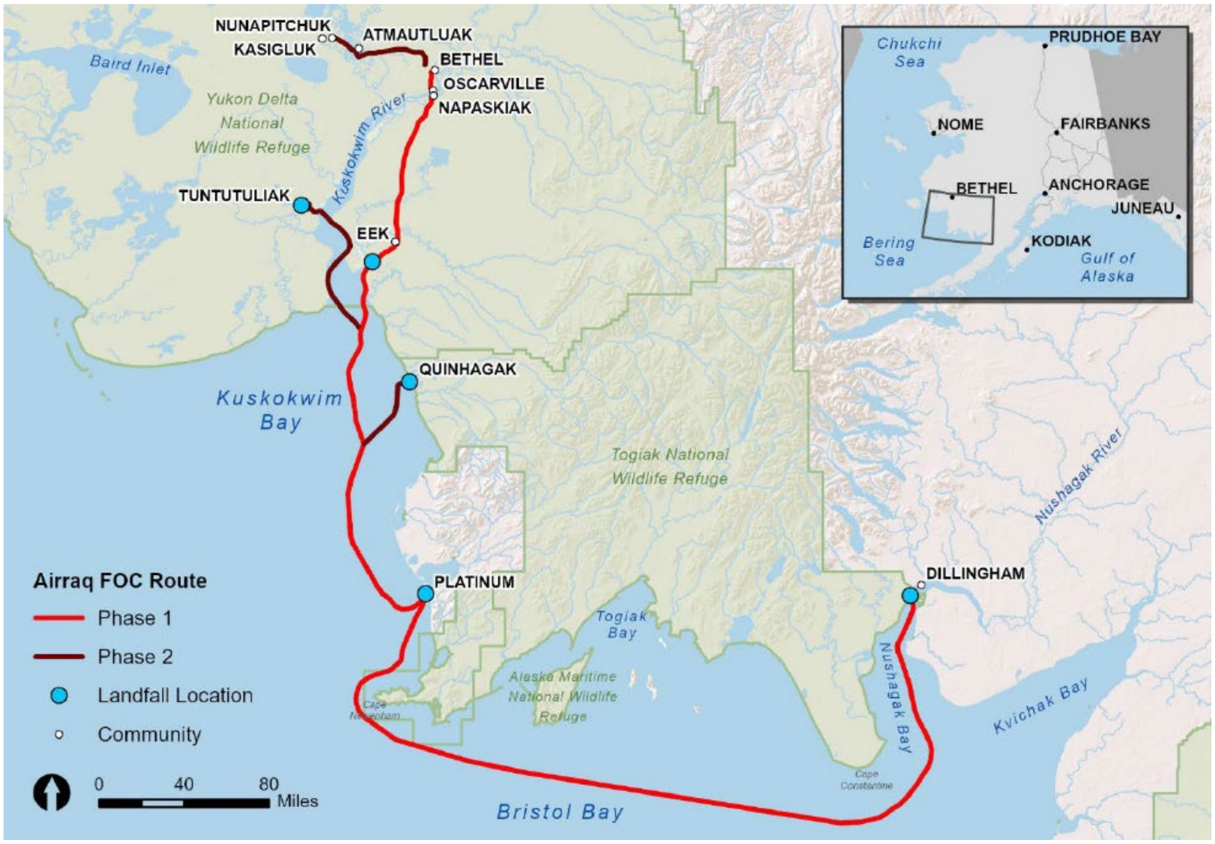

Figure 1. Proposed route for GCI/Unicom fiber optic cable

This project includes both offshore and onshore components. The submarine cable will be installed using a purpose-built and/or modified cable lay vessel and a barge with a tug assist. A pre-grapnel run will be conducted along the entire fiber optic cable route (390.5 miles) using a support vessel prior to cable installation to collect any seafloor debris. No cable will be permanently laid on, or exposed, on the surface of the seafloor. Trenching methods include jetting and plowing; the method used will be determined by water depth. The ROV will be operated remotely from the cable laying ship and use pulsed sounds generated from the ROV and cameras for positioning and orientation. The jet sled will be used from an anchored barge or shallow draft vessel. Equipment for the intertidal section of this project include a barge, an excavator, a jet sled, and an ROVJET 207 series for post-lay inspection and burial.

Project Equipment:

- Laying and burial of fiber optic cable (on the sea floor using:
  - a remotely operated vehicle (ROV; ROVJET 207 series;
  - Photo 1),
  - a plow (Photo 2),
  - a towed sled or tracked ROV, or
  - a hand jet and water lift operated by a diver.
- Vessel traffic from:
  - a main lay/burial cable ship (377 ft in length and 59 ft in breadth, propelled by two 2,200 kW main engines with an approximate speed 1–2 knots; Photo 3),
  - two utility tugs,
  - a cable-lay barge, and an additional vessel of opportunity (VOO), working in tandem with the cable-lay barge

Photo 1. A ROVJET 207 remotely operated vehicle.

Photo 2. Example plow.

Photo 3. Example cable-laying ship.

The action area is defined in the ESA regulations (50 CFR § 402.02) as the area within which all direct and indirect effects of the project will occur. 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 1µPa 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 dynamic positioning (DP) system are expected to decline to 120 dB rms re 1µPa within 1,900 m of the source. To define the action area, we considered the barge size, its DP system, and empirical measurements of noise from similar cable laying projects (Hartin et al. 2011; Tetra Tech 2013; Green et al. 2018).The action area for this project is defined as the vessel transit route length plus a buffer of 1.1 mi (1.8 km) on each side of the marine route (2.2 mi) within areas where the cable-laying ship, small landing craft, or vessel of opportunity (VOO) will be used. In areas where the tug and barge will be used, the action area is defined as the transit route length plus a buffer of 1.7 mi (2.8 km) on each side of the marine route (3.4 mi). The grapnel run will use a vessel towing a line with a hook system to remove any debris from the seafloor and PSOs will clear a 1900 m monitoring zone prior to this activity.

[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.

Because it is unfeasible and unsafe to stop activities during cable laying operations, there are no shutdown procedures for this project.

Mitigation Measures
HDR informed NMFS via email on August 1, 2023 that the project will incorporate the following mitigation measures:

General Mitigation Measures

1. GCI/Unicom will inform NMFS of impending in-water activities a minimum of one week prior to the onset of those activities.
2. If construction activities will occur outside of the time window specified in these measures, 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. Project-associated staff will cut all materials that form closed loops (e.g., plastic packing bands, rubber bands, and all other loops) prior to proper disposal in a closed and secured trash bin. Trash bins will be properly secured with locked or secured lids that cannot blow open, preventing trash from entering into the environment, thus reducing the risk of marine mammal entanglement should waste enter marine waters.
4. Project-associated staff will properly secure all ropes, nets, and other marine mammal entanglement hazards to ensure they do not blow or wash overboard.
5. To the extent it is practicable and safe, vessel operators will operate their vessel thrusters (both main drive and dynamic positioning) at the minimum power necessary to accomplish the work.

Protected Species Observer (PSO) Measures

6. Two PSOs will perform PSO duties onsite throughout cable laying activities.
7. When travel speeds are greater than 5 knots (9.3 km/hr), two PSOs will monitor all marine waters within 1,900 m of the vessel during all daylight hours, and report sightings to NMFS (cable-laying activities will take place 24 hours/day).

Table 1. Mitigation Zone for Each Activity.

Activity	Zone Radius (m)
Cable laying	1,900 meters

8. PSOs will be positioned such that they will collectively be able to monitor the entirety of each activity's mitigation zone. The action agency will coordinate with NMFS on the placement of PSOs prior to commencing in-water work.
9. Prior to commencing cable laying activities, PSOs will scan waters within the cable laying operations mitigation zone and confirm no listed marine mammal species are within the mitigation zone for at least 30 minutes immediately prior to initiation of in-water activity.

10. If one or more listed marine mammal species are observed within the mitigation zone, the in-water activity will not begin until the listed marine mammal species exit the mitigation zone of their own accord. Alternately, if the PSO has continuously scanned these waters and has not observed listed marine mammals within the zone for 30 minutes, then cable laying may commence.
11. If a listed marine mammal species is observed within a mitigation zone or is otherwise harassed, harmed, injured, or disturbed, PSOs will immediately report that occurrence to NMFS using the contact information specified in Table 2.

<u>Protected Species Observer Requirements</u>

12. PSOs must be independent (i.e., not vessel or cable crew) and have no other assigned tasks during monitoring periods.
13. The action agency or its designated non-federal representative will provide resumes or qualifications of PSO candidates to the NMFS for 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.
14. At least one PSO will have prior experience performing the duties of a PSO during construction activity.
15. At least one PSO on the project will complete PSO training prior to deployment (contact NMFS AKR PRD for a list of trained and experienced PSOs). The 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 proper reporting protocols; and
    f. an overview of PSO roles and responsibilities.
16. PSOs will:
    a. have vision that allows for adequate monitoring of the entire mitigation zone;
    b. have the ability to effectively communicate orally, by radio and in person, with project personnel;
    c. be able to collect field observations and record field data accurately and in accordance with project protocols;
    d. be able to identify to species all marine mammals that occur in the action area;
    e. have writing skills sufficient to create understandable records of observations
17. PSOs will work in shifts lasting no longer than 4 hours with at least a 1-hour break from monitoring duties between shifts.

18. PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.
19. The PSOs will have the following equipment to address their duties:
    a. tools which enable them to accurately determine the position of a marine mammal in relationship to the mitigation zone;
    b. two-way radio communication, or equivalent, with onsite project manager;
    c. tide tables for the project area;
    d. watch or chronometer;
    e. binoculars (7x50 or higher magnification) with built-in rangefinder or reticles (rangefinder may be provided separately);
    f. instruments that allow observer to determine geographic coordinates of observed marine mammals
    g. a legible copy of this LOC and all appendices
    h. legible and fillable observation record form allowing for required PSO data entry.
20. Prior to commencing in-water work or at changes in watch, PSOs will establish a point of contact with the crew. The PSO will brief the point of contact as to the mitigation procedures if listed species are observed likely to enter or within the mitigation zone, and will request that the point of contact instruct the crew to notify the PSO when a marine mammal is observed. If the point of contact goes "off shift" and delegates his duties, the PSO must be informed and brief the new point of contact.

<u>Vessels</u>

21. 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 they will remain at least 460 m (500 yards) from endangered North Pacific right whales;
    c. travel at less than 5 knots (9 km/hour) when within 274 m (300 yards) of a whale;
    d. avoid changes in direction and speed when 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. check the waters immediately adjacent to the vessel(s) to ensure that no whales will be injured when the vessel gets underway;
    g. reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 km (1 mi) or less;
22. 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))

(note: these regulations apply to all humpback whales). Specifically, pilot and crew will not:

a. 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;

b. cause a vessel or other object to approach within 100 yards of a humpback whale; or

c. disrupt the normal behavior or prior activity of a whale by any other act or omission.

21. 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, or 460 m (500 yards) in the case of North Pacific right whales, and if maritime conditions safely allow, the engine will be put in neutral and the whale will be allowed to pass beyond the vessel.

22. Vessels will not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear. No materials capable of becoming entangled around marine mammals will be discarded into marine waters.

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

23. Vessels will not approach within 5.5 km (3 nm) of rookery sites listed in 50 CFR § 224.103(d).

24. Vessels will not approach within 914 m (3,000 ft) of any Steller sea lion haulout or rookery which is not listed in 50 CFR § 224.103(d).

General Data Collection and Reporting

Data Collection

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

26. The action agency 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).

27. PSOs will record the following:

    a. the date, shift start time, shift stop time, and PSO identifier;

    b. date and time of each reportable event (e.g., a marine mammal observation, operation shutdown, reason for operation shutdown, change in weather);

    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 marine mammals, and observation date, time, and location;

    e. the predominant anthropogenic sound-producing activities occurring during each marine mammal observation;

f. observations of marine mammal behaviors and reactions to anthropogenic sounds and human presence;

g. initial, closest, and last known location of marine mammals, including distance from observer to the marine mammal, and minimum distance from the predominant sound-producing activity or activities to marine mammals;

h. whether the presence of marine mammals necessitated the implementation of mitigation measures to avoid acoustic impact, and the duration of time that normal operations were affected by the presence of marine mammals;

i. geographic coordinates for the observed animals, (or location noted on a chart) with the position recorded using the most precise coordinates practicable (coordinates will be recorded in decimal degrees, or similar standard and defined coordinate system).

Data Reporting

28. Observations of humpback whales will be transmitted to AKR.section7@noaa.gov by the end of the calendar year, including information specified in General Data Collection and Reporting (above) and photographs and videos obtained of humpback whales, most notably those of the whale's flukes.

Unauthorized Take

29. 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(s) is observed entering a shutdown zone before operations can be shut down, or is injured or killed as a direct or indirect result of this action), the PSO will report the incident to NMFS within one business day, with information submitted to akr.section7@noaa.gov. These PSO records will include:

   a. all information to be provided in the final report (see Mitigation Measures under the *Final Report* heading below):

   b. number of animals of each threatened and endangered species affected;

   c. the date, time, and location of each event (provide geographic coordinates);

   d. description of the event;

   e. the time the animal(s) was first observed or entered the shutdown 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; and

   g. if a vessel struck a marine mammal, the contact information for the PSO on duty, or the contact information for the individual piloting the vessel if there was no PSO on duty;

   h. Photographs or video footage of the animal(s) (if available).

Stranded, Injured, Sick or Dead Marine Mammal (not associated with the project)

30. If PSOs observe an injured, sick, or dead marine mammal (i.e., stranded marine mammal), 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 marine mammals, description of the stranded marine mammal's condition, event type (e.g., entanglement, dead, floating), and behavior of live-stranded marine mammals.

Illegal Activities

31. If PSOs observe 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 at (Table 2; 1-800-853-1964).
32. Data submitted to NMFS will include date/time, location, description of the event, and any photos or videos taken.

Final Report

33. A draft of the final report will be submitted to NMFS within 90 calendar days of the completion of the project summarizing the data recorded and submitted to AKR.section7@noaa.gov. A final report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report. If no comments are received from NMFS within 30 calendar days of receipt of the draft report, the report may be considered final. The report will summarize all in-water activities associated with the proposed action, and results of PSO monitoring conducted during the in-water project activities.
34. The final report will include:
    a. summaries of monitoring efforts, including dates and times of construction, dates and times of monitoring, dates and times and duration of shutdowns due to marine mammal presence;
    b. date and time of marine mammal observations, geographic coordinates of marine mammals at their closest approach to the project site, marine mammal species, numbers, age/size/sex categories (if determinable), and group sizes.
    c. digital, query-able documents containing PSO observations and records, and digital, query-able reports.

Summary of Agency Contact Information

Table 2. Summary of agency contact information.

Reason for Contact	**Contact Information**
Consultation Questions & Unauthorized Take	AKR.PRD.Section7@noaa.gov and Consultation Biologist (angela.tallman@noaa.gov)
Reports & Data Submittal	AKR.section7@noaa.gov (please include NMFS AKRO tracking 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: 1-800-424-8802 & 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
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

Bearded Seal

NMFS listed the Beringia DPS of bearded seals (*Erignathus barbatus*) as threatened under the ESA on February 26, 2013, 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, December 28, 2012).

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 seals) in these waters.

Bearded seals are associated with moving pack ice that reduces leads and other openings in the ice, and only rarely use areas of thick, continuous shore fast 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 such 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 winter 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 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 can also be a significant component of their diet (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 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

Project dedicated vessels could overlap with habitat occupied by bearded seals. However, bearded seals are associated with pack ice and the project is occurring during ice-free periods; therefore, it is highly unlikely that bearded seals will occur along the cable route and effects to bearded seals are expected to be discountable.

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[2] Northwest Arctic Borough. 2016. Important areas for marine and coastal species. Pages 415-529 in Iñuuniałiqput Iḷiḷugu Nunaŋŋuanun: 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).

The proposed project will not overlap with bearded seal critical habitat.

Arctic Ringed Seal

The Arctic subspecies of ringed (*Pusa hispida hispida*) was listed as threatened under the ESA on February 26, 2013, 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, December 28, 2012).

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 aerial survey data collected from the U.S. portion off the Bering Sea in 2012, Conn et al. (2014) calculated an abundance estimate of 174,418 ringed seals (95 percent confidence interval: 141,588 to 201,090 seals) in these waters. 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). Kelly et al. (2010) estimated the total population of ringed seals in the Chukchi and Beaufort seas in Alaska to be at least 300,000 seals 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.

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 2). 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).

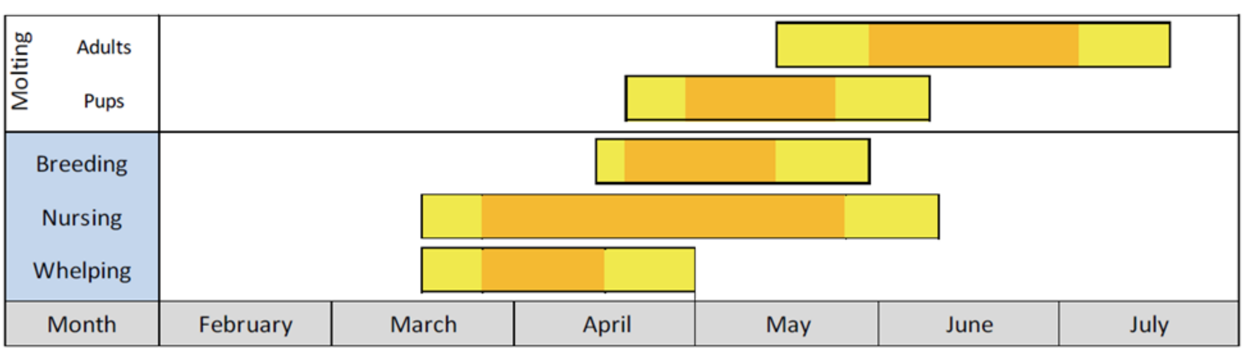

Figure 1. Approximate annual timing of Arctic ringed seal reproduction and molting. Yellow bars indicate the "normal" range over which each event is reported to occur and orange bars indicate the "peak" timing of each event (Kelly et al. 2010).

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)[2].

Arctic ringed seals typically lose a significant proportion of their blubber mass in late winter to early summer and then replenish their blubber reserves during late summer or fall and 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 (seals) as 50 Hz to 86 kHz (NMFS 2018).

More information on ringed seal biology, habitat, and distribution is available at:

Ringed Seal Species Description

Marine Mammal Stock Assessment Report: Pinnipeds-Phocids

2010 Status Review

Arctic Ringed Seal Critical Habitat

Arctic ringed seals and critical habitat in the action area

Project dedicated vessels could overlap with habitat occupied by Arctic ringed seals. However, ringed seals are associated with pack ice and the project is occurring during ice-free periods; therefore, it is highly unlikely that ringed seals will occur along the cable route and effects to ringed seals are expected to be discountable.

The proposed project will not overlap with Arctic ringed seal critical habitat.

Western North Pacific DPS Gray Whale

The gray whale (*Eschrichtius robustus*) was originally listed as endangered in 1970 (35 FR 8491, June 2, 1970 (baleen whales listing); 35 FR 18319, December 2, 1970 (gray whales)). The Eastern North Pacific (ENP) DPS stock was delisted on June 16, 1994 (59 FR31094), when it reached pre-exploitation numbers. The Western North Pacific (WNP) DPS of gray whales remains listed as endangered.

The WNP DPS gray whales are considered to be gray whales that spend all or part of their lives in the western North Pacific in the waters of Vietnam, China, Japan, Korea (Republic of Korea and/or Democratic People's Republic of Korea), or the Russian Far East, including southern and southeastern Kamchatka but not necessarily areas north of 55°N in eastern Kamchatka (NMFS 2023). The population size of the WNP DPS gray whales was estimated from photo-ID data for Sakhalin and Kamchatka at 290 whales in 2016 (90 percentile intervals = 271-311 whales; Cooke et al. 2017; Cooke 2018). Of these, 175-192 whales are estimated to be predominantly part of a Sakhalin feeding aggregation. These estimates represent animals in the 1-year plus age category. The non-ESA-listed ENP DPS gray whale population is estimated at approximately 26,960 individuals (Carretta et al. 2022).

Gray whales travel alone or in small, unstable groups and are bottom feeders that remove infaunal invertebrate prey and sediments by suction (Oliver and Slattery 1985). WNP gray whales feed during the summer and fall in the Okhotsk Sea off northeast Sakhalin Island, Russia, and off southeastern Kamchatka in the Bering Sea (NMFS 2023). The non-listed ENP population of gray whales feed mainly in the Chukchi, Beaufort, and northwestern Bering seas, with the exception of a small number of whales that summer and feed along the Pacific coast between Kodiak Island, Alaska and northern California (Carretta et al. 2022). The strong matrilineal fidelity exhibited by the whales feeding off Sakhalin Island, suggests behavioral separation of the WNP DPS from the ENP gray whales feeding in the northern Bering Sea (NMFS 2023). Therefore, we do not expect WNP DPS gray whales to be in the Alaskan waters of the Bering Sea.

In the North Pacific Ocean, the current migratory routes and wintering areas of western gray whales are complex and not fully understood (Weller et al. 2015; Weller et al. 2016). Recent studies support a trans-Pacific migration for some whales during the winter to areas off Canada, the U.S. West Coast, and Mexico. However, other western gray whales stay in the western Pacific and migrate south along the Asian coast in the winter (Omura 1988; Brownell Jr et al. 2007; Weller and Brownell Jr 2012; Weller et al. 2015; Weller et al. 2016). Based on population modeling that incorporated data on known movements of western gray whales into the eastern North Pacific, Cooke (2020) concluded that approximately 48 percent of Sakhalin whales migrate to the eastern North Pacific in the winter, indicating that about 52 percent migrate elsewhere, likely to wintering areas off the Asian coast. Thus the number of western gray whales remaining in the western North Pacific year-round is small (fewer than 100 whales; Cooke 2018). The specific migration route and timing of the WNP DPS grays are unknown making it very difficult to predict when and where they might pass through the Aleutian Island chain or along the coast of Alaska. However, given the large population size of the ENP DPS gray whale (approximately 26,960 animals; Muto et al. 2022) and the relatively small number of western gray whales (approximately 139 animals, 48 percent of the population; Cooke 2020) that make the trans-Pacific migration, there is a low likelihood that a gray whale from the WNP DPS will be encountered in Alaskan waters.

No data is available regarding WNP DPS gray whale hearing and little regarding communication; but we assume that it is similar to the ENP DPS gray. Individuals produce broadband sounds within the 100 Hertz to 12 kHz range (Dahlheim et al. 1984; Jones and Swartz 2009). The most common sounds encountered are on feeding and breeding grounds, where "knocks" with a source level of roughly 142 decibels have been recorded (Thomson and Richardson 1995).

Gray whale rattles, clicks, chirps, squeaks, snorts, thumps, knocks, bellows, and sharp blasts at frequencies of 400 Hz to 5 kHz have been recorded in Russian foraging areas (Petrochenko et al. 1991). NMFS categorizes gray whales in the low-frequency cetacean functional hearing group, with an applied frequency range between 7 Hz and 35 kHz (NMFS 2018).

More information can be found at:

Gray Whale Species Description

Marine Mammal Stock Assessment Report: Cetaceans-Large Whales

2023 WNP DPS Gray Whale Status Review

To the best of our knowledge, the range of North Pacific Gray whales does not occur within the action area.

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. Only about 26 individuals are estimated to remain of the Eastern stock that visits Alaskan waters (Muto et al. 2022).

The North Pacific right whale is distributed from Baja California to the Bering Sea with the highest concentrations in the Bering Sea, Gulf of Alaska, Okhotsk Sea, Kuril Islands, and Kamchatka area. They are primarily found in coastal or shelf waters but sometimes travel into deeper waters. In spring through fall their distribution is dictated by the distribution of their prey. In the winter, pregnant females move to shallow waters in low latitudes to calve; the winter habitat of the rest of the population is unknown.

Analyses of the data from acoustic recorders deployed between October 2000, January 2006, May 2006, and April 2007 indicate that right whales remain in the southeastern Bering Sea from May through December with peak call detection in September (Munger et al. 2008; Stafford and Mellinger 2009). Recorders deployed from 2012 to 2013 have not yet been fully analyzed, but indicate the presence of right whales in the southeastern Bering Sea almost year-round, with a peak in September and a sharp decline in detections in mid-November (Muto et al. 2018).

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 rage 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

Right whales have been consistently detected in the southeastern Bering Sea around the localized area of designated critical habitat during spring and summer feeding seasons (Moore et al. 2002; Zerbini et al. 2009; Rone et al. 2010; Rone et al. 2012). Of the 184 recent right whale sightings reported north of the Aleutian Islands, 182 occurred within the area designated as critical habitat in the Bering Sea. Recent sightings include two in the southeastern Bering Sea and three near Saint Lawrence Island in 2018.

Information on biology and habitat of the North Pacific right whale is available at:

North Pacific Right Whale Species Description

2017 Status Review

Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales

North Pacific Right Whale Critical Habitat

It is possible that project-related vessels could pass through areas occupied by North Pacific right whales. However, given the large distance from their designated critical habitat (approximately 45 nm), their extremely rare occurrence and low numbers, the likelihood of North Pacific right whales occurring within the action area is exceedingly low.

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 continued to be listed as endangered following passage of the ESA. Critical habitat has not been designated for fin whales.

Coastal and pelagic catch data from the first half of the twentieth century indicate that fin whales were not uncommon near Unalaska Bay and around Unalaska Island (Nishiwaki 1966; Reeves et al. 1985); however, fin whales have been documented infrequently around Unalaska Island since whaling ended (Stewart et al. 1987; Zerbini et al. 2006). High concentrations of fin whales are found around Kodiak Island, indicating the region's importance for foraging (Angliss and Outlaw 2007; Stafford et al. 2007; Ferguson et al. 2015; Rone et al. 2017; Brower et al. 2022). Five passive acoustic monitoring sites in the Gulf of Alaska recorded fin whales year-round with more calls at sites on or near the continental shelf compared to seamount sites in deeper water (Rice et al. 2021).

Fin whale sounds 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). Fin whale sightings have been increasing during surveys conducted in the U.S. portion of the northern Chukchi Sea from July to October, and fin whale calls were recorded each year from 2007 to 2010 in August and September in the northeastern Chukchi Sea and August to October just north of the Bering Strait, suggesting they may be re-occupying habitat used prior to large-scale commercial whaling (Muto et al. 2020).

In 2012, a fin whale was recorded by a passive recorder located 50 km north of Utqiagvik, Alaska, which was approximately 280 and 365 km northeast of the previous closest acoustic detection, and confirmed visual sighting, of a fin whale, respectively (Crance et al. 2015). A passive recorder located in the southern Chukchi Sea from 2012 to 2015 documented fin whale songs from August to November (Furumaki et al. 2021).

Fin whales produce a variety of low-frequency sounds in the 10 Hz to 0.2 kHz range (Thompson et al. 1992; Rice et al. 2021). 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

It is possible that project-related vessels could pass through areas occupied by fin whales. However, fin whales are typically found in deep water (Matsuoka et al. 2013; Rone et al. 2017) away from the immediate coast (Clarke et al. 2020); consequently it is unlikely that they would overlap with effects from cable-laying activities.

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), and continued to be listed as endangered following passage of the ESA. Critical habitat has not been designated for sperm whales.

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). The northern extent of their known range is 62°N, where Soviet catches of females occurred in Olyutorsky Bay (Muto et al. 2018). During summer, males are found in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands (Mizroch and Rice 2013). There are no recent and reliable estimates for population size or trend for sperm whales off Alaska (i.e., the North Pacific Stock). A minimum estimate of the total annual level of human-caused mortality and serious injury for North Pacific sperm whales in 2013-2017 is 4.9 whales in U.S. commercial fisheries (Muto et al. 2020).

Sperm whales produce a variety of vocalizations ranging from 0.1 to 20 kHz (Weilgart and Whitehead 1993; Goold and Jones 1995; Møhl et al. 2003; Weir and Goold 2007). 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).

Four of the most common threats cited for Southeast Alaska sperm whales are interactions with commercial fishing, whale watching, acoustic disturbance, and ship strikes (NMFS 2010). Neilson et al. (2012) found that out of the 89 defined whale strikes documented from 1978-2011 only one of those was a sperm whale, and the fate of that whale is unknown. The level of effects on sperm whales from ship noise is not fully understood but effects are expected to be similar to those described for humpback whales (NMFS 2010). Between 2012 and 2021, four suspected human-related sperm whale mortalities were reported to the Alaska Region Stranding Program.

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. 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 Koniuji 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.

Sperm whales in the action area

It is possible that project-related vessels could pass through areas occupied by sperm whales. However, sperm whales are usually found offshore in submarine canyons at the edge of the continental shelf or in water deeper than 655 ft (200 m). Therefore, it is unlikely that sperm whales would overlap with the effects of nearshore cable laying activities.

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

Humpback Whale

The humpback whale (*Megaptera novaeangliae*) was listed as endangered under the ESCA on June 2, 1970 (35 FR 8491, 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 62260, 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 62260, 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 62260; 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 Hawaii DPS (91 percent), Mexico DPS (7 percent), and Western North Pacific DPS (2 percent; NMFS 2021; Wade 2021)(Table 1). 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).

The area around the Aleutian Islands from Umnak 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 3. 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

Summer Feeding Areas	North Pacific Distinct Population Segments (DPS) (percent)			
	Western North Pacific (endangered)	Hawaii (not listed)	Mexico (threatened)	Central America (endangered)
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

Given their widespread range, relative abundance, their opportunistic foraging strategies, and frequent near-shore occurrence, humpback whales may occur along the cable route.

Western DPS Steller Sea Lion

The Steller sea lion (*Eumetopias jubatus*) was listed as a threatened species under the ESA on December 4, 1990 (55 FR 49204, November 26, 1990). On June 4, 1997, NMFS reclassified Steller sea lions into two DPS's based on genetic studies and other information (62 FR 24345, May 5, 1997); at that time the eastern DPS was listed as threatened and the Western DPS was listed as endangered. On December 4, 2013, the eastern DPS was removed from the endangered species list (78 FR 66140, November 4, 2013).

Steller sea lions range throughout the North Pacific Ocean from Japan, east to Alaska, and south to central California (Loughlin et al. 1984). They range north to the Bering Strait, with significant numbers at haul-outs on St. Lawrence Island in the spring and fall (Kenyon and Rice 1961). Breeding range extends along the northern edge of the North Pacific Ocean from the Kuril Islands, Japan, through the Aleutian Islands and Southeast Alaska, and south to California (Loughlin et al. 1984). Based on Hastings et al. (2020), NMFS concludes that Western DPS Steller sea lions are common north of Sumner Strait.

Rookery and haulout sites are located on isolated islands, rocky shorelines, and jetties from Cape Suckling, through the Bering Sea and into the Sea of Okhotsk (Muto et al. 2020). Steller sea lions are not known to migrate annually, but individuals may widely disperse 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).

Males arrive at breeding sites in May with females following shortly afterwards, and pups are born from mid-May to early July, with a peak in mid-June. During summer, Steller sea lions feed mostly over the continental shelf and shelf edge. Females attending pups 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.

The foraging strategy of Steller sea lions is strongly influenced by seasonality of sea lion reproductive activities on rookeries and the ephemeral nature of many prey species. Steller sea lions are generalist predators that eat a variety of fishes and cephalopods (Pitcher and Calkins 1981; Calkins and Goodwin 1988; NMFS 2008b), and occasionally other marine mammals and birds (Pitcher and Fay 1982; NMFS 2008b).

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

2018 Status Review

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 7 and Figure 8). 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 Seguam Pass area, as specified at 50 CFR § 226.202(c).

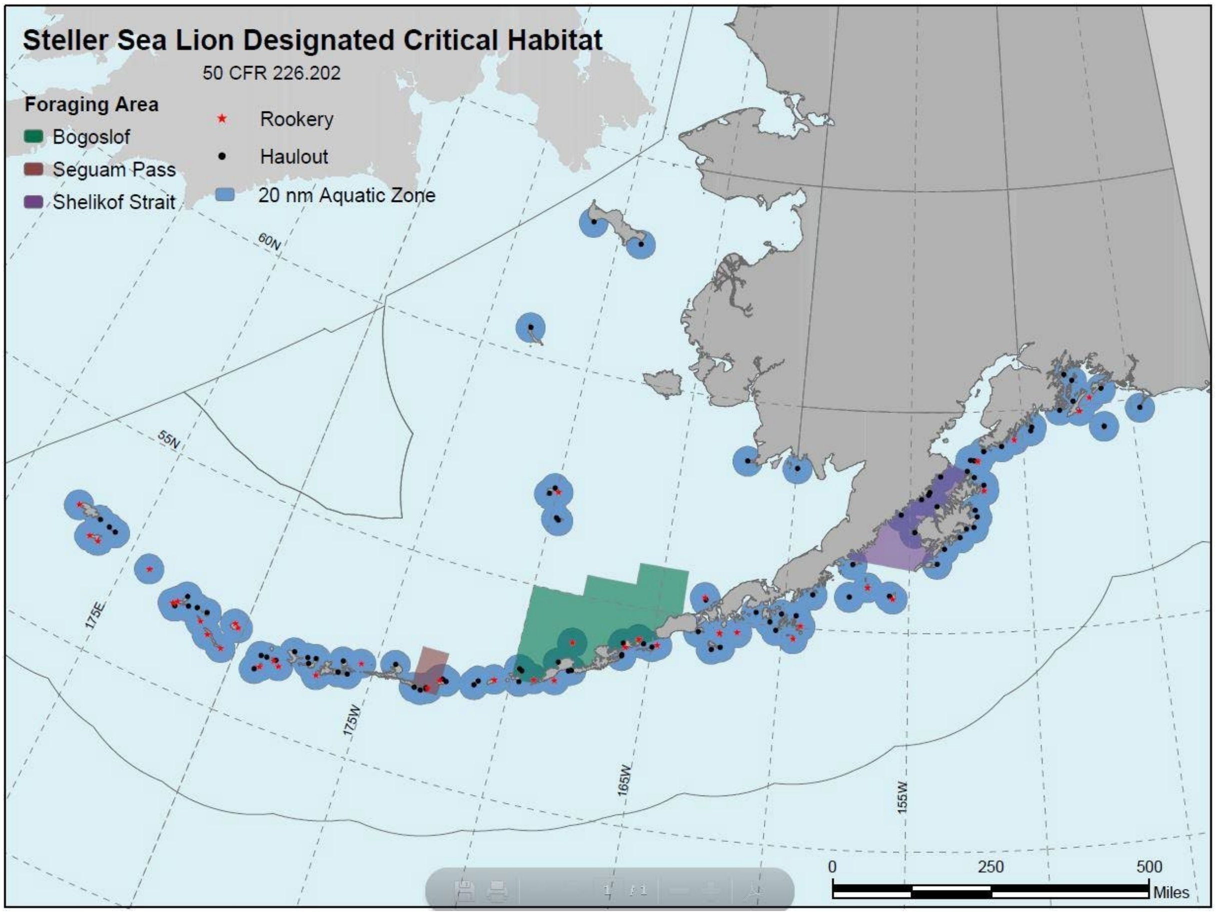

Figure 2. Designated Steller sea lion critical habitat in Alaska.

WDPS Steller sea lions and critical habitat in the action area

The cable-laying route traverses Steller sea lion critical habitat around Cape Newenham and Round Island. The action area includes 159.9 mi² (414.1 km²) within Steller sea lion critical habitat. The area of critical habitat the transit route overlaps is more than 3 nm (5.6 km) from these major haulouts but does not overlap with any rookeries. Endangered Western DPS Steller sea lion presence within the action area is likely.

Effects of the Action

For purposes of the ESA, "effects of the action" means all consequences to listed species or critical habitat 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 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.

This consultation includes NMFS guidance on the term "harass," which means 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).

The potential effects of the proposed action on listed species and critical habitat include acoustic disturbance generated by project-related vessels and cable-laying equipment, vessel strikes, effects to prey species, habitat alteration and pollution.

Acoustic Thresholds (Only include this section for projects with acoustic stressors)

Since 1997, NMFS has used generic sound exposure thresholds to determine whether an activity produces underwater sounds that might result in impacts to marine mammals (70 FR 1871, 1872, January 11, 2005). NMFS developed comprehensive guidance on sound levels likely to cause injury to marine mammals through onset of permanent and temporary threshold shifts (PTS; Level A harassment; 83 FR 28824, June 21, 2018). NMFS is in the process of developing guidance for behavioral disruption (Level B harassment onset). However, until such guidance is available, NMFS uses the following conservative thresholds of underwater sound pressure levels, expressed in root mean square (rms), from broadband sounds that cause behavioral disturbance, and referred to as Level B harassment under section 3(18)(A)(ii) of the Marine Mammal Protection Act (MMPA; 16 U.S.C. § 1362(18)(A)(ii)):

- impulsive sound: 160 dB_{rms} re 1 μPa
- continuous sound: 120 dB_{rms} re 1μPa

The generalized hearing range for each hearing group is provided in Table 2.

Table 4. Underwater marine mammal hearing groups (NMFS 2018).

Hearing Group	ESA-listed Marine Mammals In the Action Area	Generalized Hearing Range[1]
Low-frequency (LF) cetaceans (Baleen whales)	Humpback whales Fin whales North Pacific Right whales Gray whales	7 Hz to 35 kHz
Mid-frequency (MF) cetaceans *(dolphins, toothed whales, beaked whales)*	Sperm whales	150 Hz to 160 kHz
High-frequency (HF) cetaceans *(true porpoises)*	None	275 Hz to 160 kHz
Phocid pinnipeds (PW) *(true seals)*	Ringed and bearded seals	50 Hz to 86 kHz
Otariid pinnipeds (OW) *(sea lions and fur seals)*	Western DPS Steller sea lion	60 Hz to 39 kHz

[1]Respresents the generalized hearing range for the entire group as a composite (i.e., all species within the group), where individual species' hearing ranges are typically not a broad. Generalized hearing range chosen based on ~65 db threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall et al. 2007) and PW pinniped (approximation).

Acoustic Disturbance

Acoustic disturbance associated with the proposed action will include vessel noise during transit and cable laying operations. Underwater noise may temporarily disturb or mask communications between marine mammals. Vessel noise from commercial shipping traffic is a major source of low frequency (5 to 500 Hz) sound (Simmonds and Hutchinson 1996), with the majority of the sound occurring from 20-300 Hz (Richardson et al. 1995a). This overlaps with the frequency distributions of all listed species along the potential transit route (Table 4). Continuous sounds for sea going barges have been measured at a peak sound source level of 170 dB re 1 μPa rms at 1 m (broadband), and they are emitted at dominant frequencies of less than 5 kHz, and generally less than 1 kHz (Miles et al. 1987; Richardson et al. 1995a).

While in use, the cable laying barge will use a DP system to control its position. The DP system is estimated to have a sound source level of 179 dB re 1 μPa m (JASCO Unpublished Data; Hartin et al. 2011; Tetra Tech 2013; Green et al. 2018). The frequency range of the DP system is not known due to the varying thrust levels produced by the multiple motors. However, it is estimated that the DP system can produce frequencies between 12.5 Hz to 20 kHz (Tetra Tech 2013). This level of noise may cause a temporary behavioral change because marine mammals are expected to avoid the sound and barge with changes in their direction of travel or breathing pattern.

Regarding the expected noise levels from project vessels and cable burial equipment, the cable laying vessel is expected to produce the greatest harassing levels of noise. Traveling at 2-3 km/hour (1-2 knots) with an estimated SPL of 160 dB at 2m and 120 dB at 800 m (pg 92, Chorney et al., 2011), it will ensonify a single point in space to received levels greater than 120 dB for no more than 32 minutes [distance (radius) = rate x time; 1600m = 3000m/hr x t]. No SSVs are available for the plow, but we assume it will not create levels of noise that will impact any listed species.

Vessels associated with the proposed action will have a transitory and short-term presence within the action area; the potential overlap with listed marine mammals is relatively small for the construction period. Project vessel noise and presence is expected to elicit no more than short-term behavioral responses. While listed marine mammals will likely be exposed to acoustic stressors from vessel transit, the majority of acoustic energy they will be exposed to will be low-frequency, with much of the acoustic energy emitted by the vessels at 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 will 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 will not result in immediate or long-term effects to marine mammals. We do not expect that the effects from noise could be meaningfully measured or detected, and therefore we consider such effects to be insignificant.

Vessel Strike

Vessels transiting in the marine environment have the potential to collide with, or 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. Laist et al. (2001) found that while all sizes and types of vessels can strike a whale, ships greater than 80 meters and those transiting faster than 14 knots were most likely to cause severe or fatal injuries. Vessel strikes of humpback whales are far more likely than strikes of pinnipeds and other whales (Neilson et al. 2012). Risk of vessel strike has not been identified as a significant concern for Steller sea lions however, they may be more susceptible to ship strike mortality or injury in harbors or in areas where animals are concentrated, e.g., near rookeries or haulouts (NMFS 2008). An examination of all known ship strikes for large (baleen and sperm) whales from all shipping sources indicates vessel speed is a principal factor in whether a vessel strike results in death (Laist et al. 2001; Vanderlaan and Taggart 2007). 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. The authors concluded that most deaths occurred when a vessel was traveling in excess of 24.1 km/hour (13 knots), which is significantly greater than the vessel speed associated with the vessel transit and cable laying operations.

The vessel used in this project will not exceed 9 knots during transit between locations, and no more than 3 knots during the cable-laying operations. The temporary addition of project related vessels, adhering to speed and approach restrictions, renders the probability of ship strike very small, and thus adverse effects to listed species that may be present in the action area are so unlikely to occur that we consider the effects of this stressor to be discountable.

Effects to prey species

The proposed action may affect marine mammal prey species in the immediate vicinity of the action area through the introduction of in-water noise and disturbance to the substrate from entrenchment of fiber optic cable. However, it is unlikely that cable laying activities will affect primary prey species either by displacement, injury, or habitat loss because noise associated with cable laying activities will not cause more than very localized and temporary startle response in fish. Furthermore, injury or mortality to fish prey species is not expected. Rather, fish may display temporary avoidance from the action area. Any physical alterations to this habitat will not likely reduce the foraging quality of surrounding waters (i.e., the localized availability of fish) for listed species in a way that can be meaningfully measured. Therefore, we agree that cable laying activities will not measurably affect prey species and the effects will be insignificant.

Habitat Alteration

The FOC will be laid on land and on the surface of the seafloor or buried within a trench. Minor disturbance of the seafloor will occur where the cable is buried; however, natural current and wave surge processes are expected to quickly dissipate resuspended sediments (on the order of minutes) and fill any depression caused by the temporary cable trench created by the plow (on the order of days).

Because habitat alteration will be minimal, there will be no measurable impacts to humpback whale or Seller sea lion prey, as they are expected to successfully move into similar habitats. Therefore, we conclude that impacts to habitats as a result of the proposed project will be insignificant.

Spills

A small spill from light molecular weight and refined petroleum-based products could occur during cable laying operations. However, the probability of a spill occurring as a result of this project is very small. From 2010 to 2021, 822 diesel spills have occurred in marine waters of Alaska (ADEC unpublished data) predominantly from fishing vessels and passenger vessels. Majority of spills were associated with marinas, harbors and ports, not vessels specifically.

If marine mammals or their prey came in direct contact with spilled light molecular weight petroleum products from project vessels in offshore waters, it could experience substantial injury and mortality due to physical contact, inhalation or ingestion is possible. However, injury due to physical contact is also extremely unlikely to occur due the propensity for oil to not adhere to cetacean skin (BOEM 2017, BLM 2019). Depending on the spill location and timing, a small spill of refined petroleum product could be expected to evaporate and disperse in 24-36 hours (BOEM 2017). The amount of zooplankton and other prey lost in such a spill would likely be undetectable compared to what is available prey in foraging areas (BOEM 2017).

The impact of any small spills of petroleum-based products that do occur likely will be very minor due to the volatility of refined petroleum products, or in the case of heavier molecular weight lubricants, effects will be very minor due to very small volumes. Commercial vessels are required to abide by United States Coast Guard (USCG) regulations, which mandate spill response equipment on board. Additionally, the USCG would be engaged should the vessel ground or be in danger of sinking. Therefore, a spill is not likely to occur along the vessel transit route due to the low probability of occurrence, expected small spill size, and the high probability of rapid wind and wave dispersion. Therefore, we expect any spill of refined petroleum product from project vessels will not attain harmful concentrations over a large spatial extent. Thus, we expect any impact of an accidental spill associated with this action to be very minor, and adverse effects due to spilled from light molecular weight and refined petroleum products from project vessels would be insignificant and extremely unlikely to occur.

Analyzing Effects Upon 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 from project vessels at rookeries and haulouts and impacting available prey species. We evaluate effects to each of the physical or biological features below.

Effects to Critical Habitat:

The proposed project occurs within designated critical habitat for Steller sea lions. Project effects to the physical and biological features of Steller sea lion critical habitat are considered below:

1. *Terrestrial zones that extend 3,000 feet (0.9 km) landward from each major haulout and major rookery in Alaska.*

   The cable route will not occur within any terrestrial zones from major haulouts and no rookeries are present near the action area. Therefore, the proposed action does not overlap PBF1.

2. *Air zones that extend 3,000 feet (0.9 km) above the terrestrial zone of each major haulout and major rookery in Alaska.*

   The project includes no aerial activities. Therefore, the proposed action does not overlap with PBF 2.

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 144º W longitude.*

   The project will not occur east of 144º W longitude. Therefore, the proposed action does not overlap with PBF3.

4. *Aquatic zones that extend 20 nm (37 km) seaward of each major haulout and major rookery in Alaska that is west of 144º W longitude.*

   The proposed cable route is located within the 20-nautical mile aquatic zones of Steller sea lion critical habitat. However, vessel operations will be transitory and short-term. Therefore, we expect the resulting acoustic impacts on these zones to be too small to meaningfully measure or detect. Given the expected effectiveness of mitigation measures (speed and approach restrictions), use of PSOs, and the ability of listed pinnipeds to avoid vessels due to their maneuverability, adverse effects to this feature will be too small to meaningfully measure. Therefore, we conclude that both acoustic and physical effects of this cable-laying project on this feature are 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).*

   The proposed project will not be laying cable through any of the three special aquatic foraging areas. Therefore, the proposed action does not overlap with PBF5.

Conclusion

Based on this analysis, NMFS concurs with your determination that the proposed action may affect, but is not likely to adversely affect, affect Beringia Distinct Population Segment (DPS) bearded seals *(Erignathus barbatus)*, Arctic ringed seals *(Pusa hispida)*, Mexico distinct population segment (DPS) humpback whales *(Megaptera novaeangliae)*, Western North Pacific distinct population segment humpback whales *(Megaptera novaeangliae)*, Western North Pacific distinct population segment (DPS) gray whales *(Eschrichtius robustus)*, North Pacific right whale *(Eubalena japonica)*, sperm whales *(Physeter macrocephalus)*, fin whales *(Balaenoptera physalus)*, or Western DPS Steller sea lions *(Eumetopias jubatus)* and their critical habitat. In addition, NMFS also concurs that the proposed action is not likely to adversely modify or destroy designated critical habitat for the Steller sea lion.

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 Angela Tallman at angela.tallman@noaa.gov and to akr.section7@noaa.gov.

Sincerely,

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From: Angela Tallman - NOAA Affiliate <angela.tallman@noaa.gov>
Sent: Wednesday, August 30, 2023 3:09 PM
To: Carrothers, Brett
Subject: Re: Airraq Route Adjustment

Hi Brett,

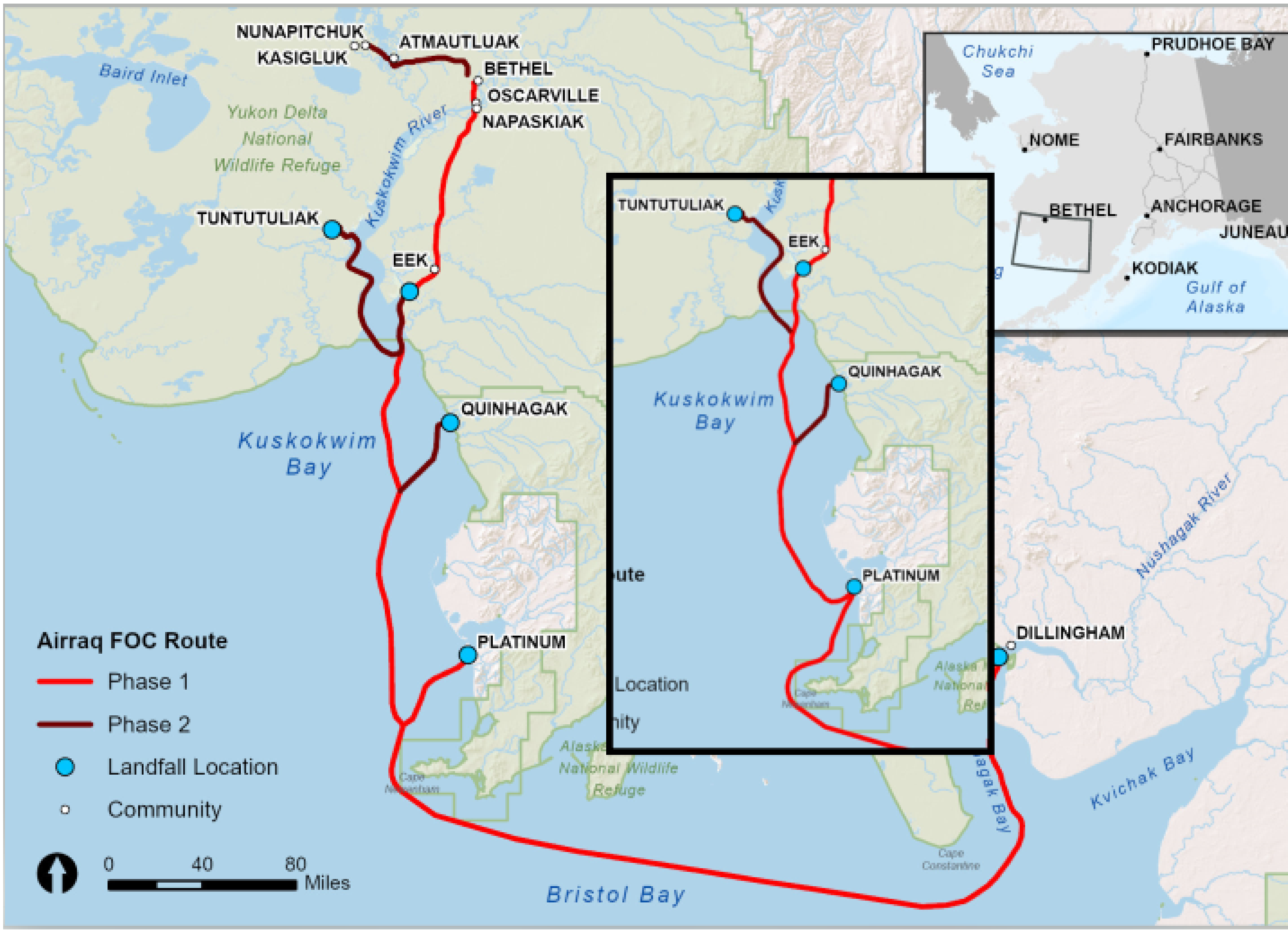
Thank you for keeping us informed about changes to the project description. In this case, the change described is sufficiently minor that it does not change the conclusions we reached in our initial S7 consultation for this project. We will do a memo-to-file on our side as well.

Thanks,

Angie Tallman
Marine Scientist, Contractor with Lynker in support of
NOAA Fisheries Alaska Regional Office | U.S. Department of Commerce
Mobile: (678) 448-8923
www.fisheries.noaa.gov

On Wed, Aug 30, 2023 at 12:37 PM Carrothers, Brett <Brett.Carrothers@hdrinc.com> wrote:

> Hi Angie,
>
> Thanks for your input. I put this together quickly, but if we need to do something more substantial/official to document this or future changes, we can definitely go that route. The current alignment is on the left, with that 'Y' junction offshore of Platinum, and the center inset is the prior alignment that was included in the BA and LOC. There's also a small change near Eek with the route to Tuntutuliak no longer crossing the Kuskokwim multiple times. This also may not be the Project's final alignment as they fine-tune the route, but I'll continue to reach out if future changes occur.
>
> If this is substantial enough to require a memo or a more formal notice to NMFS, let us know, otherwise I'm planning on just doing a memo-to-file for this change.



Thank you,

Brett Carrothers

Marine Scientist

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Airraq Network

PHASES 1 AND 2

Biological Assessment for National Marine Fisheries Service

Unicom, Inc

March 2023

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Executive Summary

Unicom, Inc., a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim Delta as part of the Airraq Network (Project). The Project will extend broadband service from Dillingham to 10 communities within the Lower Kuskokwim River Delta by placing approximately 548 miles of fiber optic cable on the ocean floor, Kuskokwim River, and terrestrial landscapes throughout the region. The cable will be trenched within the seafloor when necessary to protect it from outside aggression that could make the cable prone to fault. Terrestrial route components will take advantage of the unique landscape by laying the cable on the ground surface as much as possible, which will allow it to be overgrown by vegetation and eventually self-bury. The terrestrial route will be trenched when necessary to provide additional protections and alleviate visual concerns.

The Project has received funding through grants from the National Telecommunications and Information Administration (NTIA) and U.S. Department of Agriculture (USDA). Additionally, the Project requires a permit from the U.S. Army Corps of Engineers (USACE), Alaska District under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Under Section 7 of the Endangered Species Act (ESA), NTIA, USDA, and USACE are required to consult with the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) to ensure that any federal action will not jeopardize the continued existence of any species listed or proposed under the ESA or result in the destruction or adverse modification of designated critical habitat.

Nine ESA-listed species may occur within the action area (Table ES-1). This Biological Assessment includes an analysis of potential direct, indirect, and cumulative impacts on these species as a result of the Project. The NTIA and USDA conclude and request concurrence from NMFS that the proposed Project **may affect,** but is **not likely to adversely affect**, Beringia Distinct Population Segment (DPS) of bearded seal (*Erignathus barbatus*), fin whale (*Balaenoptera physalus*), Western North Pacific DPS of gray whale (*Eschrichtius robustus*), Mexico DPS of humpback whale (*Megaptera novaeangliae*), Western North Pacific DPS of humpback whale (*Megaptera novaeangliae*), North Pacific right whale (*Eubalena japonica*), Arctic subspecies of ringed seal (*Pusa hispida*), sperm whale (*Physeter macrocephalus*), and Western DPS of Steller sea lion (*Eumetopias jubatus*). Except for Western DPS of Steller sea lion, no designated critical habitat is present within the action area.

Table ES-1. ESA-listed Species and Critical Habitat within the Action Area

Species	ESA Status	Critical Habitat in Action Area	Effect Determination for Species	Effect Determination for Critical Habitat
Bearded Seal Beringia DPS (*Erignathus barbatus*)	Threatened	No	May affect, not likely to adversely affect	—
Fin Whale (*Balaenoptera physalus*)	Threatened	No	May affect, not likely to adversely affect	—
Gray Whale Western North Pacific DPS (*Eschrichtius robustus*)	Threatened	No	May affect, not likely to adversely affect	—

Species	ESA Status	Critical Habitat in Action Area	Effect Determination for Species	Effect Determination for Critical Habitat
Humpback Whale Mexico DPS (*Megaptera novaeangliae*)	Threatened	No	May affect, not likely to adversely affect	—
Humpback Whale Western North Pacific DPS (*Megaptera novaeangliae*)	Threatened	No	May affect, not likely to adversely affect	—
North Pacific Right Whale (*Eubalena japonica*)	Threatened	No	May affect, not likely to adversely affect	—
Ringed Seal Arctic Subspecies (*Pusa hispida*)	Threatened	No	May affect, not likely to adversely affect	—
Sperm Whale (*Physeter macrocephalus*)	Threatened	No	May affect, not likely to adversely affect	—
Steller Sea Lion Western DPS (*Eumetopias jubatus*)	Endangered	Yes	May affect, not likely to adversely affect	May affect, not likely to adversely affect

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Acronyms and Abbreviations

BA	Biological Assessment
BBMA	Bristol Bay Management Area
BIA	Biologically Important Area
BMH	beach manhole
BSAIMA	Bering Sea Aleutian Islands Management Area
BU	branching unit
CFR	Code of Federal Regulations
CO_2	carbon dioxide
CV	Coefficient of Variation
dB	decibel(s)
dB re 1 μPa rms	decibels referenced to a pressure of 1 microPascal root mean square
dBA	A-weighted decibels
DP	dynamic positioning
DPS	Distinct Population Segment
EEZ	Exclusive Economic Zone
ENP	Eastern North Pacific
ESCA	Endangered Species Conservation Act
ESA	Endangered Species Act
FOC	fiber-optic cable
FR	Federal Register
ft	foot/feet
ft^3	cubic foot/feet
FTTP	Fiber to the Premise
HTL	high tide line
Hz	hertz
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)

KMA	Kuskokwim Management Area
m	meter(s)
mi	mile(s)
mi^2	square mile(s)
MLLW	mean lower low water
MLW	mean lower low water
MMPA	Marine Mammal Protection Act
N	North
NAD 83	North American Datum of 1983
nm	nautical mile(s)
nm^2	square nautical mile(s)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTIA	National Telecommunications and Information Administration
OCS	Outer Continental Shelf
OHW	ordinary high water
PBF	physical or biological feature
PCE	Primary Constituent Element
PLGR	pre-lay grapnel run
Project	Airraq Network
PSO	Protected Species Observer
PTS	permanent threshold shift
ROV	remotely operated vehicle
SSV	sound source verification
TTS	temporary threshold shift
UME	Unusual Mortality Event
Unicom	Unicom, Inc.
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service VOO Vessel of Opportunity
VOO	Vessel of Opportunity

W	West
WNP	Western North Pacific
YK	Yukon-Kuskokwim

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1 Introduction

Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim (YK) Delta as part of the Airraq Network (Project). In doing so, Unicom will extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

The YK Delta is among the world's largest river deltas, with Bethel being its most populous community. The town of Bethel has a population of 6,500 individuals and lies approximately 68 river miles (mi) up the Kuskokwim River from the Kuskokwim Bay on its northern bank. The other nine communities are geographically isolated throughout the region. No roads connect the towns within the Lower YK Delta or with the rest of the state, and they are only accessible by boat or plane. All 10 communities that the Project proposes to service are home to the Yup'ik, with at least 74 percent of these communities' populations being Alaska Native.

The Project will provide a long-term solution, connecting these 10 underserviced communities within western Alaska with high-speed broadband connectivity. The Project is designed to overcome the region's harsh elements while creating a more efficient and modern way for western Alaska to connect with the rest of the world. The Project is composed of both marine and terrestrial construction components that have the potential to occur within habitat for Endangered Species Act (ESA)-listed species. Only marine construction has the potential to occur within the ranges and designated critical habitat of ESA-listed species managed by the National Marine Fisheries Service (NMFS).

This Biological Assessment (BA) has been prepared to address the Project's potential impacts on species listed as threatened or endangered under the ESA, and is intended to fulfill the requirements for informal consultation with NMFS under Section 7 of the ESA. The objective of this BA is to ensure that the Project, as an action authorized by the National Telecommunications and Information Administration (NTIA) and U.S. Army Corps of Engineers (USACE), does not jeopardize the continued existence of an endangered or threatened species, or adversely modify critical habitat of federally listed species.

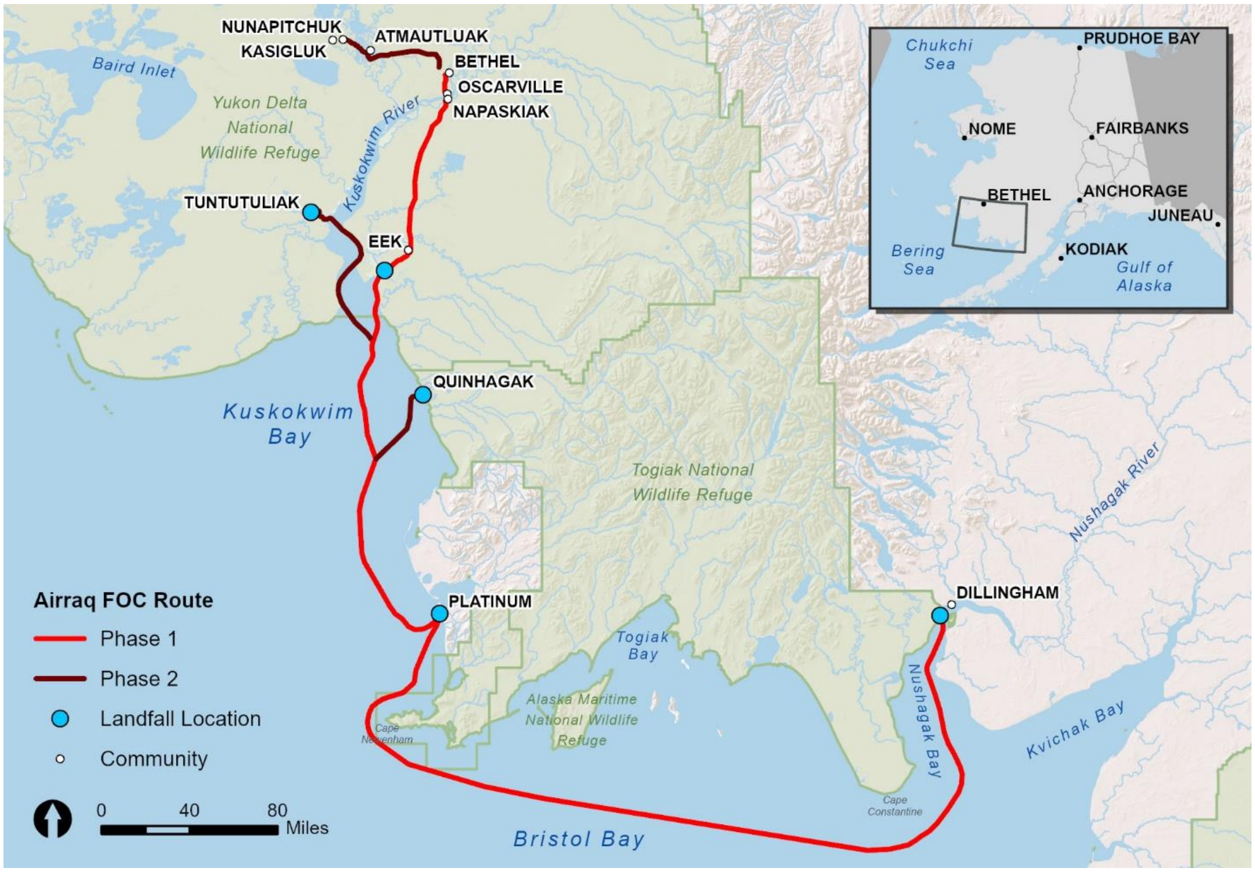
1.1 Background and Consultation History

This BA is the initial request for Section 7 ESA consultation with NMFS for this Project. A separate BA has been prepared for Section 7 ESA consultation with the U.S. Fish and Wildlife Service (USFWS).

2 Project Description

The Project will consist of two phases. Figure 2-1 provides an overview of the full Project.

Figure 2-1. Project Vicinity



Phase 1 will combine a 443-mi FOC build and Fiber to the Premise (FTTP) last mile network[1] upgrades within five communities: Platinum, Eek, Napaskiak, Oscarville, and Bethel. For the construction of Phase 1, Unicom has partnered with Bethel Native Corporation, which has been awarded a $42 million grant from the NTIA Tribal Broadband Connectivity Program.

Using a middle mile network[2], Unicom will interconnect with an FOC and microwave network within Dillingham to begin the Project. Phase 1 has an extensive marine component, extending FOC along the ocean floor from existing Unicom facilities within Dillingham to Platinum. This segment will be a 24-strand submarine FOC with a cable landing for signal regeneration in Platinum. From Platinum, the cable will continue along the marine route, paralleling the Kuskokwim Bay shoreline until it reaches a landfall location within the Eek River, immediately upstream of its confluence with the Kuskokwim River. This will begin the overland route to Eek. From Eek, the FOC route will continue the overland route to Napaskiak, where it will cross the

[1] Last mile network refers to any broadband infrastructure that connects directly to an end-user location.
[2] Middle mile network refers to any broadband infrastructure that does not connect directly to an end-user location.

Kuskokwim River to Oscarville and end in Bethel. The Project will also establish a second FOC delivery technology, FTTP, within connected communities. FTTP local network access will provide high-speed broadband access to residences and businesses within the communities of Platinum, Eek, Napaskiak, and Oscarville. The existing hybrid fiber-coaxial access networks in Bethel will be upgraded to help facilitate broadband distribution within the community.

Phase 2 will include installation of 105 mi of FOC, which will be interconnected with Phase 1 by combining middle mile network transport segments and FTTP installation in five additional communities: Quinhagak, Tuntutuliak, Atmautluak, Kasigluk, and Nunapitchuk. This portion of the Project has been awarded federal grant funding from the U.S. Department of Agriculture through the Rural Utilities Service ReConnect Grant.

Phase 2 will build off the Phase 1 FOC route with both terrestrial and marine components. Cable branching units (BU) originating from the Phase 1 FOC will connect the marine route within Kuskokwim Bay to the communities of Quinhagak and Tuntutuliak. A separate overland route will connect FOC from Bethel to Atmautluak and on to Nunapitchuk before it terminates Kasigluk. Each community in Phase 2 will construct a FTTP network to bring high-speed broadband to the community.

Project activities within the marine environment include the following components:

Marine Route: This route involves installation of broadband submarine FOC within marine environments below MLW, including segments extending from Kuskokwim Bay to Apogak and Tuntutuliak landfall locations. These segments are either trenched or laid on the seafloor.

- **Landfall Route:** This route involves installation of broadband submarine FOC at landfall locations between mean low water (MLW) and beach manhole (BMH) locations. BMHs are excavated manholes that provide connection points between submarine cable and either lightweight submarine or terrestrial cable. Landfall components between MLW and BMH locations are trenched.

Table 2-1 provides a Project summary. For the purposes of this BA, Phases 1 and 2 will be evaluated as a single Project.

Table 2-1. Project Summary

Project Component	Phase 1 Total Length (mi)	Phase 2 Total Length (mi)	Project Total Length (mi)	Phase 1 Associated Facilities	Phase 2 Associated facilities
Marine (below MLW)	328.4	62.1	390.5	None	None
Landfall (MLW to BMH)	0.7	0.1	0.8	BMH: 3	BMH: 2
Total	**329.1**	**62.2**	**391.3**	**—**	**—**

Notes: mi = miles; MLW = mean low water; BMH = beach manhole.

2.1 Construction

The following sections describe the construction methods and equipment used for the Landfall Route and Marine Route. Unicom anticipates conducting marine route construction activities in summer 2024 and completing the Project in 2026. The anticipated construction schedule is provided in Section 2.2.

2.1.1 Marine Route

Marine portions of the Project route include cable-laying operations in waters below MLW. Both phases of the Project have marine components. Phase 1 will construct the primary marine cable route, while Phase 2 will build off Phase 1 with two BUs.

The path chosen for the marine routes was identified through desktop studies and a marine route benthic survey. These engineering and field practices assist in selecting routes that provide considerations for environmental and anthropogenic forms of disturbance on the cable system that may lead to cable fault. The International Cable Protection Committee has identified fishing activities as the primary cause for submarine cable faults and repairs. As such, the proposed route avoids high-impact fishing grounds where possible. When ground fishing areas cannot be avoided, the cable will be buried. Nearshore 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 will rely on four or more vessels for construction operations. The vessel used for cable-laying operations will be dependent on water depth, location, and cable-laying method. A cable ship (Figure 2-2) will be used for cable-laying operations within areas of the marine route with water depths exceeding 40 feet (ft) and will rely on dynamic positioning (DP). Project elements in waters shallower than 40 ft will be conducted using either a tug and barge, a small landing craft stored on the cable ship, or will be conducted as a separate operation using an Alaska Vessel of Opportunity (VOO). Additionally, landfall locations will be assisted by a landing craft similar to the marine vessel *Unalaq*. These vessels will have a shallow draft, making shallow waters and landings more accessible. Segments of the cable routed into the Kuskokwim River will be laid with a cable-laying barge and tug when they reach a depth of 40 ft within Kuskokwim Bay. Tug and barge operations will continue for these segments until they reach a landfall location within tributaries of the Kuskokwim River. The tug and barge will lay lightweight submarine cable while all other marine portions of the route will use either a single armor or double armor submarine cable. The submarine cable, measuring 1 inch in diameter, is constructed from benign materials and will not carry an electrical current.

Figure 2-2. *C.S. IT Intrepid*, Typical Cable Laying Ship

For marine components, the cable will either be laid on top of the seafloor or buried within a trench (i.e., trenching). Cable will be laid on the seafloor within areas identified as low risk to cable disturbance or when traversing seafloor substrates that do not allow for trenching. When placing cable on the seafloor, bathymetric conditions will 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, trenching will be used where there is significant risk of outside disturbance to the cable. Local reroutes or cable armoring will be implemented in high-risk areas where the substrate does not allow for trenching.

Prior to trenching operations on the seabed, a pre-lay grapnel run (PLGR) will be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation will 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 along the route over the seabed. Any debris recovered by the grapnel will be discharged ashore upon completion of the operations and disposed in accordance with local regulations. If debris cannot be recovered, then a local re-route will be planned to avoid the debris. The PLGR operation will be conducted to industry standards employing towed grapnels and the type of grapnel will be determined by the nature of the seabed.

Trench burial in waters deeper than 40 ft will be conducted using a cable plow. Trenching within deep sea segments will protect the FOC against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow will be pulled along the seafloor by a tow wire connected to the cable ship. The cable will 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 will exit the lower aft end of the share blade, and the sediments will immediately collapse on top of the cable behind the plow. This form of burial will eliminate side cast because the excavated substrate will be returned to the trench immediately after the cable is laid. As a result of the immediate burial, absence of side cast, and narrow excavation footprint, cable plow trenching incurs only minimal and temporary impacts.

In waters shallower than 40 ft, trenching will take place in areas where cable protection from other environmental conditions, such as surf action and ice scour, are needed. At these depths, 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 water used for jetting will be supplied from the surface by high pressure hoses. This system will allow for jetting pressure and flow rates to be manipulated based on local conditions. The pressurized water will be focused on the seafloor, liquifying the substrate. The cable will then sink within the trench without side cast. The elimination of side cast and narrow excavation footprint results in limited and temporary impacts. The jet sled will be accompanied by divers who will monitor trenching performance and assist in operations. Figure 2-3 shows a typical jet sled.

Figure 2-3. Typical Jet Sled

Phase 1 marine portions of the Project include sections of the route between the Dillingham MLW and Platinum MLW, followed by an additional segment between the Platinum MLW and MLW at the Apogak Landfall site (Figure 2-4). To reach that landing site, the cable will be routed up the Kuskokwim River and into the Eek River. The cable will be surface laid across the riverine areas so sediment transport can passively bury the cable. Table 2-2 summarizes the length of cable that will be laid for the marine portions of the Project. A detailed map of landfalls within the Kuskokwim River tributaries is provided in Figure 2-4.

Marine elements of Phase 2 consist of two BUs extending from the Phase 1 marine route. One of the BUs will supply submarine cable to Quinhagak, while the other will connect to Tuntutuliak. To reach Tuntutuliak, the cable will enter the Kuskokwim River and travel up the Kinak River (Figure 2-4). The cable will be surface laid within the thalweg of these two rivers. Sediment transport is anticipated to self-bury the cable within the substrate. The marine portion of the BU will terminate when it reaches Tuntutuliak above tidal influence at ordinary high water (OHW)

(Figure 2-4). The nearshore construction methods used at MLW at the other locations will be used at OHW adjacent to Tuntutuliak. Phase 2 marine impacts are summarized in Table 2-2.

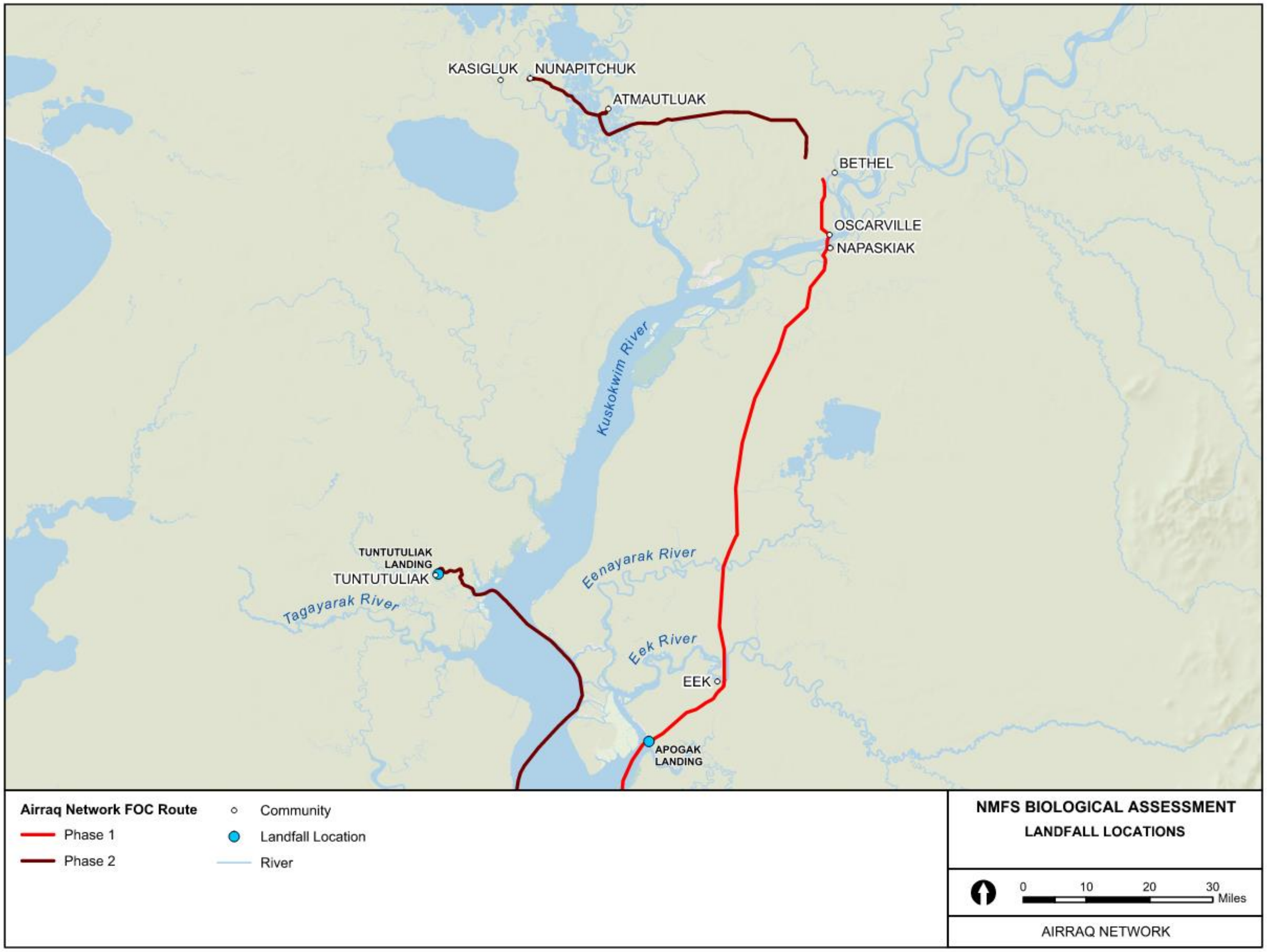
Upon completion of cable-laying operations, a post-lay inspection and burial will be conducted using a ROVJET 207, or similar remotely operated vehicle (ROV). The purpose of the post-lay inspection and burial is to inspect portions of the cable ship route where laying operations may have encountered difficulties. These difficulties include plow failure, unplanned cable repair, uncontrolled cable payout, or other unplanned events. Where burial corrections need to be made, the ROV will use jet burial, similar to that of the jet sled, and trench the cable. The ROV will be operated remotely from the cable laying ship and use pulsed sounds generated from the ROV and cameras for positioning and orientation.

Table 2-2. Marine Route Summary

FOC Route Segment	Cable Installed by Cable Ship[a] (mi)	Cable Installed by VOO, Tug and Barge, or Landing Craft[b] (mi)	Total Length (mi)
Phase 1	—	—	—
Dillingham MLW to Platinum MLW	178.7	52.5	231.2
Platinum MLW to Apogak Landing MLW	50.0	47.3	97.3
Phase 1 Total	**228.7**	**99.8**	**328.5**
Phase 2	—	—	—
Quinhagak BU – Phase 1 Route to Quinhagak MLW	0.0	20.0	20.0
Tuntutuliak BU – Phase 1 Route to Kinak River OHW at Tuntutuliak	0.0	42.1	42.1
Phase 2 Total	**0.0**	**62.1**	**62.1**
Project Total	**228.7**	**161.9**	**390.6**

Notes: VOO= Vessel of Opportunity, MLW= Mean Low Water, BU= Branching Unit, OHW= Ordinary High Water.
[a] Waters deeper than 40 ft, cable may be surface laid or trenched with a cable plow
[b] Waters shallower than 40 ft, cable may be surface laid or trenched with a jet sled

Figure 2-4. Landfall Locations within Kuskokwim River Tributaries



2.1.2 Landfall Locations

This section describes operations that occur between MLW and each landfall BMH. Landfall construction will occur concurrently with marine construction. Table 2-3 provides each Project landfall location.

Table 2-3. Project Landfall Locations

Landfall Location	Latitude (NAD 83)	Longitude (NAD 83)
Dillingham	59.003510°	-158.535688°
Platinum	59.010177°	-161.821189°
Apogak (Eek)	60.148601°	-162.183601°
Quinhagak	59.742126°	-161.929299°
Tuntutuliak	60.338149°	-162.662662°

Note: NAD 83 = North American Datum of 1983

At each landfall, the cable will be trenched within the shoreline between MLW and the BMH. A BMH is an enclosed structure that houses the splice between the incoming submarine cable and outgoing lightweight submarine or terrestrial cable that will connect to existing Unicom facilities. Each BMH will measure 3 ft by 4 ft by 4 ft, or 48 cubic ft (ft^3). Excavation dimensions may vary by shoreline, bank contour, and substrate but will not exceed 5 ft by 5 ft by 5 ft, or 125 ft^3.BMHs are positioned above the high tide line (HTL). Landfall trenching will be conducted with either a rock saw or backhoe. Rock saw trenches are typically 6 inches wide and 8 inches deep, while backhoe trenches are 3 ft wide and 3 ft deep. Excavated material from trench construction and excavation will be side cast temporarily (i.e., for less than 1 week) into wetlands and underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable

While conducting landfall construction, care will be taken to protect the shoreline from future erosion. Additionally, best practices will be employed to address stormwater runoff concerns. For all intertidal work (MLW to HTL), construction operations will occur only during low tide. When not constructing on shorelines with firm sediments such as large boulders, heavy equipment will be placed on mats to protect the substrate from slumping and erosion. Alterations to shorelines will be temporary.

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
- Landing craft similar to the marine vessel *Unalaq*

2.2 Schedule

Project construction is anticipated to begin in early 2024 and end in 2026. Marine and landfall portions of the Project will be constructed between May 2024 and the first 10 days of September 2024, with cable laying from the cable ship beginning in July 2024. It is anticipated that Phase 1 construction will be completed in December 2025, and Phase 2 construction will be completed in December 2026.

2.3 Avoidance and Minimization Measures

To reduce the potential for acoustic disturbance, and to the extent it is practicable and safe, vessel operators will be instructed to operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work. Given the slow movements of Project vessels during cable laying operations (less than 5 knots), ship strikes are very unlikely. While Project vessels are actively laying cable or transiting within the Project area, crew members trained as protected species observers (PSOs) will watch for marine mammals and perform mitigation measures when necessary. Mitigation measures include keeping a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;; routing the vessel away from oncoming marine mammals; operating the vessel at a slow, safe speed; avoiding multiple changes in direction when marine mammals are present near a vessel; not separating individuals from a group/pod; and not disrupting normal behaviors to the extent it is practicable and safe.

Along the route, the FOC will be laid on the seafloor or trenched. Though entanglement with FOC is highly unlikely, installation of FOC in trenches will remove the potential for entanglement altogether. Trenching will likely result in greater habitat disturbance, albeit temporary, through increased turbidity within the water column and indirect effects on prey resources. Pre-lay surveys will be conducted to identify areas necessary for trenching. In all other areas, the FOC will be laid on the seafloor, reducing impact on marine mammal habitat.

See Section 6.1.4, Measures to Reduce Direct Effects on Marine Mammals, for further minimization and mitigation measures.

3 Action Area

The action area defined by the ESA includes all areas directly or indirectly affected by the proposed action, not just the immediate area involved in the action (50 Code of Federal Regulations [CFR] 402.02). The action area generally extends outside the project footprint to where no measurable effects from project activities occur. For the purposes of this BA, the action area has been defined as the estimated distance to the NMFS in-water acoustic harassment disturbance threshold for continuous noise sources of 120 decibels referenced to a pressure of 1 micro Pascal root mean square (dB re 1 µPa rms).

Underwater sound propagation depends on many factors, including sound speed gradients in water, depth, temperature, salinity, and bottom composition. Additionally, the characteristics of the sound source, such as frequency, source level, type of sound, and depth of the source, will also affect propagation. By rearranging the transmission loss formula, distance to the sound threshold can be determined with the formula below:

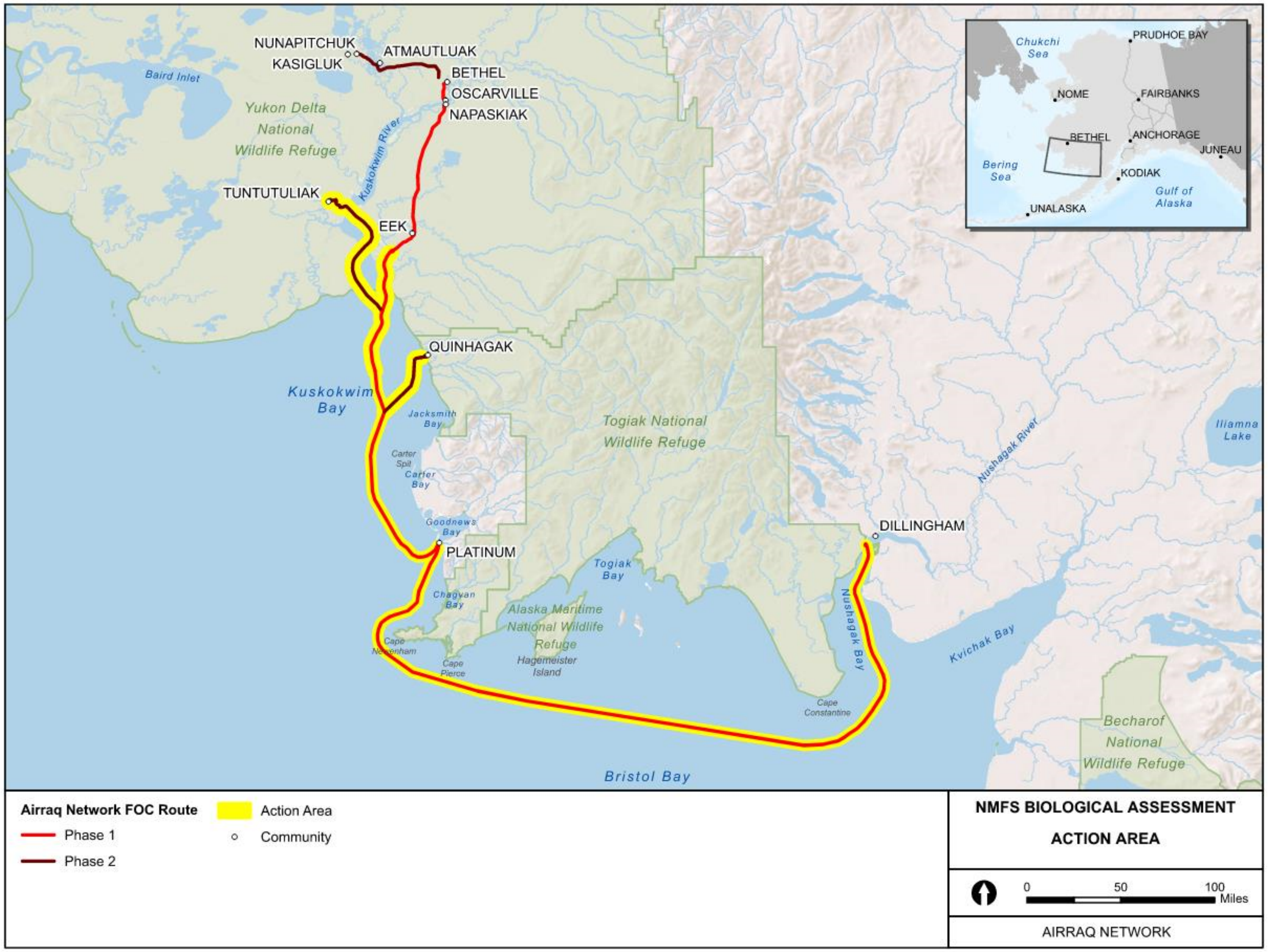
$$R = D*10^{(TL/TLc)}$$

Where

- Transmission Loss (TL) is the difference between the reference sound level in dB re 1 µPa rms and the Level B threshold in dB re 1 µPa rms (120.0 decibels [dB] for continuous sound);
- TL_c is the transmission loss coefficient;
- R is the estimated distance to where the sound level is equal to the Level B harassment threshold (120.0 dB for continuous sound); and
- D is the distance from the sound source at which the reference sound level was measured.

The action area for this Project is defined as the vessel transit route length plus a buffer of 1.1 mi (1.8 km) on each side of the marine route (2.2 mi [3.6 km] total width) within areas where the cable-laying ship, small landing craft, or VOO will be used. In areas where the tug and barge will be used, the action area is defined as the transit route length plus a buffer of 1.7 mi (2.8 km) on each side of the marine route (3.4 mi [5.6 km] total width). A cable-laying ship will be used within waters deeper than 40 ft (12 m), while a VOO will be used for cable-laying operations in waters shallower than 40 ft (12 m). It is currently unknown what type of vessel will be used, though it will likely be a tug and barge with a a landing craft in waters shallower than 40 ft (12 m) It is anticipated that the landing craft will generate significantly less sound and have a smaller action area than the tug; therefore, the same 1.7 mi (2.8 km) buffer will be applied along the marine route in waters shallower than 40 ft (12 m) as a conservative estimate. The total action area in the marine environment encompasses approximately 966 mi^2 (2503 km^2) and can be seen in Figure 3-1.

Figure 3-1. Project Action Area



Quintillion conducted a FOC-laying project in Alaska in 2016, including subsea cable-laying activity from ships in offshore waters and barges operating nearshore (Illingworth & Rodkin 2016). A sound source verification (SSV) study was conducted near Nome to characterize underwater sounds with the potential to harass marine mammals. The study measured underwater sound from trenching and winching operations by the cable-laying barge *CB Networker*, and thruster and propeller noise generated by the cable-laying ship *Ile de Brehat* while towing the plow. For the *Ile de Brehat*, plowing operations produced a generally continuous sound; the noise from the main propeller's cavitation was the dominant sound over the plow or other vessel sounds. The ship was pulling the plow at 80 percent power. The results of the measurements ranged from 145 dB re 1 µPa rms at 656 ft (200 m) to 121 dB re 1 µPa rms at 3 mi (4.9 km). One-third octave band spectra show dominant sounds between 100 and 2,500 hertz (Hz). The source level was computed to 185.2 dB re 1 µPa rms at 3.2 ft (1 m) using the measured transmission loss of 17.36 log. Assuming spherical spreading transmission loss (20 log), the distance to the 120 dB re 1 µPa rms threshold is calculated to be 1.1 mi (1.8 km) for the cable-laying ship. This calculation is consistent with what was previously issued in the NMFS Letter of Concurrence for the Unicom AU-Aleutian Fiber Optic Cable Installation Project in 2019 (NMFS # AKRO-2019-00892).

For the cable-laying tug and barge installing cable in waters 40 ft (12 m) or shallower within the Kuskokwim Bay, Kuskokwim River, and Kuskokwim River tributaries, the distance to the 120 dB re 1 µPa rms threshold was estimated using measurement taken from the tug, *Leo*, pushing a full barge, *Katie II,* near the Port of Anchorage, and recorded as 149 dB re 1 µPa rms at 328 ft (100 m) when the tug was using its thrusters to maneuver the barge during docking. Assuming spherical spreading transmission loss (20 log), the distance to the 120 dB re 1 µPa rms threshold is calculated to be 1.7 mi (2.8 km) for the cable-laying tug and barge. This same rationale was used to inform tug and barge cable-laying operations within the shallow waters of Chignik Lagoon, Chignik Lake, and Cold Bay for the Unicom AU-Aleutian Fiber Optic Cable Installation Project (NMFS # AKRO-2019-00892).

4 Species Descriptions

Species listed under the ESA that are known or suspected to occur within the action area include Beringia Distinct Population Segment (DPS) of bearded seal (*Erignathus barbatus*), fin whale (*Balaenoptera physalus*), Western North Pacific (WNP) DPS of gray whale (*Eschrichtius robustus*), Mexico DPS of humpback whale (*Megaptera novaeangliae*), WNP DPS of humpback whale (*Megaptera novaeangliae*), North Pacific right whale (*Eubalena japonica*), Arctic subspecies of ringed seal (*Pusa hispida*), sperm whale (*Physeter macrocephalus*), and Western DPS of Steller sea lion (*Eumetopias jubatus*). Designated critical habitat for the Steller sea lion is located within the action area. The action area is located outside designated critical habitat for the Beringia DPS of bearded seal, fin whale, WNP DPS of gray whale, Mexico DPS of humpback whale, WNP DPS of humpback whale, North Pacific right whale, Arctic subspecies of ringed seal, and sperm whale. NMFS has issued a proposed rule to list the sunflower sea star (*Pycnopodia helianthoides*) as threatened under the ESA (88 *Federal Register* [FR] 16212). However, sunflower sea stars are not known to occur north of the Aleutian Island chain (Gravem et al. 2021) and are therefore not considered in this BA.

A summary of the existing biological information for each species is presented below, including past and current distribution, species status, presence within the action area, and critical habitat.

4.1 Bearded Seal

4.1.1 Distribution and Life History

Bearded seals (*Erignathus barbatus*) tend to be ice dependent, occupying circumpolar latitudes in ocean habitats with waters less than 650 ft (200 m) deep. They are found within the Arctic Ocean south to Hokkaido in the western Pacific, between 85 degrees North (N) and 45 degrees N. In Alaska, bearded seals are often found in waters along the continental shelf in the Bering, Chukchi, and Beaufort seas, inhabiting seasonally ice-covered areas (Fedoseev 1965; Johnson et al. 1966; Burns 1967, 1981; Burns and Frost 1979; Smith 1981; Kelly 1988).

Two subspecies of bearded seals have been identified: *Erignathus barbatus barbatus* and *E. b. nauticus*. *E. b. barbatus* is found in the Laptev Sea, Barents Sea, North Atlantic Ocean, and Hudson Bay. *E. b. nauticus* occupies the remaining areas of the Arctic Ocean, Bering Sea, and Sea of Okhotsk (Rice 1998, Ognev 1935, Scheffer 1958, Manning 1974, Heptner et al. 1976). In North American waters, NMFS has defined 130 degrees West (W) as the delineation between the two subspecies (Cameron et al. 2010; 77 FR] 76740). Based on discrete differences between segments of *E. b. nauticus* and as a result of population concerns, the subspecies has been subdivided further into the Okhotsk DPS and the Beringia DPS (77 FR 76740). Only the Beringia DPS is considered for this BA because it is the only DPS that occurs within the action area.

Bearded seal pups are born between late April and early May, with females birthing one pup each year. Birthing and nursing occur on annual sea ice. Preferred ice habitat for birthing and nursing in late winter and early spring is drifting sea ice away from shore-fast ice. After weaning, breeding occurs, typically between late May and early June. Juveniles primarily occupy coasts, bays, estuaries, and river mouths. As ice forms, seals will move southward, following pack ice.

Females reach reproductive age at 5 to 6 years, while males reach reproductive age later, at 6 to 7 years. Males rely on vocalizations during the breeding season to attract females and compete with other males (Cameron et al. 2010).

Bearded seals off the coast of Alaska tend to occupy ice between 20 and 100 nautical mi (nm) from shore (Bengtson et al. 2000, Simpkins et al. 2003). Additionally, many seals wintering within the Bering Sea will migrate north through the Bering Strait from late April through June and over summer within the Chukchi Sea (Burns 1967, 1981). Diets for bearded seals consist primarily of benthic organisms, including epifaunal and infaunal invertebrates as well as demersal fish (Finley and Evans 1983).

4.1.2 Species Status

Two bearded seal populations are listed as threatened: the Beringia DPS and Okhotsk DPS. While the Okhotsk DPS does not occur in U.S. waters, the Beringia DPS is composed of bearded seals within waters off the western and northern coast of Alaska in addition to individuals off the coast of Russia. The Beringia DPS was listed as threatened on December 28, 2012 (77 FR 76740).

Sea-ice loss as a result of climate change is the primary concern for the Beringia DPS, and continued loss is expected to significantly threaten the persistence of the stock into the future. In addition to habitat modification from climate change, ocean acidification from carbon dioxide (CO_2) emissions is a threat to the bearded seal. Ocean acidification has the potential to alter marine ecosystems and bearded seal prey populations (Cameron et al. 2010; 77 FR 76740).

Population trends and an estimate of abundance in U.S. waters for the Beringia DPS are not available. Aerial abundance and distribution surveys within the Bering Sea were conducted in 2012 to 2013 and identified an abundance estimate of 301,836 individuals within those waters (Conn et al. 2014).

4.1.3 Presence within Action Area

The range of the Beringia DPS of bearded seal overlaps with the Project's marine action area. However, during marine operations, bearded seals that overwintered within the Bristol Bay area likely will be migrating north of the action area and through the Bering Strait. Additionally, bearded seals tend to congregate farther offshore than the Project vessel route. Therefore, few bearded seals are anticipated to occur within the action area during marine operations. Figure 4-1 shows the range of the Beringia DPS of bearded seal relative to the action area.

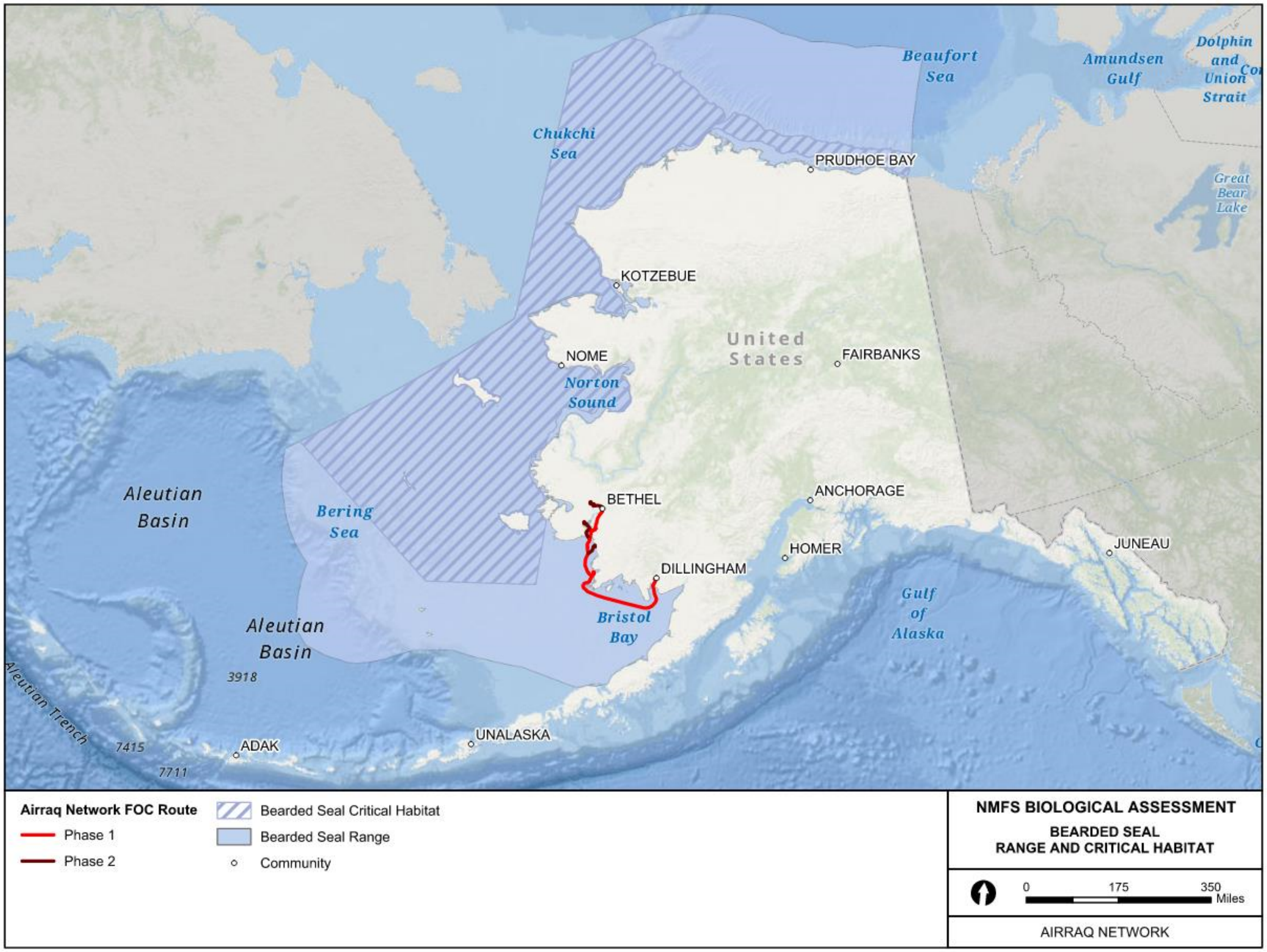
4.1.4 Critical Habitat

Critical habitat of the Beringia DPS of bearded seal includes marine waters within one specific area of the Bering, Chukchi, and Beaufort Seas, extending from the shoreward boundary to an offshore limit with a maximum water depth of 650 ft (200 m) from the ocean surface within the U.S. Exclusive Economic Zone (EEZ). The shoreward boundary follows the 65-ft (20-m) isobath (relative to mean lower low water [MLLW]) westward from the eastern limit of the U.S. EEZ within the Beaufort Sea and continuing into the northeastern Chukchi Sea to its intersection with Latitude 70 degrees 36′ N, south of Wainwright; then follows the 33-ft (10-m) isobath (relative to MLLW) to its intersection with Latitude 65 degrees 35′ N, near Cape Prince of Wales; then follows the 16-ft (5-m) isobath (relative to MLLW) to its intersection with Longitude 164 degrees 46′ W, near the mouth of the Kolovinerak River within the Bering Sea, except at Port Clarence Bay, where the shoreward boundary is defined as a continuous line across the entrance. The eastern boundary in the Beaufort Sea follows the eastern limit of the U.S. EEZ beginning at the nearshore boundary defined by the 65-ft (20-m) isobath (relative to MLLW), extends offshore to the 656-ft (200-m) isobath, then follows this isobath generally westward and northwestward to its intersection with the seaward limit of the U.S EEZ within the Chukchi Sea. The boundary then follows the limit of the U.S. EEZ southwestward and southward to the intersection of the southern boundary of the critical habitat in the Bering Sea at Latitude 60 degrees 32′26″ N, Longitude 179 degrees 9′53″ W. The southern boundary extends southeastward from this intersection point to Latitude 57 degrees 58′ N, Longitude 170 degrees 25′ W, then eastward to Latitude 58 degrees 29′ N, Longitude 164 degrees 46′ W, then follows Longitude 164 degrees 46′ W to its intersection with the nearshore boundary defined by the 16-ft (5-m) isobath (relative to MLLW) near the mouth of the Kolovinerak River. This includes waters off the coasts of the Bethel, Kusilvak, and Nome Census Areas, and the Northwest Arctic and North Slope Boroughs (77 FR 76740; December 28, 2012). Critical habitat for the bearded seal was chosen based on the following criteria:

1. Suitable sea ice habitat for whelping and nursing; suitable sea ice for these activities is defined as occurring in waters 656 ft (200 m) or less in depth, containing pack ice of at least 25 percent concentration, and providing bearded seal access to those waters from the ice
2. Suitable sea ice habitat for molting, which includes the same waters as Criteria 1, with pack ice of at least 15 percent concentration
3. Waters containing the bearded seal's primary prey source within waters of the same distinction as Criteria 1 and containing benthic organisms, including epifaunal and infaunal invertebrates as well as demersal fish

The Beringia DPS of bearded seal does not have any critical habitat within the Project's action area. Additionally, the Project is not anticipated to impact bearded seal critical habitat.

Figure 4-1. Bearded Seal Range and Critical Habitat near the Action Area



4.2 Fin Whale

4.2.1 Distribution and Life History

The fin whale (*Balaenoptera physalus*) is globally distributed (Figure 4-2) and makes seasonal latitudinal migrations, but the population structure is poorly understood. The population is frequently referred to on an ocean basin level: North Atlantic Ocean, Southern Hemisphere, and North Pacific Ocean (NMFS 2010a). Fin whale abundance and population size within the North Atlantic Ocean is well documented, but still uncertain within the North Pacific Ocean and Southern Hemisphere (NMFS 2010a).

Pre-whaling population estimates of the North Pacific population of fin whale are thought to have been 42,000 to 45,000, with approximately 25,000 to 27,000 east of Longitude 180 degrees W. The fin whale population east of Longitude 180 degrees W, dubbed “the American” population, is believed to have declined by more than 60 percent in the mid-twentieth century. The fin whale population within the Northeast Pacific declined by more than half, from 20,000 to 9,000 (NMFS 2010a). Regional estimates for the minimum population size and population trends for some portions of the Northeast Pacific population exist; however, no reliable estimates exist for the entire population (Muto et al. 2022).

The fin whale, ranging up to 88 ft (27 m), is the second largest whale in the world, following the blue whale (*Balaenoptera musculus*; Mizroch et al. 1984). They migrate seasonally, traveling from feeding areas at high latitudes in summer and lower latitudes in winter (Mizroch et al. 1984). North Pacific fin whales typically forage at a depth of 328 to 656 ft (100 to 200 m) and feed primarily on large copepods (*Calanus cristatus*) and euphausiids (krill; *Euphausia pacifica*, *Thysanoessa inermis*, *T. longipes*, *T. spinifera*). When these species are not present, fin whales will also feed on schooling fish, walleye pollock (*Gadus chalcogrammus*), and capelin (*Mallotus villosus*) (NMFS 2010a). This species reaches sexual maturity at 5 to 15 years of age and reproduce during a mating season that lasts approximately 5 months within equatorial waters. Females will bear a single calf every 2 to 3 years (Mizroch et al. 1984). The gestation period lasts approximately less than 1 year, and calves are approximately 20 ft (6 m) long at birth. The following summer, calves wean from their mothers at 6 to 7 months of age and 40 ft (12 m) in length while in higher latitudinal waters (Mizroch et al. 1984, NMFS 2010a).

Fin whale sightings are common within the Gulf of Alaska during summer months (Moore et al. 2006). Within the southeastern Bering Sea, fin whale calls are detected year-round, with peaks in September through November, and February through March (Stafford et al. 2010). Fin whale calls were detected within the northeastern Chukchi Sea from July through October (Delarue et al. 2013), and these whales have also recently been observed during summer feeding within the waters of the northern Bering Sea and southern Chukchi Sea. The acoustic data suggest that several fin whale stocks may feed within the Bering Sea, but only one of the putative Bering Sea stocks appears to migrate northward into the Chukchi Sea to feed (Delarue et al. 2013).

Fin whales produce a variety of low-frequency sounds in the 10- to 200-Hz range (Watkins 1981). While no direct data exist regarding hearing in low-frequency cetaceans, the applied frequency range is anticipated to be between 7 Hz and 35 kilohertz (kHz; NMFS 2016a).

Synthetic audiograms produced by applying models to X-ray computed tomography scans of a fin whale calf skull imply the best hearing for calves ranges from 20 Hz to 10 kHz, with maximum sensitivities between 1 and 2 kHz (Cranford and Krysl 2015).

4.2.2 Species Status

Fin whales were not a preferred species for commercial whalers because of their fast-swimming abilities and tendency to live within the open ocean. This species was not decimated by commercial whaling until the mid-1900s, after several other larger, easier to catch whale populations were devastated. Fin whales were originally listed as endangered under the Endangered Species Conservation Act (ESCA) in 1970 and later listed as endangered under the ESA, once it passed in 1973 (35 FR 8491).

The Northeast Pacific Stock of fin whale has been listed as depleted and strategic under the Marine Mammal Protection Act (MMPA) since 1972 (16 U.S. Code 1361 et seq.[3]). Protections for fin whales within the North Pacific began in the 1970s (NMFS 2010a). The International Whaling Commission (IWC) put a moratorium on commercial whaling that went into effect in 1986, providing international legal protections for fin whales.

4.2.3 Presence within Action Area

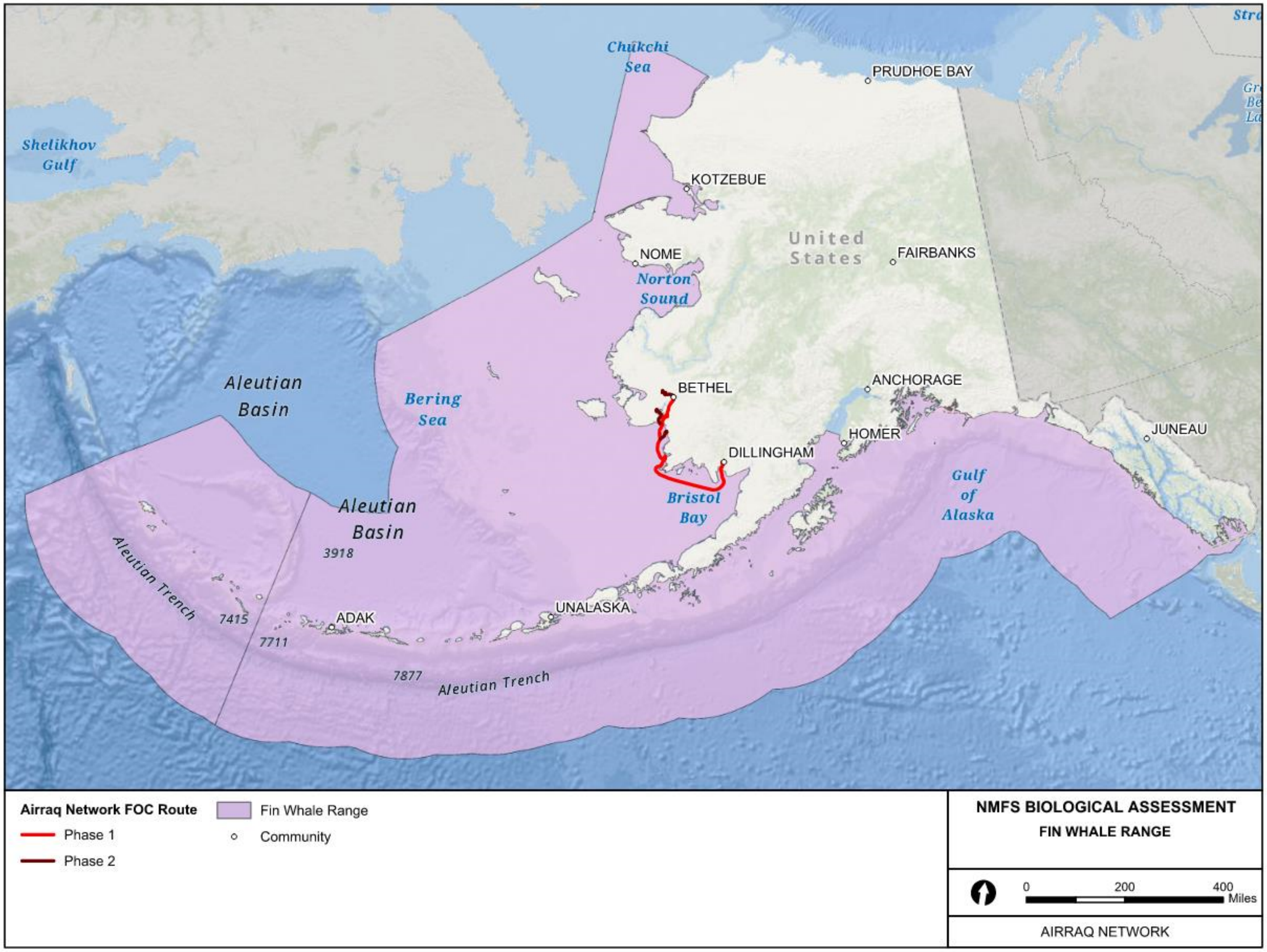
Fin whales, like most baleen whales, are thought to migrate seasonally from warm winter calving grounds within southern latitudes to cold summer feeding grounds within northern latitudes. They are commonly sighted in the Gulf of Alaska and Bering Sea during summer months (Moore et al. 2006, Mizroch et al. 2009); studies have detected fin whale calls year-round within the southeastern Bering Sea (Stafford et al. 2010). Due to the occurrence of this species within the Bering Sea, it is likely they will be observed within the action area (see Figure 4-2).

4.2.4 Critical Habitat

No critical habitat for the fin whale has been designated.

[3] https://www.fisheries.noaa.gov/topic/laws-policies#marine-mammal-protection-act

Figure 4-2. Fin Whale Range near the Action Area



4.3 Gray Whale (Western North Pacific DPS)

4.3.1 Distribution and Life History

The gray whale (*Eschrichtius robustus*) is common throughout the North Pacific Ocean (Carretta et al. 2022; see Figure 4-3). Genetic studies indicate DPSs or population stocks of gray whale within the North Pacific: the Eastern North Pacific (ENP) and WNP DPSs (LeDuc et al. 2002, Lang et al. 2014). The WNP DPS is listed as an endangered species, while the ENP DPS has recovered from whaling exploitation and was federally delisted under the ESA in 1994 (Carretta et al. 2022). The ENP DPS is not further discussed in this document. Based on photo-identification data collected off Sakhalin Island and Kamchatka in 2016, the estimated size of the WNP DPS population is 290 whales, although not all individuals may belong to the WNP DPS and may predominately be part of a Sakhalin feeding aggregation (Cooke et al. 2017, Carretta et al. 2022). Despite genetic differences, gray whales have been documented moving between the ENP and WNP populations (Urb?n et al. 2019). Brüniche-Olsen et al. (2018) concluded that the gray whale population structure cannot be determined by simple geography and may be in flux due to evolving migratory dynamics.

The WNP DPS feeds during summer and fall in the Okhotsk Sea off northeastern Sakhalin Island and in southeastern Kamchatka in the Bering Sea (Burdin et al. 2017). Some gray whales observed feeding off Sakhalin Island and Kamchatka migrate during winter to the western coast of North America within the eastern North Pacific, while others migrate southward to waters off Japan and China (Weller et al. 2016). ENP DPS gray whales migrate between the Bering, Chukchi, and Beaufort seas as well as the southern Gulf of California and Baja, with a few individuals remaining year-round off the coast of California or between Washington and Vancouver Island (ADF&G 2022).

Gray whales are benthic feeders that obtain food by scraping the sides of their heads along the sea floor, scooping up sediments and amphipods (ADF&G 2022). Gray whales primarily eat amphipod crustaceans, although a wide variety of species have been reported from gray whale stomachs, such as amphipods, decapods, and other invertebrates (Moore et al. 2003, ADF&G 2022).

4.3.2 Species Status

All gray whales are protected under the MMPA. The WNP DPS is listed as endangered under the ESA and depleted under the MMPA (Carretta et al. 2022).

In 2019, National Oceanic and Atmospheric Administration (NOAA) Fisheries declared an Unusual Mortality Event (UME) for gray whales due to an unusual spike in numbers of strandings along the western coast of North America, from Mexico through Alaska (NOAA Fisheries 2023). Since 2019, 135 gray whale strandings have been documented in Alaska (NOAA Fisheries 2023). While preliminary findings in several whales have shown evidence of emaciation, the cause of mortalities remains unknown, and the UME is still under investigation (NOAA Fisheries 2023).

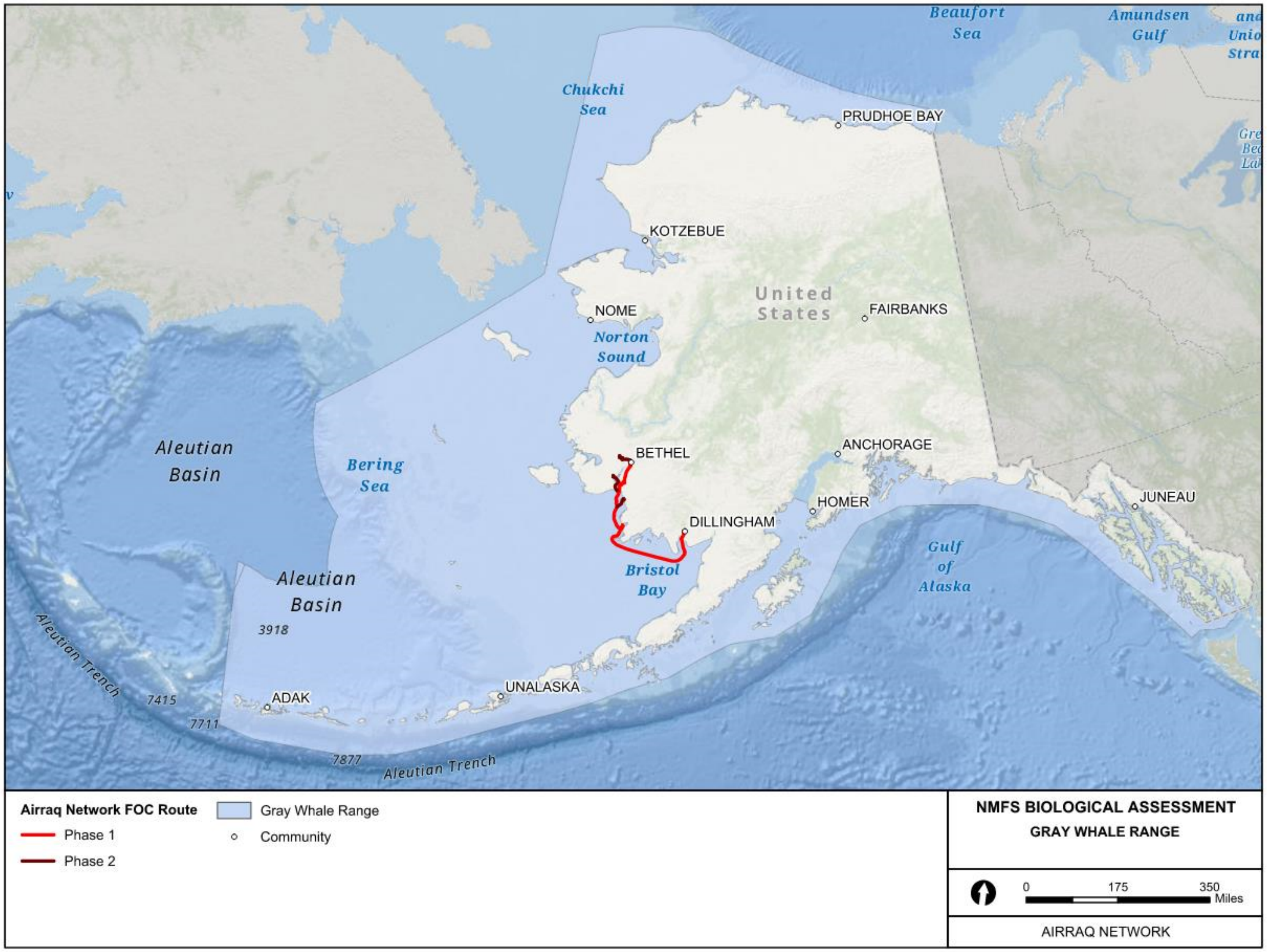
4.3.3 Presence within Action Area

While gray whales may occur within the action area between April and early January, it would likely be individuals from the non-endangered ENP DPS. The ENP DPS begin migrating northward along the coast of California to Alaska starting in late February through May (ADF&G 2022). The whales enter the Bering Sea, primarily through Unimak Pass, around April and May. They continue moving northward along the coast to their summer feeding grounds within the shallow waters of the northern and western Bering Sea and the Chukchi Sea (ADF&G 2022). The ENP DPS begin migrating southward in mid-October, returning through Unimak Pass between late October and early January (ADF&G 2022). However, the DPSs of gray whale cannot be separated in the field, and it is possible that a small number of individuals from the WNP DPS could occur within the action area.

4.3.4 Critical Habitat

No critical habitat is designated for gray whales.

Figure 4-3. Gray Whale Range near the Action Area



4.4 Humpback Whale (Western North Pacific DPS and Mexico DPS)

4.4.1 Distribution and Life History

Three DPSs of humpback whales are found in waters off the coast of Alaska: the WNP DPS (endangered), the Mexico DPS (threatened), and the Hawaii DPS (recovered; not ESA-listed). There are currently no abundance estimates for either the WNP or Mexico DPSs; however, there are estimates of abundance for humpback whale populations based on their summer feeding and winter breeding areas (NMFS 2022, Wade 2021).

The Structure of Populations, Levels of Abundance, and Status of Humpbacks (SPLASH) Project, conducted from 2004 to 2006, was the largest and most comprehensive study of humpback whales throughout the North Pacific (Muto et al. 2022). Using a multi-strata mark recapture model fit to the SPLASH data, Wade (2021) estimated abundance for humpbacks based on their summer feeding and winter breeding grounds.

The abundance estimate for humpback whales that use the Aleutian/Bering Sea summer feeding area is 7,758 (Coefficient of Variation [CV] = 0.196) using a multistate model and 2,111 (CV = 0.137) using the Chapman-Peterson summer-summer model (Wade 2021). Total North Pacific abundance estimates using the same models were 18,942 and 10,495, respectively. Winter area abundance estimates using a multistate model totaled 16,293 whales within the North Pacific (Wade 2021). Wade (2021) found that whales that spent summer within the Aleutian Islands/Bering Sea area had the lowest probability of being seen in any wintering area, suggesting that these whales could be overwintering within an unknown or unsampled area.

Despite the differing ESA statuses and DPS designations between the Mexico and Hawaii DPSs, evidence exists of whales traveling between these two breeding areas during the same winter season (Darling et al. 2022). Humpback whales from the WNP and Mexico DPSs overlap on summer feeding grounds. Humpback whales typically feed on euphausiids and small pelagic schooling fish in shallow, cold, productive coastal waters during summer months (Clapham et al. 1997). The migratory destinations of the WNP DPS are not completely known. Research indicates movement between winter/spring locations off Asia, including several island chains within the western North Pacific, to primarily Russia as well as the Bering Sea/Aleutians Islands during summer months (Figure 4-4; Muto et al. 2022). The Mexico DPS of humpback whale winters in Mexico and migrates to diverse feeding areas. Summer feeding areas for this DPS include the Aleutian Islands; Bering, Chukchi, and Beaufort Seas; Gulf of Alaska; Southeast Alaska/Northern British Columbia; Southern British Columbia/Washington; and Oregon/California (Muto et al. 2022).

Humpback whales give birth and likely mate from January to March within their wintering grounds. The winter migratory destination of the WNP DPS is not completely known but includes several island chains within the western North Pacific near Asia. Data also suggest that some whales from this DPS winter somewhere between Hawaii and Asia, possibly around the Mariana, Marshall, and Northwestern Hawaiian Islands (Muto et al. 2022). The Mexico DPS aggregates in three main locations within the Mexican Pacific during winter: the southern end of the Baja California Peninsula; the Bahia Banderas area, including the Islas Tres Marias and Isla Isabel along mainland Mexico; and the offshore Revillagigedo Archipelago (Wade et al. 2016).

Humpback whales reach sexual maturity at 5 to 11 years of age and are thought to breed within their wintering grounds or during migration. Females will bear a single calf every 1 to 5 years, with every 2 to 3 years being the most common. The gestation period lasts approximately 1 year, and calves are typically independent by 1 year of age.

No studies have directly measured the sound sensitivity of large cetacean species. Summaries of the best available information on marine mammal hearing are provided in Richardson et al. (1995), Erbe (2002), Southall et al. (2007), and NMFS (2016a). However, it is generally assumed that most animals hear well in the frequency ranges similar to those used for their vocalizations, which are mainly below 1 kHz in baleen whales (Richardson et al. 1995). NMFS has separated marine mammals into functional hearing groups, with the generalized hearing range of low-frequency cetaceans such as humpback whales considered to be between 7 Hz and 35 kHz.

Estimation of hearing ability based on inner ear morphology was completed for two mysticete species: humpback whales (700 Hz to 10 kHz; Houser et al. 2001) and North Atlantic right whales (10 Hz to 22 kHz; Parks et al. 2007). Humpback whale vocalizations generally range from 30 Hz to 8 kHz.

4.4.2 Species Status

All humpback whales are protected under the MMPA. Humpback whales were listed as endangered under the ESCA in 1970, and endangered under the ESA in 1973, when it replaced the ESCA (35 FR 18319). In 2016, NMFS divided the globally listed endangered humpback whale into 14 DPSs, and listed 4 of the DPSs as endangered (Cape Verde Islands/Northwest Africa DPS, WNP DPS, Central America DPS, and Arabian Sea DPS), and one as threatened (Mexico DPS) (81 FR 62259). The remaining nine DPSs were not listed as threatened or endangered.

4.4.3 Presence within Action Area

Humpback whales encountered within the action area are likely to be from the recovered Hawaii DPS. The probability of occurrence of the Hawaii DPS within the action area is 91 percent (Wade et al. 2021). While unlikely, individuals from the WNP and Mexico DPSs could occur within the action area. The probability of occurrence within the action area of the WNP and Mexico DPSs is 2 percent and 7 percent, respectively (Wade et al. 2021, NMFS 2021).

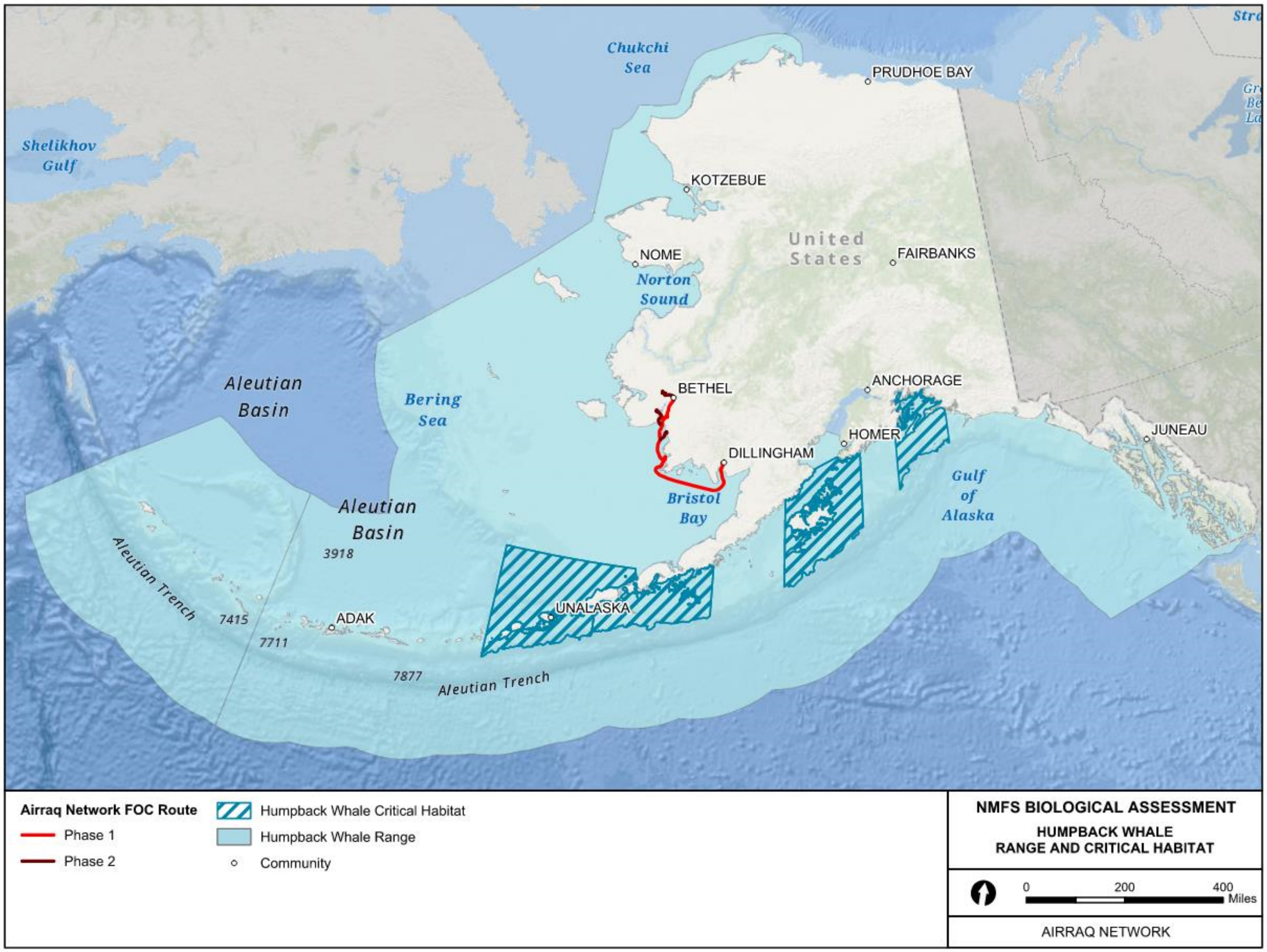
4.4.4 Critical Habitat

On May 21, 2021, NMFS designated critical habitat for the endangered WNP DPS, the endangered Central America DPS, and the threatened Mexico DPS of humpback whale (86 FR 21082). Critical habitat for the WNP DPS includes approximately 59,411 square nm (nm^2) of marine habitat within the eastern Bering Sea and Gulf of Alaska. BIAs for humpback whale feeding have been designated surrounding Kodiak Island and the Shumagin Islands (Ferguson et al. 2015). Critical habitat for the Mexico DPS includes approximately 116,098 nm^2 of marine habitat within the eastern Bering Sea, Gulf of Alaska, and California Current Ecosystem.

For both the Mexico and WNP DPSs of humpback whales, the physical and biological features (PBFs) associated with critical habitat include prey species, primarily euphausiids (*Thysanoessa*, *Euphausia*, *Nyctiphane*s, and *Nematosc*elis) and small pelagic schooling fish such as Pacific sardine (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), Pacific herring (*Clupea pallasii*), capelin, juvenile walleye pollock, and Pacific sand lance (*Ammodytes hexapterus*), of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth.

Humpback whale critical habitat for all DPSs and their associated PBFs are outside the action area, and it is not anticipated that they would be impacted by this Project (Figure 4-4).

Figure 4-4. Humpback Whale Range and Critical Habitat near the Action Area



4.5 North Pacific Right Whale

4.5.1 Distribution and Life History

The North Pacific right whale (*Eubalena japonica*) is one of the most endangered whale species worldwide (Clapham et al. 2006, Wade et al. 2011). Once abundant in the North Pacific, recent and historical whaling activities have depleted the North Pacific right whale population (Clapham et al. 2006). Due to its distinct geographic distribution and genetic analysis, it is generally accepted by researchers and recognized by NMFS that this species is composed of an eastern and western population (Brownell et al. 2001, Clapham et al. 2006, LeDuc et al. 2012, Pastene et al. 2018, Muto et al. 2022). The WNP population is found in the Sea of Okhotsk and adjacent waters, while the ENP population is found in the Bering Sea, Aleutian Islands, and Gulf of Alaska (Brownell et al. 2001). While no reliable population estimates exist for the WNP right whale, sighting data have suggested that the population may be in the low hundreds (Brownell et al. 2001; LeDuc et al. 2012). The current minimum estimate of abundance for the ENP right whale is 26 individuals, based on the 20th percentile of the Wade et al. (2011) photo-identification estimate of 31 whales (Muto et al. 2022). While this abundance estimate is more than 10 years old, Muto et al. (2022) suggests it is unlikely that the current abundance is significantly different due to the extremely low abundance and calf production of this population.

Historically, and prior to the onset of commercial whaling activities in 1835, North Pacific right whales had an extensive offshore distribution in the North Pacific and were common in the Gulf of Alaska and Sea of Japan (Scarff 1986, 2001; Clapham et al. 2004). By 1900, this species was depleted throughout its range and was no longer a principal target of commercial whaling (Scarff 2001). Efforts were made to prohibit the hunting or taking of right whales during the Convention for the Regulation of Whaling in 1931 and through the formation of the IWC in 1949 (Brownell et al., 2001; 73 FR 19000). Despite these efforts, the North Pacific right whale population was further devastated by illegal whaling conducted by the former Soviet Union between the 1950s and 1970s (Yablokov 1994, Doroshenko 2000, Clapham et al. 2004).

The majority of North Pacific right whale sightings have occurred between Latitude 40 and 60 degrees N (Clapham et al. 2006). Migratory patterns of this species is largely unknown, although research suggests they migrate from high-latitude feeding grounds in summer to more temperate waters during winter (Clapham et al. 2004). During summer months, the southeastern Bering Sea and western Gulf of Alaska are considered important and commonly used habitats for the ENP population, while winter calving grounds remain unknown (Muto et al. 2022).

North Pacific right whales prey upon a variety of zooplankton species, and the availability of these species greatly influences whale distribution on their feeding grounds within the southeastern Bering Sea (Shelden et al. 2005). Right whales feed regularly during spring and summer, and congregations of these whales can be found within areas with dense concentrations of copepods and other large zooplankton species (Shelden et al. 2005).

4.5.2 Species Status

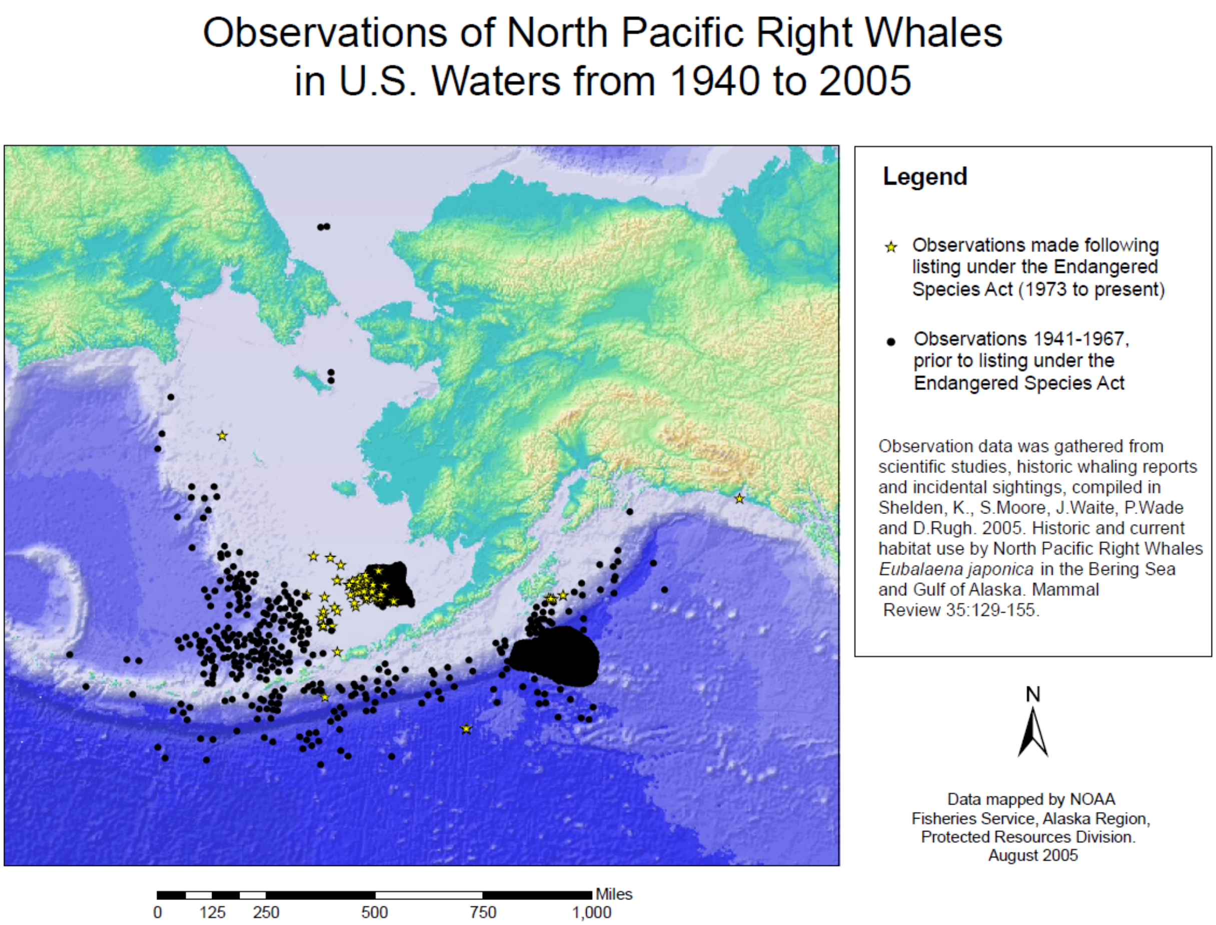
Right whales were listed as a single species in 1970 as part of the ESCA of 1969 and were granted endangered status when the ESCA was repealed and replaced by the ESA in 1973

(35 FR 8491; Clapham et al. 2006). The MMPA of 1972 also protects right whales in U.S. waters. On March 6, 2008, the North Pacific right whale was listed as a separate, endangered species that is distinct from the North Atlantic right whale (73 FR 12024). The North Pacific right whale is also listed as Endangered on the International Union for Conservation of Nature (IUCN) Red List, with the ENP subpopulation listed separately as Critically Endangered (Cooke and Clapham 2018).

4.5.3 Presence within Action Area

While the Project is within the North Pacific right whale range, no recent or historical sightings exist of this species within or near the action area (NMFS 2005; see Figure 4-5). It is unlikely that right whales would be present within the action area during cable-laying activities and therefore, unlikely that these whales would be subject to vessel strikes.

Figure 4-5. Observations of North Pacific Right Whales within U.S. Waters, 1940 to 2005



Source: NMFS 2005

4.5.4 Critical Habitat

On May 8, 2008, NOAA Fisheries designated critical habitat for the North Pacific right whale (73 FR 19000). Due to the limited information available on this species' behavior or breeding and calving areas, its critical habitat designation was based on known feeding grounds and best available sighting data (Clapham et al. 2006). The primary constituent elements (PCEs) of the North Pacific right whale are the copepods (*Calanus marshallae, Neocalanus cristatus,* and *N. plumchris*) and euphausiids (*Thysanoessa raschii*) within areas of the North Pacific Ocean in which these whales are known or believed to feed (50 CFR 226.215). Potential threats to right whale habitat are linked to commercial shipping and fishing vessel activity. Fishing activity increases the risk of entanglement, while shipping activities increase the risk of vessel strikes and oil spills in right whale habitat. Critical habitat can be found within the Gulf of Alaska and the southeastern Bering Sea (Figure 4-6).

On July 11, 2022, NMFS announced a 90-day finding on a petition to expand the North Pacific right whale critical habitat to connect the two existing critical habitat areas by extending the southeastern Bering Sea boundary westward and southward to the Fox Islands, through Unimak Pass, and eastward to the Gulf of Alaska critical habitat area (87 FR 41271; CBD and SNPRW 2022; Figure 4-7). This proposed addition would encompass a key migratory area and provide connectivity between two essential foraging grounds (CBD and SNPRW 2022). NMFS determined that the petition presented substantial scientific information and has initiated a review of the currently designated critical habitat to determine whether a revision is warranted. At the time of writing this document, NMFS has not issued a proposed or final rule on the modification of the North Pacific right whale critical habitat. The proposed addition to the critical habitat presented in the petition does not occur within the action area and is located farther from the Project than the existing North Pacific right whale critical habitat in the Bering Sea.

North Pacific right whale critical habitat and its associated PCEs lie outside the action area and are not likely to be affected by this Project.

Figure 4-6. North Pacific Right Whale Range and Critical Habitat near the Action Area

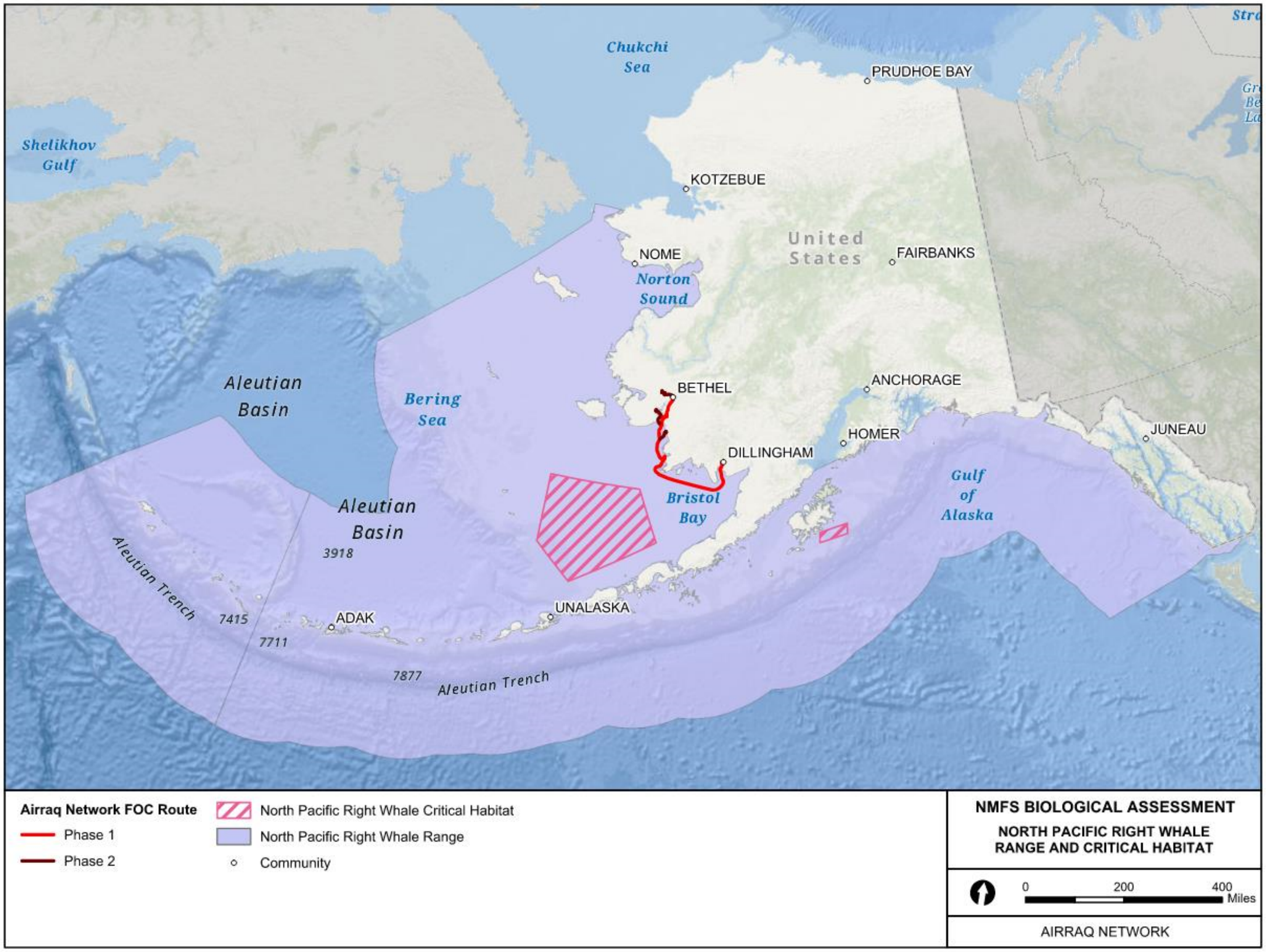
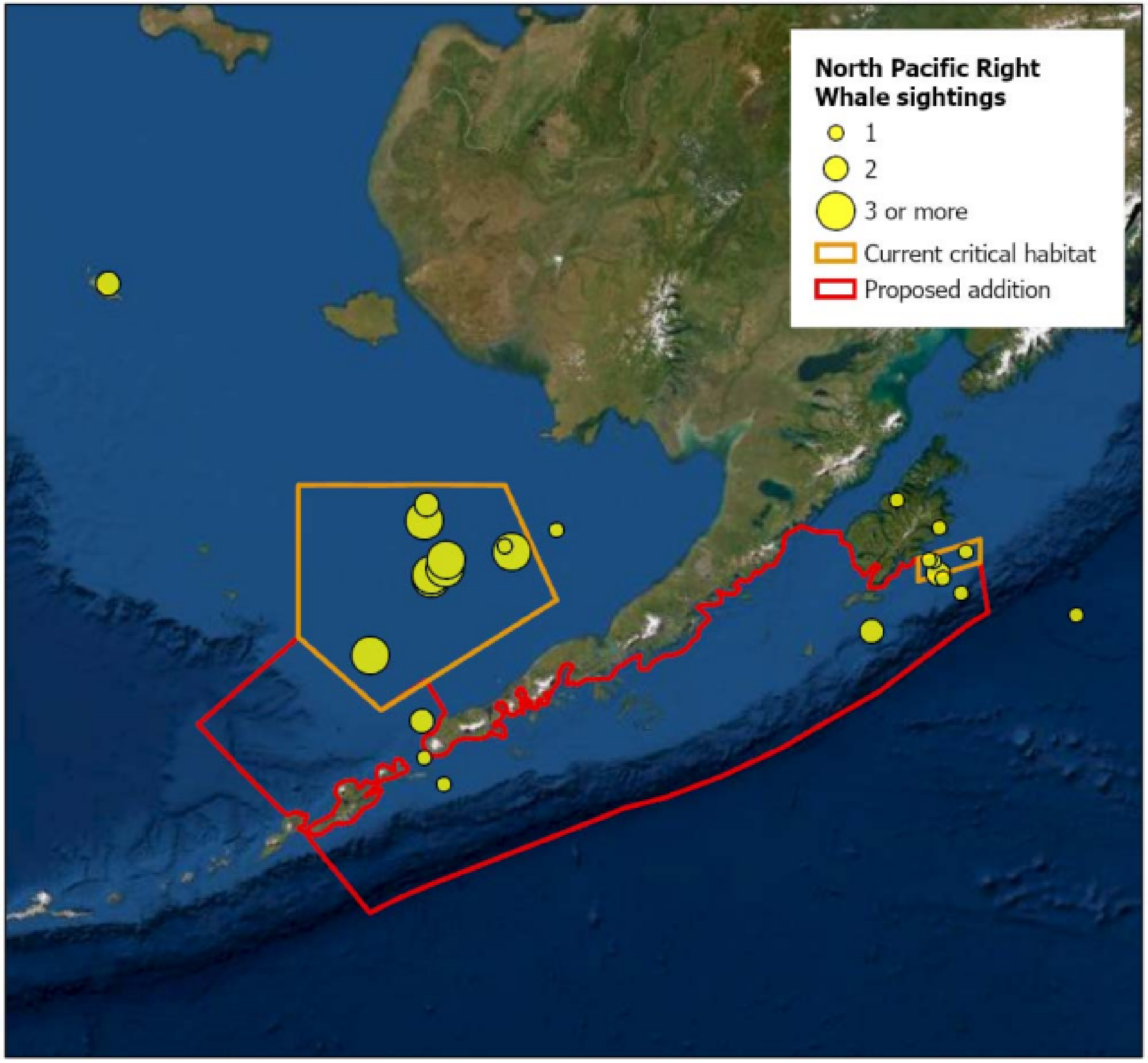


Figure 4-7. Proposed Revision to North Pacific Right Whale Critical Habitat



Source: CBD and SNPRW 2022

4.6 Ringed Seal

4.6.1 Distribution and Life History

The ringed seal (*Pusa hispida*) has a circumpolar distribution throughout the Arctic Ocean and can also be found in some specific freshwater lakes (King 1983). Five subspecies of ringed seals are recognized: *P. h. hispida* in the Arctic Ocean and Bering Sea; *P. h. ochotensis* in the Sea of Okhotsk and northern Sea of Japan; *P. h. botnica* in the northern Baltic Sea; *P. h. lagodensis* in Lake Ladoga, Russia; and *P. h. saimensis* in Lake Saimaa, Finland (Ognev 1935, Muller-Wille 1969, Rice 1988).

Ringed seals occupy both shore-fast and pack ice for most of the year (Kelly 1988). Ice is the preferred habitat for pupping and nursing in late winter through early spring and molting from late spring to early summer and is used for resting throughout the year (Lukin et al. 2006). Ringed seals off the coast of Alaska are often found in the Bering and Norton Seas and Kotzebue Sound, as well as being dispersed throughout the Chukchi and Beaufort Seas when sea ice is at its maximum extent in late winter and spring (Frost 1985).

Ringed seals reach sexual maturity as early as 3 years of age for both sexes, and as late as 7 years of age for males or 8 years of age for females. They can live up to 30 years of age. This species breeds annually and gives birth within subnivean lairs. Pups wean prior to spring ice breakup (Kelly et al. 2010).

Ringed seal movement is influenced by seasonal ice movement. They will spend winter through early spring primarily within subnivean lairs (Chapskii 1940, McLaren 1958, Smith and Stirling 1975). In late spring and early summer, they often bask on ice after abandoning their lairs and before ice melt. After ice melt, they molt and begin an intensive feeding period within open water until freeze-up in fall (Kelly et al. 2010). It is believed that most ringed seals that winter in the Bering Sea migrate northward in spring as ice recedes. They will then spend the open water period within the pack ice of the northern Chukchi and Beaufort Seas (Frost 1985).

Ringed seal diet is varied, consisting mostly of small prey. Fish within the cod family comprise a large portion of ringed seal diet throughout their range. Crustaceans, which are also commonly preyed upon by seals, tend to dominate the diets of young seals, and are more commonly consumed in open water seasons (Kelly et al. 2010).

4.6.2 Species Status

The Arctic ringed seal stock, composed of the subspecies *P. h. hispida*, was listed as threatened on December 28, 2012 (77 FR 76706). Habitat modification from climate change, including sea ice and snow cover loss, is the primary threat to this stock. Ringed seals rely on subnivean lairs, which they excavate out of snow on sea ice above their breathing holes for rest, birthing, and nursing. Inadequate snow cover has been linked to hypothermia and death in pups (Kumlien 1879, Lukin and Potelov 1978, Lydersen and Smith 1989, Smith and Lydersen 1991, Stirling and Smith 2004). Additionally, ocean acidification driven by CO_2 emissions and its impact on marine ecosystems, including prey populations, are a concern for the Arctic ringed seal stock's persistence. Prey resources include arctic cod (*Boreogadus saida*), saffron cod

(*Eleginus gracilis*), rainbow smelt (*Osmerus mordax*), shrimps, and amphipods (Kelly et al. 2010).

Reliable stock population estimates are not currently available. However, surveys from 2012 to 2013 have been used to establish population estimates of the stock within U.S. waters. Aerial abundance and distribution surveys over ice-covered portions of the Bering Sea calculated an estimate of 171,418 individuals. This estimate excludes ringed seals in shore-fast areas or individuals that may have been in the water at the time of surveying. As such, the population of ringed seals within the U.S. portion of the Bering Sea is likely to be at least twice as large (Conn et al. 2014).

4.6.3 Presence within Action Area

The Arctic ringed seal stock range overlaps with the Project's entire marine action area. Ringed seals are likely to be observed seasonally within the action area, when the ice maximum has reached Kuskokwim Bay. As cable-laying operations will occur in ice-free periods, construction operations are unlikely to occur when ringed seals are within the action area. Figure 4-8 shows the ringed seal range.

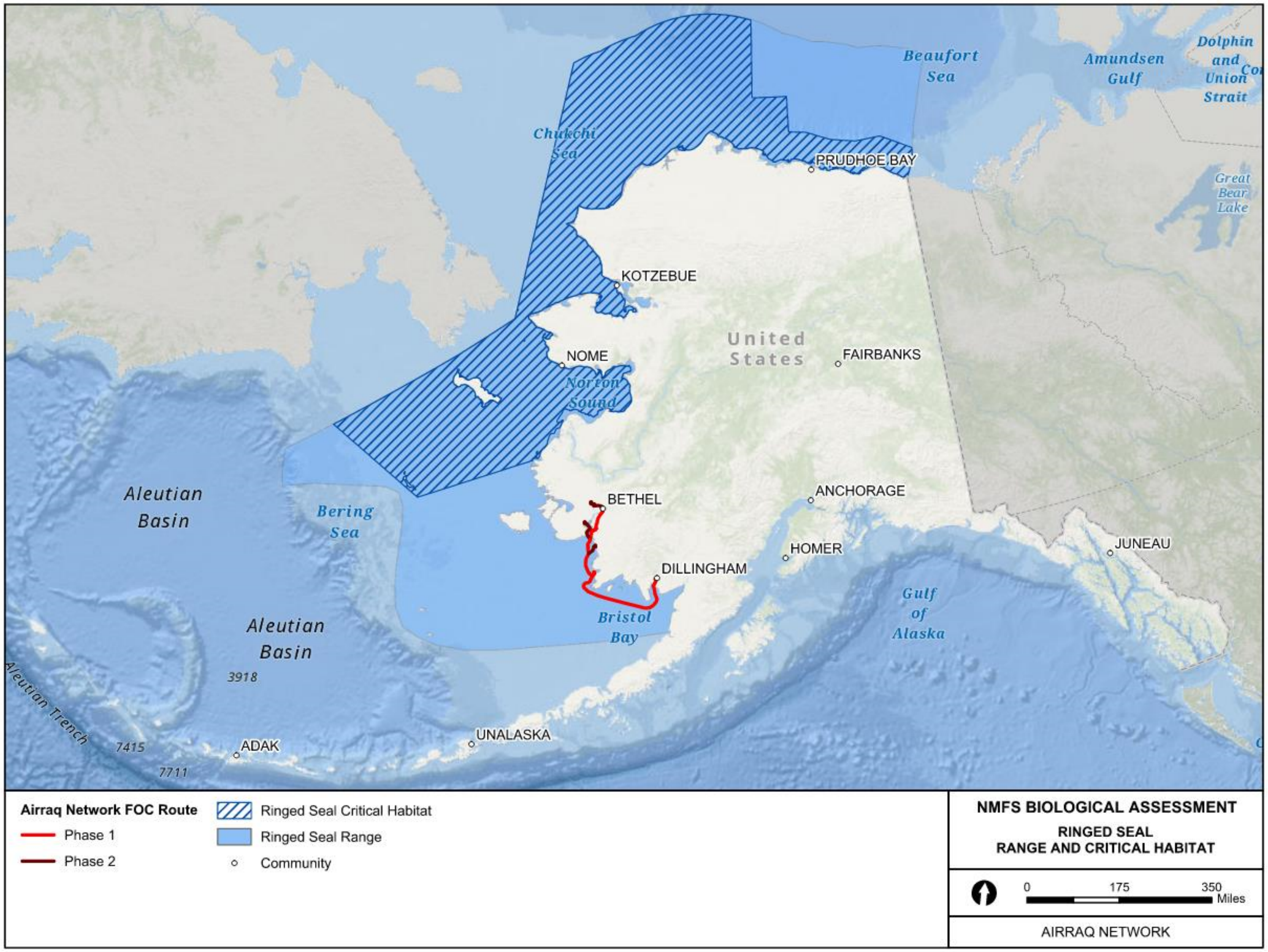
4.6.4 Critical Habitat

Critical habitat for the Arctic ringed seal stock is contained within one area within the Bering, Chukchi, and Beaufort Seas. This area extends from the nearshore boundary of 10-ft (3-m) isobath relative to MLLW to an offshore extent within the EEZ (77 FR 76706). This zone was chosen based on the following criteria:

- Snow-covered sea ice habitat suitable for the formation and maintenance of subnivean birth lairs used for sheltering pups during whelping and nursing, which is defined as waters 10 ft (3 m) or more deep (relative to MLLW) containing areas of seasonal land-fast (shore-fast) ice or dense, stable pack ice that have undergone deformation and contain snowdrifts of sufficient depth to form and maintain birth lairs (typically at least 21 inches [54 centimeters] deep)
- Sea ice habitat suitable as a platform for basking and molting, which is defined as areas containing sea ice of 15 percent or more concentration in waters 10 ft (3 m) or more deep (relative to MLLW)
- Primary prey resources to support these seals, which are defined to be small, often schooling fish, particularly arctic cod (*Boreogadus saida*), saffron cod (*Eleginus gracilis*), rainbow smelt (*Osmerus dentex*); and small crustaceans, particularly shrimps and amphipods (77 FR 76706)

The ringed seal has no critical habitat within the Project's action area. Additionally, the Project is not anticipated to affect ringed seal critical habitat.

Figure 4-8. Ringed Seal Range and Critical Habitat near the Action Area



4.7 Sperm Whale

4.7.1 Distribution and Life History

Sperm whales (*Physeter macrocephalus*) are widely distributed and can be found in every ocean in waters ranging from tropical to temperate (Jefferson et al. 2008, Popov and Eichhorn 2020); however, they are rarely found in waters with extensive ice coverage. These whales are widely distributed in the North Pacific, with the northernmost boundary extending from Cape Navarin to the Pribilof Islands (Figure 4-9). Extensive numbers of female sperm whales have been documented in the western Bering Sea and Aleutian Islands (Mizroch and Rice 2006, Ivashchenko et al. 2014). Males have been found in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands in summer (Mizroch and Rice 2013, Ivashchenko et al. 2014). Sperm whale presence was recorded year-round in the Gulf of Alaska during acoustic surveys (Mellinger et al. 2004, Muto et al. 2022).

Currently, no reliable estimates exist for the total number of sperm whales worldwide, including the North Pacific. The abundance of these whales in the North Pacific was reported to be 1,260,000 prior to exploitation, but confidence intervals for these estimates are unknown (Rice 1989). The number of sperm whales in Alaska waters is unknown, and a reliable estimate of abundance for the North Pacific population is not available (Muto et al. 2022). Kato and Miyashita (1998) reported 102,112 sperm whales in the western North Pacific, but believed their results to be positively biased. Using survey data from 2015 in the Gulf of Alaska, Rone et al. (2017) estimated a population of 345 sperm whales. This number was used in the Alaska Marine Stock Assessment 2021 Report to calculate a minimum population estimate for the North Pacific population of sperm whales. The resulting minimum population estimate for the North Pacific population of sperm whales is 244, but this is considered unreliable and a gross underestimation (Muto et al. 2022).

Sperm whales commonly forage in deep waters (1,312 to 2,953 ft [400 to 900 m]), and as deep as 7,382 ft (2,250 m; Popov and Eichhorn 2020). Sightings of these whales within waters less than 984 ft (300 m) are uncommon. In a habitat model derived from cetacean sighting data collected around the Svalbard archipelago, Storrie et al. (2018) found shallower waters (less than 1,640 ft [500 m]) to be unsuitable sperm whale habitat. These whales feed primarily on medium- to large-sized squids, but also substantial amounts of sharks, skates, fishes, and other cephalopods (Rice 1989).

Sperm whale distribution varies based on sex, age, food availability, and suitable breeding conditions. It was previously thought that juveniles and adult females remained in tropical and temperate waters year-round; however, Ivashchenko et al. (2014) identified a large number north of Latitude 50 degrees N. Currently, little information exists about the distribution of these whales within Alaska waters (Muto et al. 2022). Sperm whale breeding occurs during summer within deep offshore waters; 12- to 13-ft (3.6 to 4 m) calves are born after a 14- to 16-month gestation period.

No studies have directly measured the sound sensitivity of large cetacean species. Summaries of the best available information on marine mammal hearing are provided in Richardson et al. (1995), Erbe (2002), Southall et al. (2007), and NMFS (2016). However, it is generally assumed that most animals hear well in the frequency ranges similar to those used for their vocalizations. NMFS has separated marine mammals into functional hearing groups with the generalized hearing range of mid-frequency cetaceans, where the sperm whale is classified, between 150 Hz and 160 kHz. 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 (Ridgway and Carder 2001).

Sperm whales produce several types of click sounds: patterned clicks (codas associated with social behavior), usual clicks, creaks, and slow clicks (Weilgart and Whitehead 1988). Most acoustic energy from this species is below 4 kHz, although above 20 kHz has been reported (Thode et al. 2002). Other studies indicate that the wide-band clicks of these whales contain energy between 0.1 and 20 kHz (Weilgart and Whitehead 1993, 1997; Goold and Jones 1995).

4.7.2 Species Status

Sperm whales were a target of commercial whalers for nearly 250 years, beginning in the early to mid-1700s (NMFS 2010b). Sperm whale harvest was first regulated in the North Pacific in 1970 and the Southern Ocean in 1971 (NMFS 2010b). Concurrently, this species was listed as endangered under the ESCA in 1970 and endangered under the ESA in 1973. They are designated as depleted and strategic under the MMPA (Muto et al. 2022). The IWC put a moratorium on commercial whaling that went into effect in 1986, providing international legal protections for sperm whales.

4.7.3 Presence within Action Area

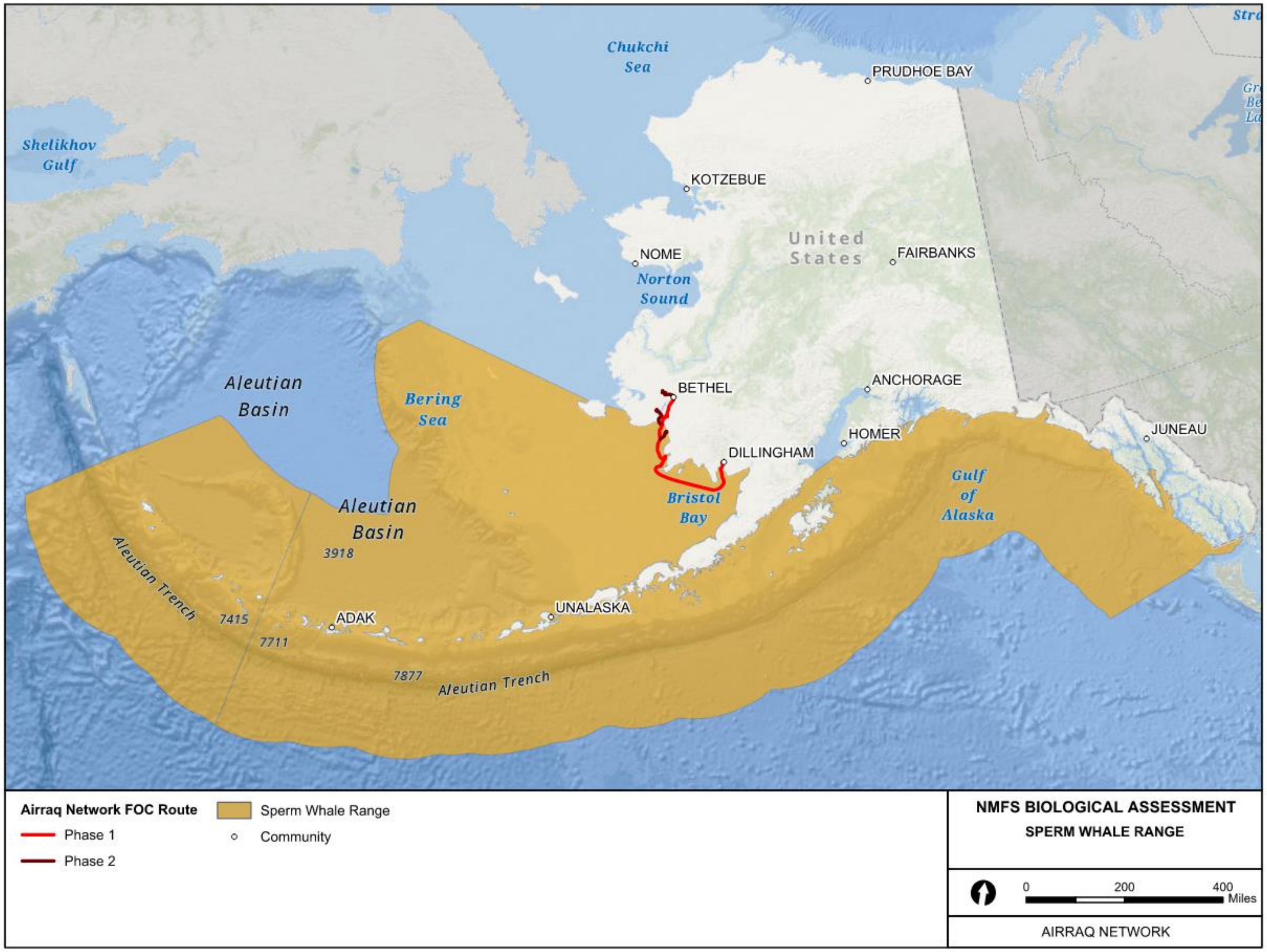
Sperm whale distribution and movement is thought to vary between sexes (Whitehead 2003). Adult whales migrate north from warm-water wintering grounds to higher latitudinal summer feeding grounds, including the Bering Sea (Rice 1989, Whitehead 2003, Angliss and Allen 2010). It was believed that females and their calves did not migrate above the Latitude 42 degrees N subarctic boundary and remained in tropical and sub-tropical waters (Rice 1989, Whitehead 2003); however, in 2008, a group of suspected females and juvenile whales were observed in higher latitudinal waters, including the Bering Sea (Fearnbach et al. 2012).

Despite the presence of male and female sperm whales in the Bering Sea, it is unlikely they will be located within the action area due to their propensity to forage in deep waters and habitat less than 1,640 ft (500 m) being deemed “unsuitable” (Storrie 2018).

4.7.4 Critical Habitat

No critical habitat is designated for sperm whales.

Figure 4-9. Sperm Whale Range near the Action Area



4.8 Steller Sea Lion

4.8.1 Distribution and Life History

Steller sea lion (*Eumetopias jubatus*) habitat extends north from California along the Pacific Coast, through the Southeast and Southcentral Alaska coast to the Aleutian Islands. From the Aleutian Islands, Steller sea lion habitat includes both Alaska, Russian, and northern Japan coastlines north to latitudes shared with Alaska's Seward Peninsula, including the Kuril Islands and Okhotsk Sea. The U.S. population is subdivided between the eastern stock and DPS and the western stock and DPS. The dividing line between the two populations is Cape Suckling, Alaska (Longitude 144 degrees W) (Loughlin et al. 1984, Loughlin 1997).

Steller sea lions spend a significant amount of their life on land, occupying both rookeries and haulouts. Rookeries are primarily used during the mating season by pups and breeding adults from late May to early June. Rookeries are where reproduction, pupping, molting, and other activities occur (Pitcher and Calkins 1981, Gisiner 1985). Haulouts are used by non-breeding adults, including those past breeding age, for resting and other activities (Bigg 1985).

Female Steller sea lions reach sexual maturity and begin breeding between 3 and 8 years of age, with 10 years being the average age of reproducing females (Pitcher and Calkins 1981). Females often breed annually and will typically birth one pup at a time. Breeding occurs, on average, 11 days after giving birth, with females undergoing a 3.5 month delayed implantation. Reproductive failure is common among Steller sea lions (37 to 45 percent; Calkins and Goodwin 1988, Pitcher and Calkins 1981). Pups will suckle for 1 to 3 years prior to becoming independent. Males reach physiological maturity by 7 years of age but are often unable to defend territory on rookeries until they are at least 8 years of age (Thorsteinson and Lensink 1962, Pitcher and Calkins 1981). When full size, females will reach an average weight of 579 pounds, with males more than doubling that at an average of 1,245 pounds. Males will typically hold territories on rookeries until 13 years of age and live up to 20 years. Females will breed until 27 years of age and live up to 30 years (Thorsteinson and Lensink 1962, Calkins and Pitcher 1981).

4.8.2 Species Status

The Steller sea lion was listed as threatened across its range in 1990. In 1997, NMFS reclassified Steller sea lions as two DPSs under the ESA based on genetic studies and phylogeographical analyses: the Eastern DPS and Western DPS (62 FR 24345). The Eastern DPS includes sea lions born east of Cape Suckling (Longitude 144 degrees W), and the Western DPS includes animals born west of Cape Suckling (Loughlin 1997). The Western DPS was listed as endangered; the Eastern DPS was listed as threatened but was delisted in 2013. This assessment evaluates the endangered Western DPS.

When the Western DPS was classified as endangered in 1997, it was because the stock was exhibiting consistent population rate declines and no signs existed of stock risks weakening, not because of critically low numbers. The trajectory of population loss and lack of lessening pressures led to the expectation that the stock would have a high risk of extinction in the foreseeable future. As a result, delisting became dependent upon sustained annual population increases.

The Western DPS decreased in size from 265,000 individuals in the 1970s to fewer than 50,000 individuals in 2000 (Loughlin et al. 1984, Loughlin and York 2000, Burkanov and Loughlin 2005). Since then, the Western DPS has undergone inconsistent growth throughout its range. Recent modeling efforts in 2019 suggest the Western DPS population size is approximately 12,581 pups and 40,351 non pups (Sease and Gudmundson 2002; Burkanov and Loughlin 2005; Fritz et al. 2013, 2016).

4.8.3 Presence within Action Area

The Western DPS Steller sea lion range overlaps with the Project's entire action area (Figure 4-10).

4.8.4 Critical Habitat

In designating critical habitat for the Western DPS, NMFS identified important marine and terrestrial sites. The designated critical habitat for Steller sea lion was chosen on August 27, 1993 (58 FR 45269). Designated critical habitat includes the following areas, as described in 50 CFR 226.202:

1. Terrestrial zones that extend 3,000 ft (0.9 km) landward from each major haulout and major rookery;
2. Air zones that extend 3,000 ft (0.9 km) above the terrestrial zone of each major haulout and major rookery within Alaska;
3. Aquatic zones that extend 3,000 ft (0.9 km) seaward of each major haulout and major rookery within Alaska that is east of Longitude 144 degrees W;
4. Aquatic zones that extend 20 nm (37 km) seaward of each major haulout and major rookery within Alaska that is west of Longitude 144 degrees W; and
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.

Aquatic zones within the U.S. breeding range of the Western DPS extend 20 nm (37 km) seaward in state and federally managed waters from the baseline or basepoint of each major rookery and major haulout within Alaska that is west of Longitude 144 degrees W. These zones were chosen based on known foraging trip distances observed by lactating females at rookeries (more than 12 mi [20 km]) and juveniles at haulouts (more than 19 mi [30 km]). The abundance of food within these areas are crucial for juveniles learning to forage on their own and for weaning (62 FR 24345).

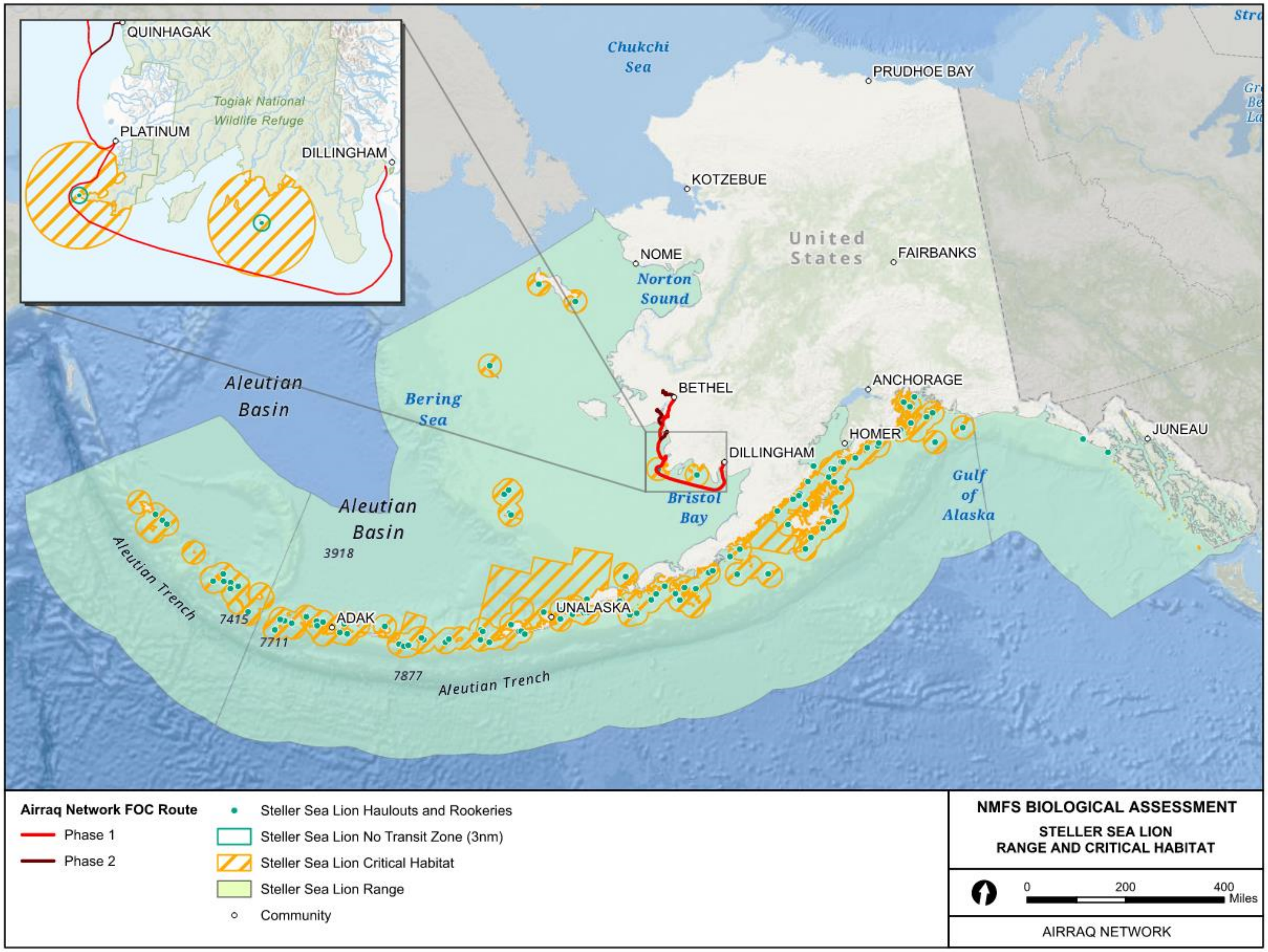
The additional three critical aquatic foraging areas were identified based on the following conditions:

- At-sea observations indicating that sea lion commonly use these areas for foraging
- Records of animals killed incidentally in fisheries (post 1980s)
- Knowledge of sea lion prey, and their life histories and distributions
- Foraging studies (NMFS 2013)

The critical habitat areas identified from the criteria above are Shelikof Strait; the southeastern Bering Sea; north of the Aleutian Islands from Unimak Island, past Bogoslof Island, to the Islands of Four Mountains; and the Seguam area. Shelikof Strait was chosen as being an important foraging site identified by significant aggregation of spawning pollock in winter months and incidental take from the pollock fishery there. Critical habitat surrounding the southeastern Bering Sea and northward was chosen for these same reasons. The Seguam area was chosen based on the presence of a significant Atka mackerel fishery and its proximity to major haulouts (62 FR 24345).

The cable-laying route traverses Steller sea lion critical habitat around Cape Newenham National Wildlife Refuge and Round Island. These areas were designated as critical habitat because they are a major haulout. The action area includes 159.9 mi^2 (414.1 km^2) within Steller sea lion critical habitat. The area of critical habitat the transit route overlaps is more than 3 nm (5.6 km) from the haulouts. Steller sea lion presence is likely at these haulouts. Figure 4-10 shows the Western DPS range and critical habitat within the action area.

Figure 4-10. Steller Sea Lion Range and Critical Habitat near the Action Area



5 Environmental Setting

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat within the action area (included in this section). The environmental baseline also includes the past and present impacts of all federal, state, or private actions and other human activities within the action area; the anticipated impacts of all proposed federal projects within the action area that have already undergone formal or early Section 7 consultation; and the impact of state or private actions that are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are also part of the environmental baseline (50 CFR 402.02).

5.1 Existing Conditions

The action area is composed of diverse marine environments, stretching from the northernmost extent of Nushagak Bay along the coast to the mouth of the Kuskokwim River. The coastline includes part of the Alaska Maritime National Wildlife Refuge, the Togiak National Wildlife Refuge, and Cape Newenham State Game Refuge, while falling primarily within the Bering Sea and Kuskokwim Bay. The action area will reach a maximum distance of approximately 51 mi (82 km) from shore and will occur within areas up to approximately 147 ft (45 m) deep.

Flood tides influence the Bering Sea through Aleutian Island passes, creating the Aleutian North Shore Current. East of Unimak Pass, the marine current flows northeastward, composing the Bering Coastal Current along the Alaskan Peninsula and into Bristol Bay. At this location, the current creates a counterclockwise gyre (NMFS 2013). Currents then primarily flow northward and westward around Cape Newenham toward Kuskokwim Bay while also flowing eastward to the inner bay.

Six major watersheds drain into Bristol Bay: the Togiak, Nushagak, Kvichak, Naknek, Egegik, and Ugashik River watersheds. The Nushagak and Kvichak River watersheds are the largest among them, occupying approximately 50 percent of the region’s watershed. They comprise five distinct physiographic divisions: the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak – Bristol Bay Lowland (EPA 2014). These watersheds are turbid and dominated by seasonal runoff. In summer, during periods of significant freshwater out-welling, the ebb tide currents often substantially exceed the flood tides. This input keeps Nushagak and Kvichak Bays colder in spring relative to the rest of Bristol Bay. As terrestrial waters warm later in summer with increasing ambient temperatures, so do the bays. The turbidity weakens primary production within the bay, but high nutrient levels are driven by out-welling discharge from detritus, dissolved organic material, and salmon-derived nutrients (NMFS 2013). In addition to fish and invertebrates, the nutrients help support aquatic vegetation such as eel grass and kelp species. The two watersheds are composed of the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak-Bristol Bay Lowland, all of which play a major role in dividing the region’s watersheds. These features range from sea level to 9,186 ft (2,800 m) and contain more than 33,554 mi (54,000 km) of streams (NMFS 2013).

The Kuskokwim River Basin is the largest river basin providing freshwater input to Kuskokwim Bay. It is drained by the Kuskokwim River and many of its tributaries, from Cape Newenham State Game Refuge to the Ninglick River (BLM n.d.). In total, the river basin includes 11 percent of the State of Alaska. The region is contained within the Alaska Range to the south and east, with the Kuskokwim Mountains on the north and west. The bay experiences some of the largest tides within southwestern Alaska, and it is assumed that tidal influence is present up to river mile 97 of the Kuskokwim River. Tidal amplitude begins to subside to the north and outside the bay. In winter, annual ice tends to cover Kuskokwim Bay in its entirety, and includes portions of Bristol Bay. At a minimum, the sheet ice will also include the Bering Sea shelf and the entire Chukchi Sea (USFWS 2012). During this time, Kuskokwim Bay can reach 29 degrees Fahrenheit (-1.7 degrees Celsius).

The Kuskokwim Bay and Bering Sea region is subject to a large number of earthquakes. This is the result of the presence of six fault systems within the area: the Tintina-Kaltag Fault, Iditarod-Nixon Fork Fault, Denali-Farewell Fault, Lake Clark-Castle Mountain Fault System, Bruin Bay Fault, and Border Ranges Fault. Some sections along these faults are seismically active and generate earthquakes (EPA 2014). Seasonal weather changes are often drastic within the region and have consequences for marine life. The Bering Sea is subject to circulation patterns from both the north and south. These circulation patterns bring in strong winds, which influence ice movement, but keep air temperatures relatively mild. The prevailing circulation pattern may last months to decades. Bering Sea summer weather tends to be mild. Skies remain somewhat clear for long periods, which can cause sea temperatures to rise. Additionally, occasional moderate summer storms produce winds that are responsible for ocean mixing (Bond n.d.). The state of the Bering Sea influences the Kuskokwim Delta’s climate, where a strong inland gradient in coastal temperature occurs.

5.1.1 Coastal Development

At its southernmost extent, the action area includes the community of Dillingham. It then traverses through Nushagak Bay to Bristol Bay, and around Cape Newenham National Wildlife Refuge to Kuskokwim Bay. It then enters the Kuskokwim River, where it splits. Two boroughs are within the action area: the Dillingham Census Area and Bethel Census Area. Both boroughs combined cover the Alaska coastline from Kvichak Bay in the south to coastline directly west of Newtok in the north and include extensive inland components. Due to the region’s remoteness, it is largely undisturbed from human development.

The Bethel Census Area includes 18,207 residents. Bethel is the largest community within the region, with a population of 6,500 residents. A majority of Bethel’s economy originates from regional services such as government administration, transportation, freight, and social services. One of the few non-government sources of revenue for the region is commercial fisheries. The Coastal Villages Region Fund is a non-profit group that allocates revenue from fishing rights from the federal government to create jobs, build infrastructure, and fund education (Agnew Beck Consulting 2011).

The Dillingham Census Area includes 4,673 residents across 10 communities, the largest of which are Dillingham (population 2,327), Togiak (population 873), Manokotak (population 483), New Stuyahok (population 476), and Aleknagik (population 208) (Robinson et al. 2020). The region's economy is predominately seasonal employment and composed of harvesting and processing of local salmon fisheries. Each year, 70 percent of the fish returning to the Bristol Bay area are harvested. In addition to fisheries, tourism plays a part in the local economy as Dillingham provides an entry point to Togiak National Wildlife Refuge and Wood-Tikchik State Park. Table 5-1 provides a summary of regional economic expenditures based on salmon ecosystem services, expressed in 2009 dollars.

Table 5-1. Summary of Regional Economic Expenditures Based on Salmon Ecosystem Services

Economic Sector	Estimated Direct Expenditure (sales per year, in $ millions)
Commercial Fisheries, Wholesale Value	300.2
Sport Fisheries	60.5
Sport Hunting	8.2
Wildlife Viewing/Tourism	104.4
Subsistence Harvest	6.3
Total	**479.6**

Source: EPA 2014

5.1.2 Transportation

None of the communities serviced by the Project are accessible to the rest of the state by road. The existing road network is discontinuous and limited to the areas surrounding a few communities; therefore, water and air are the primary modes of inter-community transportation. The Alaska Marine Highway System does not serve the communities within or near the action area. Aviation is the principal means of transporting people to communities throughout the region. Except for Oscarville, each serviced community has an Alaska Department of Transportation and Public Facilities or other government-controlled public airport, as well as numerous additional Federal Aviation Administration-registered public and private runways (DOT&PF 2017).

Marine waters within the action area experience varying levels of marine-based vessel traffic. Marine vessels are typically associated with freight, fishing, transportation, and fuel delivery (USACE 2008). In particular, Nushagak Bay experiences very high vessel traffic from spring through fall during the commercial salmon fishing season. Due to a lack of interconnecting roads, the region's local communities rely on barges for local commerce and shipment of items not feasible to transport by air (USACE 2009).

5.1.3 Fisheries

Both state and federally managed fisheries occur within the action area. Two state fishery management areas overlap the action area: the Kuskokwim Management Area (KMA) and the Bristol Bay Management Area (BBMA) (Smith and Gray 2022, Tiernan et al. 2022). Within these management areas are sport, commercial, subsistence, and personal use fisheries. Additionally, federally managed fisheries within the action area supply subsistence and commercial opportunities.

Alaska Statute 16.05.258, *Subsistence Use and Allocation of Fish and Game*, establishes the subsistence use priority for reasonable harvest opportunity consistent with sustained yield when resources are not abundant enough to provide for all consumptive uses (Smith and Gray 2022).

The Alaska National Interest Lands Conservation Act of 1980 provided a priority for rural Alaska residents for taking fish and wildlife on federal public lands and called for creation of regional advisory councils to provide rural residents' input into the Federal Subsistence Program. These policies have made subsistence user groups the priority in management throughout the State of Alaska. For the KMA, 2010 to 2014 surveys identified that salmon contributed 40 percent of the total subsistence resource harvest within Kuskokwim River communities, broken up as 65 percent within middle and upper river communities and 25 percent within lower river communities (Smith and Gray 2022).

Fishing efforts in state fisheries are primarily focused on salmon. The BBMA supports the largest wild sockeye salmon (*Oncorhynchus nerka*) fishery in the world, providing approximately 46 percent of the average global abundance of wild sockeye salmon (EPA 2023). Within the BBMA, one of the five commercial salmon districts occur within the action area, the Nushagak District. Fishing gear types within the Nushagak District include set gillnet and drift gillnet. Harvest diversity includes sockeye, Chinook (*O. tshawytscha*), chum (*O. keta*), pink (*O. gorbuscha*), and coho (*O. kisutch*) salmon. Sockeye salmon are the most harvested salmon within the district and provide significant economic benefits to the region. Between 2018 and 2022, three of the largest sockeye salmon harvests ever recorded for the district occurred, and its systems repeatedly ranked among the highest recorded for escapement numbers. Due to dwindling Chinook salmon returns for the district, the Alaska Department of Fish and Game is recommending it be listed as a stock of concern within the Nushagak District (Tiernan et al. 2022).

The KMA is composed of three active commercial salmon fishing districts, all of which occur within the action area: District 1, District 4, and District 5. Sockeye, Chinook, chum, pink, and coho salmon have been harvested within the KMA. In recent years, Chinook and chum salmon returns within the Kuskokwim River have been inconsistent. Chinook salmon runs in 2012, 2013, and 2014 were the lowest three on record. Escapement made a slight rebound, reaching a nearly average run total in 2019, only to significantly decline again in 2020 and 2021. Chum salmon return numbers remained near average between 2007 and 2019. However, 2020 numbers were well below average, and 2021 was the lowest on record. Sockeye salmon abundance in 2021 was mixed throughout the Kuskokwim River drainage and ranged from average to below average. Reliable coho salmon return numbers are not available for the region, but available data suggest that returns have been average to below average since 2016 (Smith and Gray 2022).

Other state-managed fisheries within the KMA include subsistence herring, while the BBMA includes a herring sac roe fishery, which is composed of seine, gillnet, and hand harvests (Tiernan et al. 2022). The Bering Sea Aleutian Islands Management Area (BSAIMA), a state managed area for shellfish, has several registration areas overlapping the action area that target tanner (*Chionoecetes bairdi*), snow (*C. opilio*), Dungeness (*Metacarcinus magister*), and king (Lithodidae) crab as well as scallops (Pectinidae) (Nichols and Shaishnikoff 2022). Federal subsistence and commercial fisheries also occur off the western coast of Alaska, along the action area. These fisheries occur within the federally managed BSAIMA, which are both commercial and subsistence groundfish fisheries. Commercial opportunities include trawl, longline, jig, and pot fisheries. These fisheries have 19 different target species, with walleye pollock (*Gadus chalcogrammus*) being the most popular among them. Walleye pollock account for a majority of the harvest in terms of both metric tons and ex-vessel value. Subsistence harvests are very small relative to that of commercial harvests and target cod, halibut, rockfish, and other species within nearshore waters (NPFMC 2020). These commercial fisheries have the potential to compete with marine mammals for resources.

5.1.4 Tourism

The recreational tourism economy provides significant benefits for residents of the Bristol Bay region. In addition to being a source of employment, it helps support an economy that provides essential goods to Bristol Bay residents. Recreational tourism is responsible for 15 percent of jobs within the region (EPA 2014). In addition to tourism related to the local salmon ecosystem, access to the Nushagak and Kvichak River watersheds as well as the Togiak National Wildlife Refuge and Cape Newenham State Park via air, boat, snowmachine, and foot are largely regulated by the local tourism industry (USFWS 2009).

Tourism within the YK Delta is limited. This is partially due to high costs associated with transportation as well as limited accommodations, tourism-centric infrastructure, and inconsistent and unreported weather that can restrict air travel. Despite this, the region offers many forms of recreation and ecotourism, including access to the Yukon Delta National Wildlife Refuge, the largest wildlife refuge in the United States; fishing; and events such as the Kuskokwim 300 sled dog race (Agnew Beck Consulting 2018).

5.1.5 Vessel Traffic

Vessel traffic within the action area is closely linked to commercial fisheries. The average number of salmon permit holders fishing in District 4 within the KMA since 1980 is 223. Participation has ranged between 67 and 408 during this time. In 2021, participation was the lowest on record, with 74 individual permit holders. The only season with lower participation was 2020 (Smith and Gray 2022). A significant decrease in participation has been mirrored across all KMA districts. Permit registration within the BBMA has been more consistent and significantly exceeds that in the KMA. Participation in the salmon fisheries for both management areas is shown in Table 5-2.

Table 5-2. Permits Fished by District and Gear Type within KMA and BBMA, 2001–2021

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2001	412	159	32	1,566	834
2002	318	114	30	1,183	680
2003	359	114	34	1,389	714
2004	390	116	29	1,426	797
2005	403	145	29	1,526	829
2006	373	132	24	1,567	844
2007	366	125	28	1,621	836
2008	374	146	25	1,636	850
2009	342	179	39	1,642	855
2010	433	241	48	1,731	861
2011	413	219	48	1,747	878
2012	379	179	58	1,740	883
2013	378	197	71	1,709	854
2014	358	194	61	1,751	881
2015	283	189	61	1,744	885

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2016	—[b]	—[b]	—[b]	1,715	858
2017	—[b]	—[b]	—[b]	1,728	881
2018	—[b]	—[b]	—[b]	1,735	879
2019	—[b]	—[b]	—[b]	1,767	893
2020	—[b]	67	17	1,724	841
2021	—[b]	74	13	1,753	870
2001–2011 Average	**380**	**153**	**33**	**1,529**	**82**
2011–2021 Average	**140**	**90**	**28**	**1,736**	**90**
Average	**265**	**123**	**31**	**1,632**	**86**

Notes: KMA = Kuskokwim Management Area; BBMA = Bristol Bay Management Area.
Source: Smith and Gray 2021, Tiernan et al. 2022
[a] Two drift permit holders may concurrently fish from the same vessel.
[b] Confidential due to three or fewer permits fished, processors, or buyers. Included as 0 in averages.

Passenger water transportation services are limited within the action area. This is especially true when compared to other regions throughout the state that are more accessible and have more residents. Passenger water transportation services are limited within the area and are largely related to sightseeing, guiding services, and general transportation support (USACE 2008). According to the Alaska Division of Occupational and Business Licensing database, 457 companies with valid 2008 Alaska licenses offer various modes of passenger water transportation services.

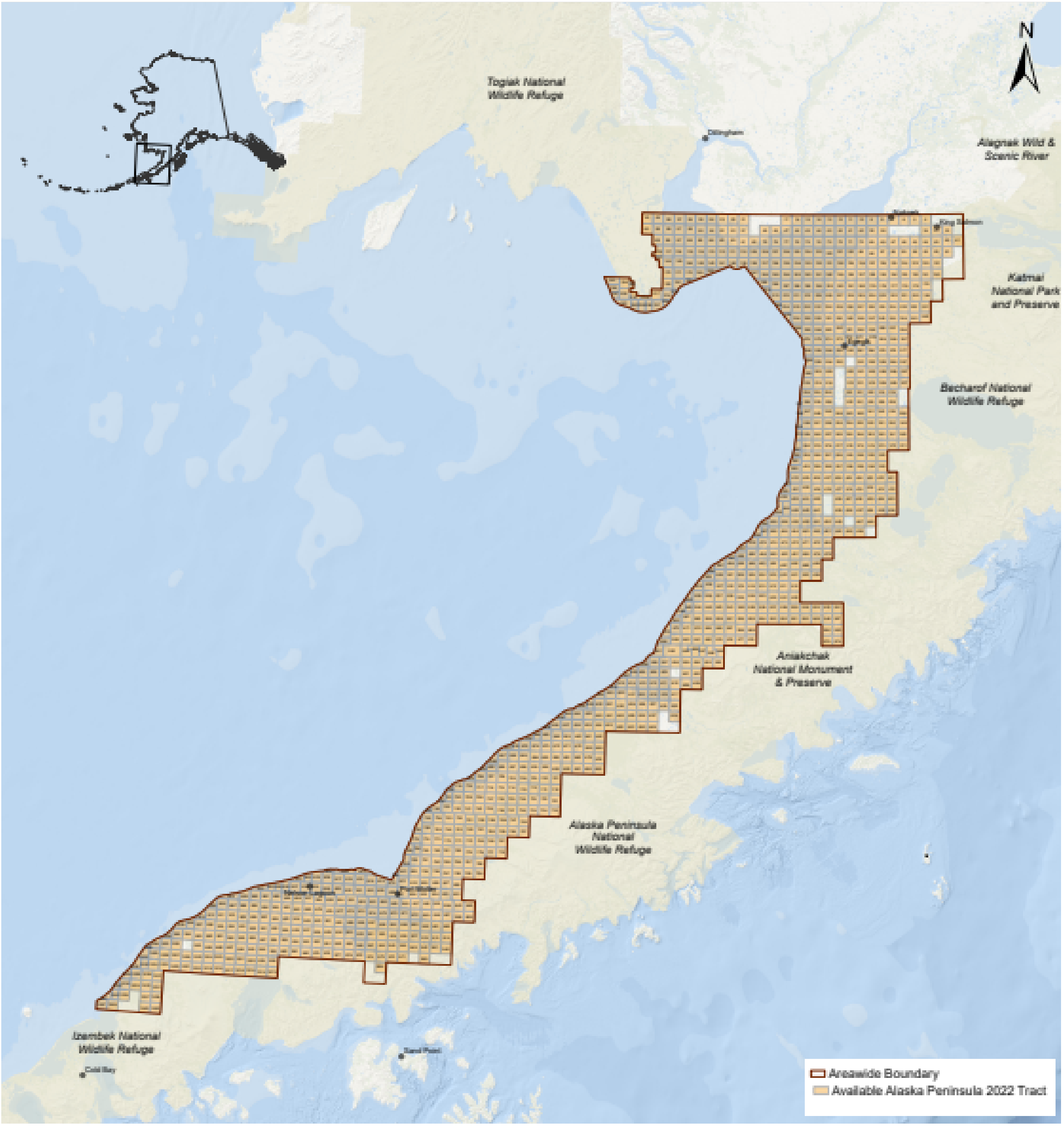
5.1.6 Resource Extraction

The Bristol Bay area contains significant mineral deposits, which creates mining potential for the region. The most popular among these deposits are porphyry copper and gold (EPA 2014). The only mining project currently within the Bristol Bay watershed is the Pebble Project. On January 30, 2023, the U.S. Environmental Protection Agency issued a Final Determination under its Clean Water Act Section 404(c) authority to limit actions related to the development of the Pebble Deposit in order to protect salmon resources (EPA 2023). Other large potential mine operations within the Bristol Bay region include Big Chunk South, Big Chunk North, Groundhog, Audn/Iliamna, and Humble (EPA 2014).

The only current project within the Kuskokwim River Watershed is Donlin Gold. Donlin Gold is pursuing an open pit gold mine 10 mi (16 km) north of Crooked Creek (ADNR n.d.). Crooked Creek is approximately 190 mi (307 km) from the mouth of the Kuskokwim River. To meet project energy demands, a 312-mi (502-km) long pipeline is proposed to be buried to bring natural gas from Cook Inlet to the mine site. Historically, the Kuskokwim River Basin has been an active mining region. Platinum placer mines have occurred intermittently within the area surrounding Goodnews Bay since the 1920s. Platinum mining has ceased within the Goodnews Bay area since 2012. The most recent platinum mine within the region was shut down due to the misuse of wastewater ponds and pollution of nearby waters.

The North Aleutian Basin Outer Continental Shelf (OCS) overlaps the eastern portion of the action area. Within the OCS, oil and gas leases exist, beginning on the western side of Nushagak Bay, east around Bristol Bay, and south to the Alaskan Peninsula (Figure 5-1). Past exploration has not yielded any commercial production within the region (ADNR 2014). Additionally, no bids on leases have occurred within the region in recent years.

Figure 5-1. Alaska Peninsula Oil and Gas Lease Tract Map



Source: ADNR 2022

Oil and gas exploration within the western and northern portions of the project area have been primarily focused on the Bethel and Holitna Basins. With the exception of deep well exploration near Bethel in the 1980s, the region has not focused on subsurface exploration. Additionally, research suggests a very low probability for the occurrence of conventional, economically recoverable oil resources within the region (Nuvista 2015).

6 Effects of the Action

Effects of the action are all consequences, including those from other activities, to listed species or critical habitat that are caused by the proposed action. A consequence is caused by the proposed action if it will not occur but for the proposed action and is reasonably certain to occur. Effects of the action may occur later in time and include consequences occurring outside the immediate area involved in the action (50 CFR 402.02, as amended by 83 FR 35178).

6.1 Direct Effects

6.1.1 Noise

6.1.1.1 SOUNDS PRODUCED BY THE PROPOSED PLAN

Vessels generate noise during normal operations. The vessels for this Project will use main drive propellers and/or DP thrusters to maintain position or move slowly during cable-laying or trenching operations. During these activities, non-impulse sounds are generated by the collapse of air bubbles (cavitation) created when propeller blades move rapidly through the water. Several acoustic measurements of vessels conducting similar operations using these types of propulsion have been made within Alaska waters in previous years.

Quintillion conducted a FOC-laying project in Alaska in 2016, including subsea cable-laying activities from ships in offshore waters (Illingworth & Rodkin 2016). As part of the project, an SSV study was conducted near Nome to characterize underwater sounds with the potential to harass marine mammals. The study measured thruster and propeller noise generated by the cable-laying ship *Ile de Brehat* while towing the plow. At 80 percent power, *Ile de Brehat* plowing operations produced a generally continuous sound; the noise from the main propeller's cavitation was the dominant sound over the plow or other vessel sounds. The results of the measurements ranged from 145 dB re 1 µPa rms at 656 ft (200 m) to 121 dB re 1 µPa rms at 3 mi (4.9 km). One-third octave band spectra show dominant sounds between 100 and 2,500 Hz. The source level was computed to 185.2 dB re 1 µPa rms at 3.2 ft (1 m) using the measured transmission loss of 17.36 log. Assuming spherical spreading transmission loss (20 log), the distance to the 120 dB re 1 µPa rms threshold is calculated to be 1.1 mi (1.8 km) for the cable-laying ship.

For the cable-laying tug and barge installing cable in waters 40 ft (12 m) or shallower within the Kuskokwim Bay, Kuskokwim River, and Kuskokwim River tributaries, the distance to the 120 dB re 1 µPa rms threshold was estimated using measurement taken from the tug, *Leo*, pushing a full barge, *Katie II,* near the Port of Alaska, and recorded as 149 dB re 1 µPa rms at 328 ft (100 m) when the tug was using its thrusters to maneuver the barge during docking. Assuming spherical spreading transmission loss (20 log), the distance to the 120 dB re 1 µPa rms threshold is calculated to be 1.7 mi (2.8 km) for the cable-laying tug and barge.

Project activities may also include the production of pulsed sounds from single-beam navigational echo sounders and positioning beacons (transceivers and transponders) used to determine the location ROV equipment operating on or near the seafloor. These acoustic sources typically produce pulsed sounds at much higher frequencies than those produced by vessel thrusters, in narrow frequency bands, and in some cases (e.g., navigational echosounders), with narrow downward directed beamforms. For example, positioning beacons measured in the Chukchi Sea operated with center frequencies of 27 kHz (most energy between 26 and 28 kHz), 32 kHz (most energy between 25 and 35 kHz), and 22 to 23 kHz or 21 to 21.5 kHz (most energy between 20 and 25 kHz). For directional sources, the difference between in-beam and out-of-beam sound pressure levels at the same distance ranged from 5 to 15 dB re 1 µPa rms. Because high-frequency sounds attenuate more quickly in water, distances to threshold levels that may elicit behavioral responses in marine mammals were in the tens to several tens of meters, even within the narrow in-beam sound fields (Warner and McCrodan 2011). For this reason, and because the species considered in this BA have less sensitive hearing at these higher frequencies, ROV sonar is likely subsumed by non-impulsive vessel sounds and is therefore not considered further.

6.1.1.2 EFFECTS OF SOUND ON AFFECTED MARINE MAMMALS

The effects of sound on marine mammals are highly variable, and can be generally categorized as follows (adapted from Richardson et al. 1995):

1. The sound may be too weak to be heard at the animal's location (i.e., lower than the prevailing ambient sound level, the hearing threshold of the animal at relevant frequencies, or both).
2. The sound may be audible but not strong enough to elicit any overt behavioral response (i.e., the animal may tolerate it, either without or with some deleterious effects, such as masking or stress).
3. The sound may elicit behavioral reactions of variable conspicuousness and variable relevance to the animal's well-being; these can range from subtle effects on respiration or other behaviors (detectable only by statistical analysis) to active avoidance reactions.
4. Upon repeated exposure, the animal may exhibit diminishing responsiveness (habituation/sensitization), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics, unpredictable in occurrence, and associated with situations that the animal may perceive as a threat.
5. Any anthropogenic (i.e., human-made) sound that is strong enough to be heard has the potential to reduce (mask) the ability of marine mammals to hear natural sounds at similar frequencies, including calls from conspecifics, odontocetes echolocation sounds, and environmental sounds due to wave action or (at high latitudes) ice movement. Marine mammal calls and other sounds are often audible during the intervals between pulses, but mild to moderate masking may occur during that time because of reverberation.
6. Very strong sounds have the potential to cause temporary or permanent reduction in hearing sensitivity, or other physical or physiological effects. Received sound levels must far exceed the animal's hearing threshold for any temporary threshold shift to occur. Received levels must be even higher for a risk of permanent hearing impairment.

6.1.1.3 HEARING ABILITIES OF AFFECTED MARINE MAMMALS

The hearing abilities of marine mammals are functions of the following (Richardson et al. 1995, Au et al. 2000):

1. Absolute hearing threshold at the frequency in question (the level of sound barely audible in the absence of ambient noise); the “best frequency” is the frequency with the lowest absolute threshold
2. Critical ratio (i.e., the signal-to-noise ratio required to detect a sound at a specific frequency in the presence of background noise around that frequency)
3. Ability to determine sound direction at the frequencies under consideration
4. Ability to discriminate among sounds of different frequencies and intensities

Marine mammals rely heavily on the use of underwater sounds to communicate and gain information about their surroundings. Experiments and monitoring studies also show that they hear and may react to many types of anthropogenic sounds (Richardson et al. 1995, Gordon et al. 2004, Nowacek et al. 2007, Tyack 2008).

Baleen Whales (Mysticetes)

The hearing abilities of baleen whales (mysticetes) have not been studied directly given the difficulties in working with such large animals. Behavioral and anatomical evidence indicate that they hear well at frequencies below 1 kHz (Richardson et al. 1995, Ketten 2000). Frankel (2005) noted that gray whales reacted to a 21 to 25 kHz signal from whale-finding sonar. Some baleen whales react to pinger sounds up to 28 kHz, but not to pingers or sonars emitting sounds at 36 kHz or above (Watkins 1986). Additionally, baleen whales produce sounds at frequencies up to 8 kHz, while humpback whales can produce frequencies that can reach more than 24 kHz (Au et al. 2006).

The anatomy of the baleen whale inner ear is theorized to be well adapted for detection of low-frequency sounds (Ketten 1991, 1992, 1994, 2000; Parks et al. 2007). Although humpback whales may have some auditory sensitivity to frequencies above 22 kHz, baleen whales’ functional hearing range is thought to be approximately 7 Hz to 22 kHz, or possibly 35 kHz (Berta et al. 2009). Baleen whales are said to constitute the low-frequency hearing group (Southall et al. 2007; NMFS 2016a). The absolute sound levels that they can detect below 1 kHz are probably limited by increasing levels of natural ambient noise at decreasing frequencies (Clark and Ellison 2004). Ambient noise levels are higher at low frequencies than at mid frequencies. At frequencies below 1 kHz, natural ambient levels tend to increase with decreasing frequency.

The hearing systems of baleen whales are more sensitive to low-frequency sounds than the ears of the small-toothed whales that have been studied (e.g., MacGillivray et al. 2014). Therefore, baleen whales are likely to hear vessel sounds farther away than small-toothed whales; at closer distances, vessel sounds may seem more prominent to baleen than to toothed whales. However, baleen whales are commonly seen within the range of sounds from vessels (or other sources such as seismic airguns) that would be detectable and often show no overt reaction. Behavioral responses by baleen whales to various anthropogenic sounds, including sounds produced by vessel thrusters, have been documented. These behavioral responses correspond to received sound levels that are typically well above the minimum levels that baleen whales are assumed to detect (see below).

Seals and Sea Lions (Pinnipeds)

Underwater audiograms have been determined for several species of phocid seals (true seals) and otariids (eared seals) (reviewed in Richardson et al. 1995; Kastak and Schusterman 1998, 1999; Kastelein et al. 2002, 2005, 2009; Reichmuth et al. 2013; Sills et al. 2014, 2017; Cunningham and Reichmuth 2016). The functional hearing range for phocid seals in water is generally considered to extend from 50 Hz to 86 kHz (Southall et al. 2007, NMFS 2016a), however, some species, including otariids, have a narrower auditory range (60 Hz to 39 kHz; NMFS 2016a). In comparison with odontocetes, pinnipeds tend to have lower best frequencies, lower high-frequency cutoffs, better auditory sensitivity at low frequencies, and poorer sensitivity at frequencies of best hearing.

Some phocid seals have better sensitivity at low frequencies (less than or equal to 1 kHz) than odontocetes. Below 30 to 50 kHz, the hearing thresholds of most species tested are essentially flat down to1 kHz, and range between 60 and 85 dB re 1 µPa. For the otariid pinnipeds, the high frequency cutoff is lower than for phocids and sensitivity at low frequencies (below 1 kHz) rolls off faster, resulting in an overall narrower bandwidth of best sensitivity (NMFS 2016).

6.1.1.4 POTENTIAL EFFECTS OF SOUND FROM THE ACTION ON AFFECTED MARINE MAMMALS

Vessel noise can contribute substantially to a low-frequency ambient noise environment. Vessel noise from this Project could affect marine animals along the proposed cable-laying route. Houghton et al. (2015) proposed that vessel speed is the most important predictor of received noise levels, with low vessel speeds (such as those expected during the proposed action) resulting in lower sound levels. Sounds produced by large vessels generally dominate ambient noise at frequencies from 20 to 300 Hz (Richardson et al. 1995). However, some energy is also produced at higher frequencies (Hermannsen et al. 2014). The following subsections summarize results from studies addressing the potential effects, or lack thereof, of vessel sounds on affected marine mammals.

Tolerance

Studies suggest underwater sounds from industrial activities are often detectable in the water at distances many kilometers away from a sound source. As described below, marine mammals often show no apparent response to industrial activities of various types at distances more than a few kilometers away from the sound source (Moulton et al. 2005, Harris et al. 2001, LGL et al. 2014). This is often the case even when the sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of that mammal group. Although various baleen whales, toothed whales, and pinnipeds (less frequently) have been shown to react behaviorally to underwater sound such as airgun pulses under some conditions, at other times mammals of all three groups have shown no overt reactions (Stone and Tasker 2006, Hartin et al. 2013). In general, pinnipeds and small odontocetes seem to be more tolerant of exposure to some types of underwater sound than baleen whales. Given the slow speeds of the Project vessels, it is expected that many marine mammals will show no response to the planned vessel activities.

Masking

Masking is the obscuring of sounds of interest by interfering sounds. Masking can affect a marine mammal's ability to communicate, detect prey, or avoid predation and other hazards. Masking from vessel noise can reduce the effective communication distance of a marine mammal if the frequency of the sound source is close to the communication frequency used by the mammal, and if the sound is present for a significant duration (e.g., Richardson et al. 1995, Clark et al. 2009, Jensen et al. 2009, Gervaise et al. 2012, Hatch et al. 2012, Rice et al. 2014, Dunlop 2016, Erbe et al. 2016, Jones et al. 2017, Cholewiak et al. 2018). In addition to the frequency and duration of the masking sound, the strength, temporal pattern, and location of the sound source contributes to the extent of the masking (Branstetter et al. 2013, 2016; Finneran and Branstetter 2013; Sills et al. 2017). Branstetter et al. (2013) reported that time-domain metrics are also important in describing and predicting masking. In order to compensate for increased ambient noise, some cetaceans are known to increase the source levels of their calls in the presence of elevated noise levels from shipping, shift their peak frequencies, or otherwise change their vocal behavior (e.g., Parks et al. 2011, 2012, 2016a, 2016b; Castellote et al. 2012; Melcón et al. 2012; Azzara et al. 2013; Tyack and Janik 2013; Luís et al. 2014; Sairanen 2014; Papale et al. 2015; Bittencourt et al. 2016; Dahlheim and Castellote 2016; Gospić and Picciulin 2016; Gridley et al. 2016; Heiler et al. 2016; Martins et al. 2016; O'Brien et al. 2016; Tenessen and Parks 2016).

Using acoustic propagation and simulation modeling, Clark et al. (2009) estimated lost communication space from vessel traffic for fin, humpback, and North Atlantic right whales in the northwestern Atlantic Ocean. They found that because of higher call source levels and the frequency range of calls falling outside the range of the strongest ship sounds, fin and humpback whales are likely to experience much less of a reduction in communication space than North Atlantic right whales. Since right whale call frequencies are more centered on the strongest frequencies produced by large ships and their call source levels are typically lower, they may experience nearly complete loss of communication space when a large ship is within 2.5 mi (4 km) of that whale. However, the sound source levels of the ship used by Clark et al. (2009) were much higher than those expected to be produced by the smaller and slower moving vessels used during this Project's cable-laying activities. Therefore, masking is not anticipated to present a significant concern for the large baleen whales, including North Pacific right whales, expected to be encountered within the Project area.

Auditory studies on pinnipeds indicate that they can hear underwater sound signals of interest in environments with relatively high background noise levels, a possible adaption to the noisy nearshore environment they inhabit (Southall et al. 2000). Southall et al. (2000) found northern elephant seals, harbor seals, and California sea lions lack specializations for detecting low-frequency tonal sounds in background noise, but rather were more specialized for hearing broadband noises associated with schooling prey. Given the ability for pinnipeds to hear well in noisy backgrounds (Southall et al. 2000), combined with the relatively short duration and low intensity of exposure from the cable-laying activities, masking concerns are not particularly significant for Steller sea lions.

Disturbance Reactions

Reactions of gray and humpback whales to vessels have been studied, and limited information is available about the reactions of right whales and rorquals (fin, blue, and minke whales). Reactions of humpback whales to boats are variable, ranging from approach to avoidance (Payne 1978, Salden 1993). Baker et al. (1982, 1983) and Baker and Herman (1989) found humpback whales often move away when vessels are within several kilometers. They seem less likely to react overtly when actively feeding than when resting or engaged in other activities (Krieger and Wing 1984, 1986). Increased levels of ship noise have been shown to affect foraging (Blair et al. 2016) and singing behavior by humpback whales (Tsujii et al. 2018). Fin whale sightings in the western Mediterranean were negatively correlated with the number of vessels within the area (Campana et al. 2015). Minke whales and gray seals have shown slight displacement in response to construction-related vessel traffic (Anderwald et al. 2013).

Southall et al. (2007) reviewed several papers describing the responses of marine mammals to non-pulsed sound. In general, little or no response was observed in animals exposed at received levels from 90 to 120 dB re 1 µPa rms. Probability of avoidance and other behavioral effects increased when received levels were 120 to 160 dB re 1 µPa rms. Some of the relevant studies are summarized below.

Baker et al. (1982) reported some avoidance by humpback whales to vessel noise when received levels were 110 to 120 dB re 1 µPa rms, and clear avoidance at 120 to 140 dB re 1 µPa rms (sound measurements were not provided by Baker but were based on measurements of identical vessels by Miles and Malme 1983).

Malme et al. (1986) observed the behavior of feeding gray whales during four experimental playbacks of drilling sounds (50 to 315 Hz; 21-minute overall duration and 10 percent duty cycle; source levels 156 to 162 dB re 1 µPa-m). In two cases, for received levels of 100 to 110 dB re 1 µPa, no behavioral reaction was observed. Avoidance behavior was observed in two cases where received levels were 110 to 120 dB re 1 µPa rms.

Richardson et al. (1990) performed 12 playback experiments in which bowhead whales within the Alaska Arctic were exposed to drilling sounds. Whales generally did not respond to exposures in the 100 to 130 dB re 1 µPa rms range, although some indication of behavioral changes occurred in several instances. McCauley et al. (1996) reported several cases of humpback whales responding to vessels in Hervey Bay, Australia. Results indicated clear avoidance at received levels between 118 to 124 dB re 1 µPa rms in three cases for which response and received levels were observed and measured.

Frankel and Clark (1998) conducted playback experiments with wintering humpback whales using a single speaker producing a low-frequency “M-sequence” (sine wave with multiple-phase reversals) signals in the 60 to 90 Hz band with output of 172 dB re 1 µPa rms. For 11 playbacks, exposures were between 120 and 130 dB re 1 µPa rms and included sufficient information regarding individual responses. During eight of the trials, no measurable differences occurred in tracks or bearings relative to control conditions; however, on three occasions, whales either moved slightly away from (n = 1) or toward (n = 2) the playback speaker during exposure. The presence of the source vessel itself had a greater effect than did the M-sequence playback.

Nowacek et al. (2004) used controlled exposures to demonstrate behavioral reactions of northern right whales to various non-pulse sounds. Playback stimuli included ship noise; social sounds of conspecifics; and a complex, 18-minute “alert” sound consisting of repetitions of three different artificial signals. Ten whales were tagged with calibrated instruments that measured received sound characteristics and concurrent animal movements in three dimensions. Five out of six exposed whales reacted strongly to alert signals at measured received levels between 130 and 150 dB re 1 µPa rms (i.e., ceased foraging and swam rapidly to the surface). Two of these individuals were not exposed to ship noise, and the other four were exposed to both stimuli. These whales reacted mildly to conspecific signals. Seven whales, including the four exposed to the alert stimulus, had no measurable response to either ship sounds or actual vessel noise.

A negative correlation between the presence of some cetacean species and the number of vessels within an area has been demonstrated by several studies (e.g., Campana et al. 2015, Culloch et al. 2016, Oakley et al. 2017). Based on modeling, Halliday et al. (2017) suggested that shipping noise can be audible more than 62 mi (100 km) away and could affect the behavior of a marine mammal at a distance of 32 mi (52 km) in the case of tankers.

Based on the above information regarding baleen whale responses to non-impulse sounds, it is possible that some baleen whales may exhibit minor, short-term disturbance responses to underwater sounds from the cable-laying and trenching activities. Based on expected sound levels produced by the activity, any potential impacts on baleen whale behavior would likely be localized to within a few kilometers of the active vessel(s) and would not result in population-level effects.

Temporary Threshold Shift

Temporary Threshold Shift (TTS) is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter 1985). While experiencing TTS, the hearing threshold rises, and a sound must be stronger to be heard. It is a temporary phenomenon, and (especially when mild) is not considered to represent physical damage or “injury” (Southall et al. 2007, Le Prell 2012). However, the onset of TTS has been considered an indicator that, if the animal is exposed to higher levels of that sound, physical damage is ultimately a possibility. However, research has shown that sound exposure can cause cochlear neural degeneration, even when threshold shifts and hair cell damage are reversible (Kujawa and Liberman 2009, Liberman 2016). These findings have raised some doubts as to whether TTS should continue to be considered a non-injurious effect (Weilgart 2014; Tougaard et al. 2015, 2016).

The magnitude of TTS depends on the level and duration of sound exposure, and to some degree on frequency, among other considerations (Kryter 1985, Richardson et al. 1995, Southall et al. 2007). Extensive studies on terrestrial mammal hearing in air show that TTS can last from minutes or hours to days (in cases of strong TTS). More limited data from odontocetes and pinnipeds show similar patterns (e.g., Mooney et al. 2009a, 2009b; Finneran et al. 2010).

No data, direct or indirect, exist regarding sound levels or properties required to induce TTS in any baleen whale. The frequencies to which mysticetes are most sensitive are assumed to be lower than those to which odontocetes are most sensitive, and natural background noise levels at those low frequencies tend to be higher. As a result, auditory thresholds of baleen whales within their frequency band of best hearing are believed to be higher (less sensitive) than are those of odontocetes at their best frequencies (Clark and Ellison 2004). From this, Southall et al. (2007) suspected that received levels causing TTS onset may also be higher in mysticetes. However, Wood et al. (2012) suggested that received levels that cause hearing impairment in baleen whales may be lower.

In pinnipeds, initial evidence from exposures to non-pulses suggested that some pinnipeds (harbor seals in particular) incur TTS at somewhat lower received levels than do most small odontocetes exposed for similar durations (Kastak et al. 1999, 2005, 2008; Ketten et al. 2001). Kastak et al. (2005) reported that the amount of threshold shift increased with increasing sound exposure level (SEL) in a California sea lion and harbor seal. They noted that, for non-impulse sound, doubling the exposure duration from 25 to 50 minutes (i.e., a +3-dB change in SEL) had a greater effect on TTS than an increase of 15 dB (95 versus 80 dB) in exposure level. Mean threshold shifts ranged from 2.9 to 12.2 dB, with full recovery within 24 hours (Kastak et al. 2005). Kastak et al. (2005) suggested that, for non-impulse sound, SELs resulting in TTS onset in three species of pinnipeds may range from 183 to 206 dB re 1 µPa2 rms, depending on the absolute hearing sensitivity.

Permanent Threshold Shift

When Permanent Threshold Shift (PTS) occurs, physical damage occurs to the sound receptors within the ear. In some cases, total or partial deafness can result; however, in other cases, the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter 1985). Physical damage to a mammal's hearing apparatus can occur if it is exposed to sound impulses that have very high peak pressures, especially if they have very short rise times. Rise time is the interval required for sound pressure to increase from the baseline pressure to peak pressure. However, sounds during the proposed action are non-impulsive and not expected to have high peak pressures. As sea lion hearing is best between 1 and 25 kHz, the majority of cavitation noise from ships occurs outside their most sensitive hearing range. The highest sensitivity of baleen whale hearing is within the range of frequencies produced by ships. However, it is unlikely that a whale or sea lion would remain close enough to a vessel for sufficiently long to incur PTS from the low-intensity ship sounds.

6.1.1.5 POTENTIAL EFFECTS OF NOISE FROM ACTION ON FIN WHALES

Avoidance responses of fin whales to noise from vessel traffic alone have not been widely reported, but information about responses to seismic survey vessels during periods of inactive versus active use of airguns suggest that these whales may show some avoidance of operating vessels to a distance of 0.6 mi (1.0 km) when airguns are not active (Stone 2015). However, fin whales have routinely been sighted from seismic survey vessels during active airgun use, suggesting a certain level of tolerance of anthropogenic sounds (Stone 2003, 2015; Stone and Tasker 2006; MacLean and Haley 2004). Anderwald et al. (2013) identified a negative relationship between the presence of minke whales (closely related to fin whales) and the number of vessels present during construction of a gas pipeline across a bay on the northwestern coast of Ireland, suggesting some avoidance response of construction vessel activity may be expected.

The effects of sounds from shipping vessels on fin whale calls were investigated by Castellote et al. (2012). They found that in locations with heavy shipping traffic, fin whale 20-Hz notes had a shortened duration, narrower bandwidth, decreased center frequency, and decreased peak frequency. These results indicate that fin whales likely modify their call characteristics to compensate for increased background noise conditions, which may help reduce potential impacts from anthropogenic sounds.

The action area for this Project covers 966 mi^2 (2503 km^2) of fin whale habitat. However, given the low vessel speeds and low sound levels produced by this Project, the effects on fin whales are expected to be minimal and temporary.

6.1.1.6 POTENTIAL EFFECTS OF NOISE FROM ACTION ON NORTH PACIFIC RIGHT WHALES

The effects of noise on North Pacific right whales are poorly understood, but numerous studies have occurred on these whales. Similar to the findings of Castellote et al. (2012) for fin whales, right whales have been found to alter their calls in response to changing ambient noise conditions (Parks et al. 2007, 2009, 2011). Tenessen and Parks (2016) used acoustic propagation modeling to show that both the passing of a nearby ship and the overall elevated background noise levels from distant vessels can reduce the distance over which right whales can communicate; however, they also showed that changes in the amplitude and frequency content of calls can compensate and increase the likelihood of detecting communication signals in shipping noise. The potential loss of right whale communication space as a result of shipping noise has also been studied by Clark et al. (2009) and Hatch et al. (2012). In addition to impacts on right whale vocalizations, noise from shipping may also be responsible for elevated stress hormone levels in these whales (Rolland et al. 2012).

Tagged right whales showed no response to the playback of ship sounds, or actual ships, but did respond to the playback of an “alert” signal by swimming strongly to the surface (Nowacek et al. 2004). The authors hypothesized that the lack of responses to ship sounds may have resulted from habituation to those sounds within the heavily trafficked northwestern Atlantic Ocean.

In all these cases, the vessel sounds considered were primarily from very large shipping vessels traveling at speeds routinely above 10 knots (18.5 km/hr) and as high as 20 knots (37 km/hr). Sounds produced by the smaller and slower moving vessels involved in the proposed action are expected to be substantially lower and will not create overall elevated levels of ambient noise associated with heavily used shipping lanes. Due to the lower speeds and sounds produced by this Project, changes in North Pacific right whale call characteristics or stress levels are unlikely to result from the activity.

Wright et al. (2018) found that North Pacific right whales use Unimak Pass both during and outside their migration period. This area has frequent vessel traffic and associated noise, and may be a location where North Pacific right whales are more vulnerable to interactions with vessels. However, the lower levels of vessel activity within this region relative to the northwest Atlantic Ocean mean North Pacific right whales may be more likely to show avoidance responses to vessel sounds, which may be beneficial in reducing the likelihood of ship strike.

The action area for this Project covers 966 mi^2 (2503 km^2) of the North Pacific right whale range. Given the low sound levels produced by Project vessels and slow speeds during cable laying, along with the avoidance and minimization measures, potential effects on North Pacific right whales are anticipated to be minimal and temporary in nature.

6.1.1.7 POTENTIAL EFFECTS OF NOISE FROM ACTION ON GRAY WHALES

There have been many studies on the effects of anthropogenic sounds on gray whales. Most of these are seismic survey-related, and the whales showed mixed reactions to the sounds. Studies of seismic surveys near Sakhalin Island in 1997 and 2001 found no indication that WNP gray whales exposed to seismic sounds were displaced from their overall feeding grounds (Würsig et al. 1999, Johnson et al. 2007, Meier et al. 2007, Yazvenko et al. 2007a), but the whales exhibited subtle behavior changes and localized redistribution to avoid close approaches by the seismic vessel (Weller et al. 2002, 2006; Yazvenko et al. 2007a). Although these responses were observed, the frequency of feeding did not seem to be altered (Yazvenko et al. 2007b). Similarly, no large changes in gray whale movement, respiration, or distribution patterns were observed during the seismic programs conducted in 2010 (Bröker et al. 2015, Gailey et al. 2016).

Gray whale responses to offshore drilling activities with sound characteristics similar to or including vessel propulsion have also been reported. Malme et al. (1984) used playback of sound from helicopter overflight as well as drilling rigs and platforms to study behavioral effects on migrating ENP gray whales. Received levels exceeding 120 dB re 1 µPa rms induced avoidance reactions. Malme et al. (1984) calculated 10, 50, and 90 percent probabilities of gray whale avoidance reactions at received levels of 110, 120, and 130 dB re 1 µPa rms, respectively.

Malme et al. (1986) observed the behavior of feeding ENP gray whales during four experimental playbacks of drilling sounds (50 to 315 Hz; 21-minute overall duration; 10 percent duty cycle; source levels 156 to 162 dB re 1 µPa-m). In two cases, for received levels of 100 to 110 dB re 1 µPa rms, no behavioral reaction was observed. Avoidance behavior was observed in two cases where received levels were 110 to 120 dB re 1 µPa rms.

The action area of this Project covers 966 mi^2 (2503 km^2) of the gray whale range. The low probability of encountering WNP gray whales within this region make it unlikely that effects to this species will occur.

6.1.1.8 POTENTIAL EFFECTS OF NOISE FROM ACTION ON HUMPBACK WHALES

Measurements of several different whale-watching boats on humpback whale wintering grounds in Hawaii showed that the vessels should be readily audible to the whales (despite high ambient noise levels resulting from chorusing humpback whales), but that vessel sounds received by the whales are likely at lower levels than the sounds received by whales when in close proximity to another singing whale. That is, the source levels of singing whales are, at times, higher than the source levels of whale watching boats (Au and Green 2000). For that reason, the authors concluded that there is little chance of auditory injury to whales resulting from whale-watch boat activities. However, disturbance reactions by humpback whales from whale-watch vessels have been reported (Schaffar et al. 2013), as well as ship strikes from these vessels (Lammers et al. 2013). Humpback whales have also shown a general avoidance reaction at distances from 1.2 to 2.5 mi (2 to 4 km) of cruise ships and tankers (Baker et al. 1982, 1983), although they have displayed no reactions at distances to 0.5 mi (0.8 km) when feeding (Watkins et al. 1981, Krieger and Wing 1986), and temporarily disturbed whales often remain within the area despite the presence of vessels (Baker et al. 1988, 1992).

Dunlop (2016) considered the effect of vessel noise and natural sounds on migrating humpback whale communication behavior. Results showed that humpback whales did not change how often or for how long they produced common vocal sounds in response to increases in either wind or vessel noise. However, increases in vocal source levels and the use of non-vocal sounds (e.g., flipper and tail slaps on the water surface) were observed in response to wind noise, but not vessel noise. The author suggested this may mean humpback whales are susceptible to masking from vessel sounds, but differences in the spectral overlap of wind and vessel sounds with humpback whale communication signals may also be a contributing factor. Tsujii et al. (2018) determined that vessel noise caused humpback whales in the Ogasawara water to stop singing temporarily rather than modifying the sound characteristics of their song through frequency shifting or source level elevation. Fournet et al. (2018) noted that humpback whale foraging calls in Southeast Alaska were approximately 25 to 65 dB lower than those reported by Thompson et al. (1986), and average source level estimates for humpback whale calls within the eastern Australian migratory corridor were 29 dB higher than those within Glacier Bay (Dunlop et al. 2013). This could be the result of overall lower ambient noise within Alaska waters, but it does provide a more accurate source level estimate for humpback whales in Alaska and highlight that humpback whale calls on foraging grounds may be at risk for acoustic masking (Fournet et al. 2018, McKenna et al. 2012).

Behavioral response studies of humpback whales to sounds from a small seismic airgun (20 cubic inch) involved both “control” and “active” approaches, where a vessel approached or crossed the path of migrating whales with and without the airgun operating. Results showed minor decreases in group dive time and the speed of southward movement, but no difference in these metrics between the “control” and “active” trials, suggesting that the whales were responding to the vessel sounds more than the airgun sounds. Similar results showing minor changes in speed and/or direction were observed during “control” and “active” trials involving the ramp-up of a 440-cubic-inch airgun array (Dunlop et al. 2016). These results provide further support for minor responses by humpback whales to nearby vessels, but not significant disturbance reactions.

The action area for this Project covers 583 mi^2 (2,209 km^2) of the humpback whale range. Given the low sound levels produced by Project vessels and slow speeds during cable laying, potential effects on humpback whales are anticipated to be minimal and temporary in nature.

6.1.1.9 POTENTIAL EFFECTS OF NOISE FROM ACTION ON SPERM WHALES

Studies of sperm whales and the effects of airgun sounds show that these whales have considerable tolerance of airgun pulses, and in most cases do not show strong avoidance (Stone and Tasker 2006, Moulton and Holst 2010). Sperm whales studied off the coast of Kaikoura, New Zealand, did not appear to alter their respiratory behavior, blow rates, or surface intervals in the presence of whale watching vessels (Isojunno et al. 2018).

The action area of this Project covers 966 mi^2 (2503 km^2) of the sperm whale range habitat. Sperm whales are typically found within waters greater than 984 ft (300 m) deep, so it is unlikely that these whales will be encountered. In the unlikely event that one is encountered, the low vessel speeds and associated sound levels are anticipated to have minimal effects on sperm whales and be temporary.

6.1.1.10 POTENTIAL EFFECTS OF NOISE FROM ACTION ON STELLER SEA LIONS

Most information regarding the reaction of sea lions to boats is related to the disturbance of hauled-out animals. None of the proposed cable-laying activities will come within disturbance distance to sea lion haulouts, so impacts of this type are not expected.

There is little information about the reaction of sea lions to ships while in the water other than some anecdotal information that they are often attracted to vessels (Richardson et al. 1995). However, one study of sea lion hearing found that California sea lions can detect realistic, complex acoustic signals in the presence of masking vessel noise better than predicted by a basic hearing model (Cunningham et al. 2014). This suggests that noise from Project vessels is unlikely to have any significant effects.

The action area of this Project covers 966 mi^2 (2503 km^2) of Steller sea lion range and 159.9 mi^2 (414.1 km^2) of critical habitat. No landing sites are near haulouts. Given the relatively low sounds levels produced by Project vessels, it is unlikely that impacts on Steller sea lions will occur from in-water sounds produced by cable-laying activities.

6.1.1.11 POTENTIAL EFFECTS OF NOISE FROM ACTION ON RINGED SEALS AND BEARDED SEALS

Research suggests arctic seals do not exhibit avoidance behavior for sound levels less than 190 dB re 1 µPa rms (Harris et al. 2001). While conducting seismic operations within the Beaufort Sea, both ringed and bearded seals were frequently within range of sound levels exceeding 190 dB re 1 µPa rms when they dive (Harris et al. 2001). Despite showing some avoidance behavior when exposed to sounds greater than 180 dB re 1 µPa rms, the observed horizontal avoidance was minor enough to only account for a slight reduction in sound exposure during dives.

The Project's action area covers 966 mi^2 (2503 km^2) of ringed and bearded seal habitat. Given the low sound levels produced from Project vessels relative to ringed and bearded seal tolerance levels, it is unlikely that impacts on these seals will occur from in-water sounds produced from cable-laying activities.

6.1.2 Strandings and Mortality

Due to the low intensity and non-impulsive nature of sounds produced by cable-laying activities, strandings or mortality resulting from acoustic exposure is highly unlikely. Any potential effects of this nature are more likely to come from ship strike. Globally, the amount of shipping traffic has increased steadily over the past several decades. Along with increasing baleen whale populations (in some locations), ship strike has been identified as a major factor potentially affecting complete recovery of whale populations to pre-exploitation levels. Laist et al. (2001) reported that fin whales are struck most frequently, but right, humpback, sperm, and gray whales are also regularly hit. Fewer records exist of collisions with blue, sei, and minke whales. Humpback whales on feeding (Hill et al. 2017) and breeding (Lammers et al. 2013) grounds are known to experience ship strikes, and right whales are vulnerable on their feeding grounds within the northwest Atlantic (Knowlton and Kraus 2001).

In Alaska, from 1978 to 2011, 86 percent (n = 93) of reported ship strikes were of humpback whales, and 15 cases occurred in which humpback whales struck anchored or drifting vessels (Neilson et al. 2012). An apparent lack of effective avoidance responses by large whales, including right and fin whales, contributes to the risk of ship strike (Nowacek et al. 2004, McKenna et al. 2015).

Several studies have considered the risk of ship strike to fin and humpback whales within areas with heavy shipping traffic along the western coast of North America (Williams and O'Hara 2010, Nichol et al. 2017, Rockwood et al. 2017). Places where high densities of whales overlapped with frequent transit by large and fast-moving ships were identified as high-risk areas. Similarly, assessments of vessel-strikes of North Atlantic right whales resulted in changes to shipping lanes and speed restrictions within waters off the eastern coast of the United States.

The most significant factor in ship strikes appears to be vessel speed. Most lethal and severe injuries to large whales resulting from documented ship strikes have occurred when vessels were traveling at 14 knots (26 km/hr) or greater (Laist et al. 2001), speeds common among large ships. Vanderlaan and Taggart (2007), using a logistic regression modeling approach based on vessel strike records, found that for vessel speeds greater than 15 knots (28 km/hr), the probability of a lethal injury (mortality or severely injured) from a ship strike approaches 1. Similarly, Currie et al. (2017) found a significant decrease in close encounters with humpback whales in the Hawaiian Islands and, therefore, reduced likelihood of ship strike when vessels speeds were below 12.5 knots (22.2 km/hr). Reducing ship speeds to less than 10 knots (18.5 km/hr) has proven effective for reducing ship strikes of North Atlantic right whales (Laist et al. 2014, Van der Hoop et al. 2015, Wiley et al. 2016). Because of the slow operating speeds (typically 0.5 to 2 knots [1 to 4 km/hr]) and generally straight-line movements of Project vessels during cable-laying operations, the likelihood of a ship strike is very low.

6.1.3 Habitat Disturbance

The proposed action will result in primarily temporary impacts on habitats used by the listed marine mammals. The main habitat disturbance impact associated with the proposed action will be temporarily elevated noise levels and the associated effects on marine mammals, as discussed in Section 6.1.1. Other potential habitat disturbance effects of the proposed action on marine mammals include the risk of ship strikes (see Section 6.1.2) and the risk of entanglements with cables and bottom disturbance (see the following subsections).

6.1.3.1 ENTANGLEMENT RISK

The presence of the submarine FOC during proposed marine construction has the potential to affect listed marine mammals. The presence of cables between the vessel and seafloor, as well as exposed cables on the seafloor, presents a potential risk of whale entanglement. While reports regarding whale interaction with deep-sea cables are rare, they have been recorded.

Heezen (1957) reported 14 instances of whales entangled in submarine cables, some of these at depths more than 3,281 ft (1.0 km). All the whales that could be positively identified to the species level were sperm whales. Entanglements often occurred near repairs where there was a chance for extra slack cable on the bottom (Heezen 1957). These reports of entanglement from cables were from more than 60 years ago, with very few, if any, reports from cable-laying activities within the last 20 years.

6.1.3.2 BOTTOM DISTURBANCE

Sea bottom disturbance resulting from the proposed PLGR, post-lay inspection and burial, and cable burial has the potential to temporarily interact with marine mammals through reduced visibility caused by the suspension of seafloor sediments within the water column. Although increased turbidity has been shown to reduce the visual acuity of harbor seals (Weiffen et al. 2006), observations of blind harbor and gray seals indicated they were capable of foraging successfully enough to maintain body condition (Newby et al. 1970, McConnell et al. 1999). High levels of turbidity are present in locations where marine mammals that do not use biosonar routinely forage, and laboratory studies have shown that seals are able to use other sensory systems to detect and follow potential prey without using their vision (Dehnhardt et al. 2001). Additionally, bottom disturbance will be minimized by the short duration and temporary nature of marine construction activities, resulting in a rapid recovery to original conditions. Therefore, any increases in turbidity are likely to have limited or no direct effects on marine mammals.

6.1.3.3 POTENTIAL EFFECTS OF HABITAT DISTURBANCE ON MARINE MAMMAL SPECIES

The direct loss of habitat available to listed marine mammals due to vessel noise is expected to be minimal. Vessel noises will occupy a small fraction of the area available to marine mammals, and any disruptions are expected to be minimal and temporary, with no lasting effects, as addressed in Section 6.1.1.

The risk of entanglement with FOC is expected to be very minimal, both during the cable laying (cable between the vessel and the seafloor) and once laid on the seafloor, if not buried. With the exception of gray whales, listed marine mammal species are not typical benthic feeders that routinely feed near or on the seafloor, thus decreasing the potential for interactions with the laid cables. The WNP DPS of gray whales are not known to feed within the action area as their feeding grounds are in the Okhotsk Sea off northeastern Sakhalin Island and in southeastern Kamchatka in the Bering Sea (Burdin et al. 2017).

The limited increase in turbidity as a result of suspension of sediments from bottom disturbance will have minimal direct effect on listed marine mammals. The potential indirect effects of bottom disturbance on marine mammals through reduced feeding opportunities is assessed in Section 6.2.

6.1.4 Measures to Reduce Direct Effects on Marine Mammals

As described above, direct effects to listed marine mammals may result from in-water sounds produced by Project vessel activities, potential ship strike by Project vessels, or disturbance to habitat. Given the continual movement of the cable-laying vessel during Project activities, it is not practicable to use a noise attenuating device, such as a bubble curtain, sometimes used during other in-water construction activities. To reduce the potential for acoustic disturbance, and to the extent it is practicable and safe, vessel operators will be instructed to operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work.

Given the slow movements of Project vessels while laying cable, ship strikes are very unlikely. Nonetheless, and to further reduce potential direct effects on listed marine mammals, while Project vessels are traveling at speeds greater than 5 knots (9.3 km/hr) within the Project area, Unicom plans for crew members trained as PSOs to watch for marine mammals and assist in performing mitigation measures when necessary.

The distance to the 120 dB re 1 μPa rms disturbance threshold for continuous sound was calculated as 1.1 mi (1.8 km) for the cable-laying vessel and 1.7 mi (2.8 km) for the cable-laying tug and barge (Section 3 Action Area). These will be defined as the disturbance zones for these activities.

Project vessels will implement the following procedures:

- During marine operations where travel speed is less than 5 knots (9.3 km/hr), it is unsafe to stop activities, so there are no shut down procedures for this Project; however, where travel speeds are greater than 5 knots (9.3 km/hr), vessel crew trained as PSOs will monitor the appropriate disturbance zones for marine mammals and help perform mitigation measures when needed.
- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) away from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.
- Prior to the start of cable-laying operations, crew members trained as PSOs will clear the disturbance zone for a period of 30 minutes when activities have been stopped for longer than a 30-minute period. Clearing the zone means no marine mammals have been observed within the zone for that 30-minute period. If a marine mammal is observed within the zone, activities may not start until:
  - The marine mammal(s) is visually observed to have left the disturbance zone; or
  - Has not been seen within the zone for 15 minutes in the case of pinnipeds, sea otters (*Enhydra lutris*), and harbor porpoises (*Phocoena phocoena*); or
  - Has not been seen within the zone for 30 minutes in the case of cetaceans.
- Consistent with safe navigation, Project vessels will avoid traveling within 3 nm (5.6 km) of Steller sea lion rookeries or major haulouts (to reduce the risks of disturbance of Steller sea lions and collision with protected species).

- If travel within 3 nm (5.6 km) of major rookeries or haulouts is unavoidable, transiting vessels will reduce speed to 9 knots (16.6 km/hr) or less while within 3 nm (5.6 km) of those locations. Vessels laying cables are already operating at speeds less than 3 nm (5.6 km).
- The transit route for the vessels will avoid known Steller sea lion BIAs and designated critical habitat to the extent practicable.
- Vessels and barges will not allow tow lines to remain within the water when not in use, and no trash or other debris will be thrown overboard, reducing the potential for marine mammal entanglement.
- Where possible, FOC will be laid on the seafloor, reducing impact on marine mammal habitat.
- Vessels will take reasonable steps to alert other vessels in the vicinity of whale(s), and report any stranded, dead, or injured listed whale or pinniped to the Alaska Marine Mammal Stranding Hotline at 877-925-7773.
- Although take is not authorized, if a listed marine mammal is taken (e.g., struck by a vessel), it must be reported to NMFS within 24 hours. The following will be included when reporting take of a listed species:
  - Number of listed animals taken
  - Date, time, and location of the take
  - Cause of the take (e.g., vessel strike)
  - Time the animal(s) was first observed and last seen
  - Mitigation measures implemented prior to and after the animal was taken
  - Contact information for PSO, if any, at the time of the collision, ship's pilot at the time of the collision, or ship's captain

Unicom will train crew members as PSOs on the cable-laying barge and ship to be on watch during all daylight hours when traveling at speeds greater than 5 knots (9.3 km/hr). Crew member PSOs will:

- Be trained in marine mammal identification and behaviors
- Have no other primary duty than to watch for and report on events related to marine mammals when observing
- Work in shifts lasting no longer than 4 hours without breaks, and will not perform duties as a PSO for more than 12 hours in a 24-hour period (to reduce PSO fatigue)
- Have the following to aid in determining the location of observed listed species, take action if listed species enter the exclusion zone, and record these events:
  - Binoculars, range finder, Global Positioning System, and compass
  - Two-way radio communication with construction foreman/superintendent
- PSOs will record all mitigation measures taken to avoid marine mammals observed using NMFS-approved observation forms. Reported actions on sighting reports will include time, location, the vessels position, speed, and corrected bearing.
- Reports will be sent to NMFS at the end of Project activities.

6.2 Indirect Effects

The proposed action will result primarily in temporary indirect impacts on listed marine mammals through the food sources they use. Although activities may affect individual prey species, it is not expected that prey availability for marine mammals will be significantly affected.

Potential effects of the noise and bottom disturbance produced by Project activities on fish and invertebrates are summarized below. Any effects on these potential prey species could indirectly affect marine mammals within the Project area.

6.2.1 Potential Impacts of Noise on Habitat

Exposure to anthropogenic underwater sounds has the potential to cause physical (i.e., pathological and physiological) and behavioral effects on marine invertebrates and fish. Studies that conclude physical and physiological effects occur typically involve captive subjects that are unable to move away from the sound source and are therefore exposed to higher sound levels than they would be under natural conditions. Comprehensive literature reviews related to auditory capabilities of fish and marine invertebrates as well as the potential effects of noise include Hastings and Popper (2005), Popper (2009), Popper and Hastings (2009a, 2009b), and Hawkins et al. (2015).

Underwater sound has both a pressure and particle displacement component. While all marine invertebrates and fish appear to have the capability of detecting the particle displacement component of underwater sound, only certain fish species appear to be sensitive to the pressure component (Breithaupt 2002, Casper and Mann 2006, Popper and Fay 2010).

6.2.1.1 INVERTEBRATES

The sound detection abilities of marine invertebrates are not well known. Aquatic invertebrates, except aquatic insects, do not possess the equivalent physical structures present in fish and marine mammals that can be stimulated by the pressure component of sound. It appears that marine invertebrates respond to vibrations (i.e., particle displacement) rather than pressure (Breithaupt 2002).

Among the marine invertebrates, decapod crustaceans and cephalopods have been the most intensively studied in terms of sound detection and the effects of exposure to sound. Crustaceans appear to be most sensitive to low frequency sounds (i.e., less than 1,000 Hz) (Budelmann 1992; Popper et al. 2001). Both cephalopods (Packard et al. 1990) and crustaceans (Heuch and Karlsen 1997) have been shown to possess acute infrasound (i.e., less than 20 Hz) sensitivity. Some studies suggest invertebrate species, such as the American lobster (*Homarus americanus*), may also be sensitive to frequencies greater than 1,000 Hz (Pye and Watson 2004). A recent study concluded that planktonic coral larvae can detect and respond to sound, the first description of an auditory response in the invertebrate phylum Cnidaria (Vermeij et al. 2010).

6.2.1.2 FISH

Marine fish are known to vary widely in their abilities to detect sound. Although hearing capability data only exist for fewer than 100 of the 27,000 fish species (Hastings and

Popper 2005), current data suggest that most fish species detect sounds with frequencies less than 1,500 Hz (Popper and Fay 2010). Some marine fish, such as shads and menhaden, can detect sound at frequencies greater than 180 kHz (Mann et al. 1997, 1998, 2001).

Numerous papers about the behavioral responses of fish to marine vessel sound have been published in the primary literature. They consider the responses of small pelagic fish (e.g., Misund et al. 1996, Vabo et al. 2002, Jørgensen et al. 2004, Skaret et al. 2005, Ona et al. 2007, Sand et al. 2008), large pelagic fish (Sar? et al. 2007), and groundfish (Engås et al. 1998, Handegard et al. 2003, De Robertis et al. 2008). Generally, most of the papers indicate that fish typically exhibit some level of reaction to the sound of approaching marine vessels, the degree of reaction being dependent on a variety of factors, including the activity of the fish at the time of exposure (e.g., reproduction, feeding, and migration), characteristics of the vessel sound, and water depth. Simpson et al. (2016) found that vessel noise and direct disturbance by vessels raised stress levels and reduced anti-predator responses in some reef fish and, therefore, more than doubled mortality by predation. This response has negative consequences for fish but could be beneficial to marine mammals that prey on fish.

Given the routine presence of other vessels within the region and the lack of significant effects on fish species from their presence, indirect effects to listed species from exposure of fish to Project vessel sounds is expected to be very unlikely.

6.2.1.3 SEA BOTTOM DISTURBANCE

Limited negative effect of sea bottom disturbance will occur during various marine cable installation activities, including PLGR, post-lay inspection and burial, and jet burial. During each of these activities, equipment will contact the substrate. Section 2.1 describes each of these activities and indicates that contact between each activity’s equipment and the substrate is very limited in surface area extent. Bottom disturbance during the PLGR is very surficial, while disturbance caused by jet burial from the jet sled and ROV is slightly deeper but will not exceed approximately 5 ft (1.5 m). Sediment and benthos would be most affected by the activities, although there is some potential for limited temporary suspension of sediment within the water column. It is unlikely that there will be any significant indirect effect on listed marine mammals through the activities’ disturbance of the sea bottom on invertebrate and fish eggs and larvae within the water column.

7 Determination of Effects

This BA evaluates the potential impacts of the Project on the Beringia DPS of bearded seal, fin whale, WNP DPS of gray whale, Mexico DPS of humpback whale, WNP DPS of humpback whale, North Pacific right whale, Arctic subspecies of ringed seal, sperm whale, and Western DPS Steller sea lion, as well as Steller sea lion critical habitat. To reach a conclusion, impacts of the Project are not considered in isolation, but are placed in the context of the current status of the species and critical habitat, the environmental baseline, and cumulative effects. Consistent with ESA guidance, a “may affect, but is not likely to adversely affect” determination means that all effects are beneficial, insignificant, or discountable. For purposes of this assessment, “may affect, but is not likely to adversely affect” suggests that any potential effects are highly unlikely, would be of a short duration, would not have any adverse effects to the species or critical habitat, and would not be measurable or considered insignificant or discountable. A "may affect, and is likely to adversely affect" determination means that listed resources are likely to be exposed to the action or its environmental consequences, and may respond in a negative manner to the exposure. After considering these aggregate effects on the species, the recommended effect determinations are described in the following sections.

7.1 Bearded Seal

The Project **may affect, but is not likely to adversely affect** bearded seals. A **may affect** determination is warranted because bearded seals are known to occur within the action area and could detect noise associated with cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Bearded seals are highly associated with pack ice and are unlikely to be observed during installation.
- Bearded seals are more highly associated with deeper waters within the Bering Sea than where Project construction will occur.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
    - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
    - Route away from oncoming marine mammals;
    - Operate at a slow, safe speed;
    - Avoid multiple changes in direction when marine mammals are present near the vessel;
    - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
    - Not separate individuals from a group or pod; and
    - Avoid disrupting normal behaviors.

7.2 Bearded Seal Critical Habitat

A **no effect** determination is warranted for bearded seal critical habitat because:

- Critical habitat for the bearded seal does not occur within the Project area.

7.3 Fin Whale

The Project **may affect, but is not likely to adversely affect** fin whales. A **may affect** determination is warranted because fin whales are known to occur within the action area and could detect noise associated with subsea cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Fin whales are associated with deeper waters within the Bering Sea and are very unlikely to be observed during the installation.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

7.4 Fin Whale Critical Habitat

A **no effect** determination is warranted for fin whale critical habitat because:

- No critical habitat for the fin whale has been designated.

7.5 Gray Whale (Western North Pacific DPS)

The Project **may affect, but is not likely to adversely affect** the WNP DPS of gray whale. A **may affect** determination is warranted because the WNP DPS may occur within the action area. A **not likely to adversely affect** determination is warranted because:

- The WNP DPS that migrates across the southern Bering Sea area is likely to remain south of the Aleutian Islands and is not likely to occur within the action area.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

7.6 Gray Whale (Western North Pacific DPS) Critical Habitat

A **no effect** determination is warranted for the WNP DPS of gray whale critical habitat because:

- No critical habitat for the WNP DPS has been designated.

7.7 Humpback Whale (Western North Pacific DPS and Mexico DPS)

The Project **may affect, but is not likely to adversely affect** the WNP DPS and Mexico DPSs of humpback whales. A **may affect** determination is warranted because the WNP and Mexico DPSs may occur within the action area. A **not likely to adversely affect** determination is warranted because:

- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

7.8 Humpback Whale (Western North Pacific DPS and Mexico DPS) Critical Habitat

A **no effect** determination is warranted for the WNP and Mexico DPSs of humpback whale critical habitat because:

- Critical habitat for the WNP and Mexico DPSs does not occur within the Project area.

7.9 North Pacific Right Whale

The Project **may affect, but is not likely to adversely affect** North Pacific right whales. A **may affect** determination is warranted because these whales may occur within the action area. A **not likely to adversely affect** determination is warranted because:

- North Pacific right whales have not been recently or historically sighted near the action area and are therefore unlikely to occur within the action area.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

7.10 North Pacific Right Whale Critical Habitat

A **no effect** determination is warranted for the North Pacific right whale critical habitat because:

- Critical habitat for the North Pacific right whale does not occur within the Project area.

On July 11, 2022, NMFS announced a 90-day finding on a petition to expand the North Pacific right whale critical habitat (87 FR 41271). The expansion proposed in the petition would connect the two existing critical habitat areas by extending the Southeastern Bering Sea boundary west and south to the Fox Islands, through Unimak Pass, and east to the Gulf of Alaska critical habitat area. At the time of writing this document, NMFS has not issued a proposed or final rule on the modification of the North Pacific right whale critical habitat. Should the North Pacific right whale critical habitat be modified based on what was proposed in the petition, a **no effect** determination would be warranted because:

- The proposed addition to the critical habitat presented in the petition does not occur within the action area and is located farther from the Project than the existing North Pacific right whale critical habitat in the Bering Sea.

7.11 Ringed Seal

The Project **may affect, but is not likely to adversely affect** ringed seals. A **may affect** determination is warranted because these seals are known to occur within the action area and could detect the noise associated with cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Ringed seals are associated with pack ice and are unlikely to be observed during installation.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

7.12 Ringed Seal Critical Habitat

A **no effect** determination is warranted for the ringed seal critical habitat because:

- Critical habitat for the ringed seal does not occur within the Project area.

7.13 Sperm Whale

The Project **may affect, but is not likely to adversely affect** sperm whales. A **may affect** determination is warranted because these whales are known to occur within the action area and could detect the noise associated with subsea cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Sperm whales are associated with deeper waters within the Bering Sea and are very unlikely to be observed during the cable installation.
- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

7.14 Sperm Whale Critical Habitat

A **no effect** determination is warranted for sperm whale critical habitat because:

- No critical habitat for the sperm whale has been designated.

7.15 Steller Sea Lion

The Project **may affect, but is not likely to adversely affect** the Steller sea lion. A **may affect** determination is warranted because Steller sea lions are known to occur within the action area and could detect the noise associated with cable installation activity. A **not likely to adversely affect** determination is warranted because:

- Noise associated with cable installation is unlikely to harass marine mammals.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- To the best extent that is safe and practicable, Project vessels will:
  - Keep a distance of at least 0.5 mi (800 m) from North Pacific right whales and 328 ft (100 m) from all other marine mammals;
  - Route away from oncoming marine mammals;
  - Operate at a slow, safe speed;
  - Avoid multiple changes in direction when marine mammals are present near the vessel;
  - Operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work to minimize acoustic disturbance;
  - Not separate individuals from a group or pod; and
  - Avoid disrupting normal behaviors.

7.16 Steller Sea Lion Critical Habitat

The Project **may affect, but is not likely to adversely affect** designated Steller sea lion critical habitat. A **may affect** determination is warranted because designated critical habitat is located within the action area, and temporary habitat modifications will result from cable-laying activities. A **not likely to adversely affect** determination is warranted because:

- Subsea installation activity will be short term and localized.
- To reduce the potential for acoustic disturbance and to the extent it is practicable and safe, vessel operators will be instructed to operate their vessel thrusters (both main drive and DP) at the minimum power necessary to accomplish the work.
- Where possible, FOC will be laid on the seafloor, reducing impact on marine mammal habitat.

Additionally, the above potential impacts would be limited as a result of avoidance and minimization measures, including the following:

- Vessels will be operated at a slow, safe speed
- Consistent with safe navigation, Project vessels will avoid traveling within 3 nm (5.6 km) of Steller sea lion rookeries or major haulouts (to reduce the risks of disturbance of Steller sea lions and collision with protected species).
- If travel within 3 nm (5.6 km) of major rookeries or haulouts is unavoidable, transiting vessels will reduce speed to 9 knots (16.6 km/hr) or less while within 3 nm (5.6 km) of those locations. Vessels laying cables are already operating at speeds less than 3 nm (5.6 km).
- The transit route for the vessels will avoid known Steller sea lion BIAs and designated critical habitat to the extent practicable.

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Appendix E. USFWS ESA Section 7 Consultation and MMPA Guidance

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UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
Washington, DC 20230

March 14, 2023

Ms. Sara Boario, Regional Director
U.S. Fish and Wildlife Service
1011 East Tudor Road
Anchorage, AK 99503

SUBJECT: Non-Federal Designation for U.S. Fish and Wildlife Service Consultation

Dear Ms. Boario,

This letter is regarding the AIRRAQ network project, which will bring broadband service to 10 rural Alaska villages in the Yukon-Kuskokwim Delta. The National Telecommunications and Information Administration (NTIA) has awarded a Tribal Broadband Connectivity Program grant to Bethel Native Corporation, who is partnered with Unicom to design, construct, and manage the project. Additionally, the U.S. Department of Agriculture (USDA) Rural Utilities Service (RUS) has awarded a grant to Unicom to support the project. The project will involve work in both marine and terrestrial environments.

While federal funding for the project is provided by NTIA and RUS, both agencies have agreed to partner to implement the National Environmental Policy Act with NTIA as the lead federal agency and RUS acting as a cooperating agency. This lead- and cooperating agency designation is extended to consultations with your agency. NTIA believes consultation under Section 7 of the Endangered Species Act (ESA) is required for species under your jurisdiction. Pursuant to 50 CFR §402.08, we designate Unicom (a wholly owned subsidiary of GCI Communications Corporation) and Unicom's consultant HDR Engineering, Inc. (HDR) as our non-Federal representatives to conduct Section 7 consultation using the following actions:

- Informal consultation and technical conversation with your agency for listed species
- Preparation of a Biological Assessment (subject to NTIA review and concurrence)

NTIA is also planning informal consultation under Section 7 of the ESA with National Marine Fisheries Service, Protected Resources Division, and appreciates coordination between both federal agencies with jurisdiction over species in the project area.

Mr. Simon Wigren is HDR's primary point of contact for consultation for this project and can be reached via email at simon.wigren@hdrinc.com and by phone at 907-644-2189.

NTIA remains responsible for the content of the Biological Assessment to include an action area determination and findings of effect for listed species and/or critical habitat. If required, NTIA will be responsible for initiating formal consultation.

If you have questions or need any additional information, please contact me at apereira@ntia.gov or 202-834-4016.

Sincerely,

AMANDA PEREIRA

Digitally signed by AMANDA PEREIRA
Date: 2023.03.14 17:29:35 -04'00'

Amanda Pereira
Environmental Program Officer
National Telecommunications and Information Administration
Department of Commerce

April 6, 2023

Douglass Cooper
U.S. Fish and Wildlife Service
Anchorage Field Office
4700 BLM Road
Anchorage, AK 99507

RE: Section 7 Endangered Species Act Informal Consultation Request for the Airraq Network Project

Dear Mr. Cooper,

On behalf of Unicom, Inc. (Unicom), the National Telecommunications and Information Administration (NTIA), and the U.S. Department of Agriculture (USDA) Rural Development (RD) Rural Utilities Service (RUS), HDR Engineering, Inc. (HDR) requests to initiate informal consultation with the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the Endangered Species Act (ESA) for the Airraq Network Project (Project). Additionally, HDR requests concurrence from USFWS that construction of Unicom's proposed Project will have no effect on spectacled eider (*Somateria fischeri*), short-tailed albatross (*Phoebastria albatrus*), and the Southwest Alaska Distinct Population Segment (DPS) of northern sea otter (*Enhydra lutris kenyoni*), and that the Project may affect, but is not likely to adversely affect, Steller's eider (*Polysticta stelleri*).

Unicom proposes to extend broadband service from Dillingham to 10 communities in the Lower Kuskokwim River Delta by placing approximately 548 miles of fiber optic cable on the ocean floor, in the Kuskokwim River, and on terrestrial landscapes throughout the region (Figure 2-1 in Attachment 1).

The federal action triggering this consultation request is funding of the Project through grants from NTIA and RUS. As such, NTIA and RUS are required to ensure that the Project will not result in a significant environmental effect. Additionally, the Project requires a permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act from the U.S. Army Corps of Engineers. The information contained in this letter and the Biological Assessment (Attachment 1) includes an analysis of potential direct, indirect, and cumulative impacts to ESA-listed species as a result of the Project. NTIA and USDA conclude and request concurrence from USFWS that the proposed Project will have **no effect** on spectacled eider (*Somateria fischeri*), short-tailed albatross (*Phoebastria albatrus*), and the Southwest Alaska DPS of northern sea otter (*Enhydra lutris kenyoni*), and that the Project **may affect, but is not likely to adversely affect**, Steller's eider (*Polysticta stelleri*) (Table 1). No designated critical habitat for Steller's eider, spectacled eider, nor the Southwest Alaska DPS of northern sea otter is present within the action area.

582 E. 36th Ave., Suite 500, Anchorage, AK 99503-4169
(907) 644-2000

Table 1. ESA-listed Species and Critical Habitat within the Action Area

Species	ESA Status	Effect Determination for Species	Critical Habitat within Action Area
Steller's Eider (*Polysticta stelleri*)	Threatened	May affect, not likely to adversely affect	No
Spectacled Eider (*Somateria fischeri*)	Threatened	No Effect	No
Short-tailed Albatross (*Phoebastria albatrus*)	Endangered	No Effect	No
Northern Sea Otter – Southwest Alaska Distinct Population Segment (*Enhydra lutris kenyoni*)	Threatened	No Effect	No

Table 2 provides overland surface impacts for the Project. Table 3 provides the landfall locations. See Figure 2-1 of Attachment 1 for a map of the Project.

Table 2. Overland Surface Impacts

FOC Route Segment	Cable Surface Laid on Uplands (mi)	Cable Trenched in Uplands (mi)	Cable Surface Laid on Wetlands and Waterbodies (mi)	Cable Trenched in Wetlands (mi)	Cable Attached to Existing Aerials (mi)
Apogak to Eek Village	—	—	6.8	0.5	—
Eek Village to Napaskiak	—	<0.1	34.9	1.3	—
Napaskiak to Oscarville	—	<0.1	0.9	<0.1	—
Oscarville to Bethel	—	—	—	—	4.7
Bethel to Atmautluak	—	<0.1	19.7	0.6	—
Atmautluak to Nunapitchuk	—	—	6.7	0.2	—
Nunapitchuk to Kasigluk	—	—	—	—	—
Quinhagak to Quinhagak	—	—	—	0.5	—
Project Total	**—**	**<0.1**	**69.0**	**3.2**	**4.7**

Notes: FOC = fiber optic cable; mi = mile

Table 3. Project Landfall Locations

Landfall Location	Latitude (NAD 83)	Longitude (NAD 83)
Dillingham	59.003510°	-158.535688°
Platinum	59.010177°	-161.821189°
Apogak (Eek)	60.148601°	-162.183601°
Quinhagak	59.742126°	-161.929299°
Tuntutuliak	60.338149°	-162.662662°

Note: NAD 83 = North American Datum of 1983

Avoidance and Minimization Measures

As part of the proposed Project, Unicom has committed to the following measures intended to avoid and minimize adverse impacts on ESA-listed species and their habitat:

- Vessels will be traveling at speeds less than 5 knots during cable laying operations, pre-lay grapnel run, and post-lay inspection and burial.
- Cable routing has been selected to avoid concentration areas where eiders and albatross occur to reduce potential behavioral or disturbance effects.
- The overland cable routes will be laid or trenched in winter, when protected bird species are not present onshore.
- Artificial lighting will be reduced or shielded so it is not projected skyward to reduce attracting birds.
- The cable-laying vessels will not discharge materials into the ocean that may attract seabirds, including short-tailed albatross.
- Bird strikes with vessels will be unlikely since marine cable-laying activities will occur in May through September, when long daylight hours occur.
- Prior to the start of cable-laying operations, Protected Species Observers (PSO) will clear the disturbance zone for a period of 30 minutes when activities have been stopped for longer than a 30-minute period. Clearing the zone means no marine mammals have been observed within the zone for that 30-minute period. If a marine mammal is observed within the zone, activities may not start until it:
    - Is visually observed to have left the zone; or
    - Has not been seen within the zone for 15 minutes in the case of pinnipeds, sea otters (*Enhydra lutris*), and harbor porpoises (*Phocoena phocoena*); or
    - Has not been seen within the zone for 30 minutes in the case of cetaceans.

Unicom will train crew members as PSOs on the cable-laying barge and ship to be on watch during all daylight hours when traveling at speeds greater than 5 knots (9.3 km/hr). Crew member PSOs will:

- Be trained in marine mammal identification and behaviors.
- Have no other primary duty than to watch for and report on events related to marine mammals, when observing.

- Work in shifts lasting no longer than 4 hours without breaks, and will not perform duties as a PSO for more than 12 hours in a 24-hour period (to reduce PSO fatigue).
- Have the following to aid in determining the location of observed listed species, take action if listed species enter the exclusion zone, and record these events:
    - Binoculars, range finder, Global Positioning System, and compass
    - Two-way radio communication with construction foreman/superintendent
- PSOs will record all mitigation measures taken to avoid marine mammals observed using NMFS-approved observation forms. Reported actions on sighting reports will include time, location, the vessels position, speed, and corrected bearing.
- Reports will be sent to NMFS at the end of Project activities.

Unicom has also committed to the following measures intended to reduce the potential for spills of hazardous substances and implement plans for spill response:

- All fuel and hazardous substances used by the Project will be handled and stored on site in compliance with state and federal regulatory guidance. All fuels and chemicals will be stored in appropriate primary containment areas. Secondary containment areas will be designed in compliance with all applicable permits and regulations.

Fuels and other products will be transported to the action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.

Listed Species and Determination of Effects

Steller's Eider

The Project **may affect, but is not likely to adversely affect** the Steller's eider. A **may affect** determination is warranted because the action area is located within the species' range, and Steller's eiders have been observed within the action area in the past. A **not likely to adversely affect** determination is warranted because the low levels and low frequency of the noise associated with construction is not likely to result in disturbance or injury. The eiders are unlikely to be disturbed by the presence of vessels due to their slow speeds. The artificial lighting on the vessels is unlikely to disturb eiders because marine-based cable laying will occur during summer. The short-term disturbance of the benthic habitat in which eiders may feed will have an insignificant impact on eider foraging ability or efficiency.

Spectacled Eider

While the historical range of the spectacled eider has been observed within the action area in the past, a **no effect** determination is warranted because the probability of spectacled eiders occurring within the action area is so low as to be discountable.

Short-tailed Albatross

A **no effect** determination is warranted because the probability of the short-tailed albatross occurring during cable-laying activities between May and June is so low as to be discountable.

Southwestern DPS of Northern Sea Otter

A **no effect** determination is warranted because the action area is not within the current known range of the Southwest Alaska DPS of northern sea otter, so the probability of this species occurring within the action area is so low as to be discountable.

We look forward to working with you on this important Project to support broadband connectivity in Western Alaska. If you have any questions or need additional information, please contact me via phone at (907) 644-2189 or email (simon.wigren@hdrinc.com).

Sincerely,

Simon Wigren
Wildlife Biologist
HDR

Enclosures:	Attachment 1: Biological Assessment Attachment 2: Non-Federal Designee Letter from NTIA
cc w/enclosures:	Valerie Haragan, GCI, Permitting Lead Keja Whiteman, NTIA, Program Manager Amanda Pereira, NTIA, Program Officer James Wetherington, USDA RD, Environmental Lead

United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Southern Alaska Fish and Wildlife Field Office
Anchorage Fish and Wildlife Conservation Office
4700 BLM Road
Anchorage, Alaska 99507

In Reply Refer to:
FWS/R7/SAFWFO, AFWCO

Simon Wigren
HDR Engineering, Inc.
582 E. 36th Avenue, Suite 500
Anchorage, Alaska 99503

Subject: Bethel Native Corporation - Unicom Airraq Project, Yukon-Kuskokwim Delta, Alaska (Consultation Number 2023-0060288)

Dear Simon Wigren:

Thank you for your April 6, 2023, 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). Unicom, Inc. (Unicom), in cooperation with the National Telecommunications and Information Administration (NTIA), and the U.S. Department of Agriculture (USDA) Rural Development Rural Utilities Service proposes to extend broadband service from Dillingham to ten communities in the lower Kuskokwim River Delta. The NTIA and USDA determined the proposed project may affect but is not likely to adversely affect the federally threatened Steller's eider (*Polysticta stelleri*). The project does not occur in critical habitat for any listed species. The NTIA has designated Unicom and HDR Engineering, Inc. as their non-Federal representatives.

You determined project activity will have no effect on the federally endangered short-tailed albatross (*Phoebastria* (=*Diomedea*) *albatrus*), the federally threatened southwestern distinct population segment (SW-DPS) northern sea otter (*Enhydra lutris kenyoni*), and the federally threatened spectacled eider (*Somateria fischeri)* and therefore they will not be discussed further in this letter.

Project Description

The purpose of the project is to extend broadband service from Dillingham to ten communities in the lower Kuskokwim River Delta. Specifically, the proposed project would:

- Place approximately 390.5 miles of fiber optic cable (FOC) on the ocean floor.
- Place approximately 157.5 miles of FOC on terrestrial landscapes, including landfall, overland, community shore, and fiber to the premise (FTTP) routes.
- Lay or trench FOCs on the seafloor and on terrestrial routes, where appropriate.

- Attach cables on FTTP routes to existing utility poles, where possible.

Overland cable routes will be laid or trenched in winter, and marine cable placing will occur May to September. Construction of this project is anticipated to begin in 2024.

Listed Species

Steller's Eiders

The threatened Steller's eider is a small, compact sea duck that nests on the Alaska Coastal Plain, near Utqiaġvik. A western subpopulation has historically nested in western Alaska; however, this population is now limited to a small area on the Yukon-Kuskokwim Delta with less than 50 adult individuals (USFWS, 2019). Steller's eiders spend the majority of their lives in the marine environment, occupying terrestrial habitats only during the nesting season (USFWS, 2019). The species undergoes an annual migration from tundra nesting grounds to pacific wintering habitat, during which they undergo a flightless molt (Petersen, 1980).

Mitigation Measures

Unicom, Inc. will implement the following actions to avoid potential effects on Steller's eiders:

- Vessels will travel at speeds less than 5 knots during cable laying operations, pre-lay grapnel run, post-lay inspection, and burial.
- Cable routing has been selected to avoid concentration areas where eiders and albatross occur to reduce behavioral and disturbance effects.
- Overland cable routes will be laid or trenched in winter, when protected bird species are not expected to be present on shore.
- Artificial lighting will be reduced or shielded so it is not projected skyward to reduce attracting birds.
- Cable-laying vessels will not discharge materials into the ocean that may attract seabirds.
- Marine cable-laying activities will occur May to September when long daylight occurs, which should make bird strikes with vessels unlikely.

Unicom, Inc. will also implement the following measures intended to reduce the potential for spills of hazardous materials and implement spill response plans:

- All fuel and hazardous substances used will be handled and stored on site in compliance with State and Federal regulatory guidance. All fuels and chemicals will be stored in appropriate primary containment areas. Secondary containment areas will be designed in compliance with all applicable permits and regulations.
- Fuels and other products will be transported to the action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.

Effects of the Action

Project activities could disturb eiders if any are present and nesting during terrestrial activities. Scheduling terrestrial activities for winter months, when no eiders are expected to be present, should minimize the potential for this effect. Similarly, marine-based activities could disturb molting eiders or result in vessel collision if those activities occur during wintering or molting periods. Scheduling marine activities for May to September, when fewer eiders are expected to be present, should minimize the potential for this effect. Spill or release of hazardous materials could injure or kill eiders or degrade their foraging habitat. Implementing spill prevention and response measures should minimize the potential for this effect.

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. 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 and refer to Consultation Number 2023-0060288.

Sincerely,

DOUGLASS COOPER

Digitally signed by DOUGLASS COOPER
Date: 2023.06.01 11:33:07 -08'00'

Douglass M. Cooper
Ecological Services Branch Chief

References

Petersen, M.R. 1980. Observations of wing-feather molt and summer feeding ecology of Steller's eiders at Nelson Lagoon, Alaska. Wildfowl 31:99-106.

[USFWS] U.S. Fish and Wildlife Service. 2019. Status assessment of the Alaska breeding population of Steller's eiders. Fairbanks Fish and Wildlife Field Office, Fairbanks, Alaska.

Airraq Network

PHASES 1 AND 2

Biological Assessment for U.S. Fish and Wildlife Service

Unicom, Inc

March 2023

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Executive Summary

Unicom, Inc., a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim Delta as part of the Airraq Network (Project). The Project will extend broadband service from Dillingham to 10 communities within the Lower Kuskokwim River Delta by placing approximately 548 miles of fiber optic cable on the ocean floor, Kuskokwim River, and terrestrial landscapes throughout the region. The cable will be trenched within the seafloor when necessary to protect it from outside aggression that could make the cable prone to fault. Terrestrial route components will take advantage of the unique landscape by laying the cable on the ground surface as much as possible, which will allow it to be overgrown by vegetation and eventually self-bury. The terrestrial route will be trenched when necessary to provide additional protections and alleviate visual concerns.

The Project has received funding through grants from the National Telecommunications and Information Administration (NTIA) and U.S. Department of Agriculture (USDA). Additionally, the Project requires a permit from the U.S. Army Corps of Engineers (USACE), Alaska District under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Under Section 7 of the Endangered Species Act (ESA), NTIA, USDA, and USACE are required to consult with the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) to ensure that any federal action will not jeopardize the continued existence of any species listed or proposed under the ESA, or result in the destruction or adverse modification of designated critical habitat.

Four ESA-listed species may occur within the action area (Table ES-1). This Biological Assessment includes an analysis of potential direct, indirect, and cumulative impacts to these species as a result of the Project. The NTIA and USDA conclude and request concurrence from the USFWS that the proposed Project will have **no effect** on spectacled eider (*Somateria fischeri*), short-tailed albatross (*Phoebastria albatrus*), and the Southwest Alaska Distinct Population Segment (DPS) of northern sea otter (*Enhydra lutris kenyoni*), and that the Project **may affect, but is not likely to adversely affect**, Steller's eider (*Polysticta stelleri*). No designated critical habitat for Steller's eider, spectacled eider, or the Southwest Alaska DPS of northern sea otter is present within the action area.

Table ES-1. ESA-listed Species and Critical Habitat within the Action Area

Species	ESA Status	Effect Determination for Species	Critical Habitat within Action Area
Steller's Eider (*Polysticta stelleri*)	Threatened	May affect, not likely to adversely affect	No
Spectacled Eider (*Somateria fischeri*)	Threatened	No Effect	No
Short-tailed Albatross (*Phoebastria albatrus*)	Endangered	No Effect	No
Northern Sea Otter – Southwest Alaska Distinct Population Segment (*Enhydra lutris kenyoni*)	Threatened	No Effect	No

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Acronyms and Abbreviations

BA	Biological Assessment
BBMA	Bristol Bay Management Area
BMH	beach manhole
BSAIMA	Bering Sea Aleutian Islands Management Area
BU	branching unit
CFR	Code of Federal Regulations
CLS	Cable Landing Station
CV	Coefficient of Variation
dB	decibel
dB re 1 μPa rms	decibels referenced to a pressure of 1 microPascal root mean square
DP	dynamic positioning
DPS	Distinct Population Segment
ESA	Endangered Species Act
FOC	fiber-optic cable
FR	Federal Register
ft	foot/feet
ft^3	cubic foot/feet
FTTP	Fiber to the Premise
hr	hour(s)
HTL	high tide line
Hz	hertz
kHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
KMA	Kuskokwim Management Area
m	meter(s)
mi	mile(s)
mi^2	square mile(s)
MLW	mean lower low water
NAD 83	North American Datum of 1983

nm	nautical mile(s)
NMFS	National Marine Fisheries Service
NTIA	National Telecommunications and Information Administration
OCS	Outer Continental Shelf
OHW	ordinary high water
PCE	Primary Constituent Element
PLGR	pre-lay grapnel run
Project	Airraq Network
PSO	Protected Species Observer
PTS	permanent threshold shift
ROV	remotely operated vehicle
TL	transmission loss
TTS	temporary threshold shift
Unicom	Unicom, Inc.
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
YK	Yukon-Kuskokwim

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1 Introduction

Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim (YK) Delta as part of the Airraq Network (Project). In doing so, Unicom will extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

The YK Delta is among the world's largest river deltas, with Bethel being its most populous community. The town of Bethel has a population of 6,500 individuals and lies approximately 68 river miles (mi) up the Kuskokwim River from the Kuskokwim Bay on its northern bank. The other nine communities are geographically isolated throughout the region. No roads connect the towns within the Lower YK Delta or with the rest of the state, and they are only accessible by boat or plane. All 10 communities that the Project proposes to service are home to the Yup'ik, with at least 74 percent of these communities' populations being Alaska Native.

The Project will provide a long-term solution, connecting these 10 underserviced communities within western Alaska with high-speed broadband connectivity. The Project is designed to overcome the region's harsh elements while creating a more efficient and modern way for western Alaska to connect with the rest of the world. The Project is composed of both marine and terrestrial components that have the potential to occur within habitat for Endangered Species Act (ESA) listed species managed by the U.S. Fish and Wildlife Service (USFWS).

This Biological Assessment (BA) has been prepared to address the Project's potential impacts on species listed as threatened or endangered under the ESA and is intended to fulfill the requirements for informal consultation with the USFWS under Section 7 of the ESA. The objective of this BA is to ensure that the Project, as an action authorized by the National Telecommunications and Information Administration (NTIA) and U.S. Army Corps of Engineers (USACE), does not jeopardize the continued existence of an endangered or threatened species, or adversely modify critical habitat of federally listed species.

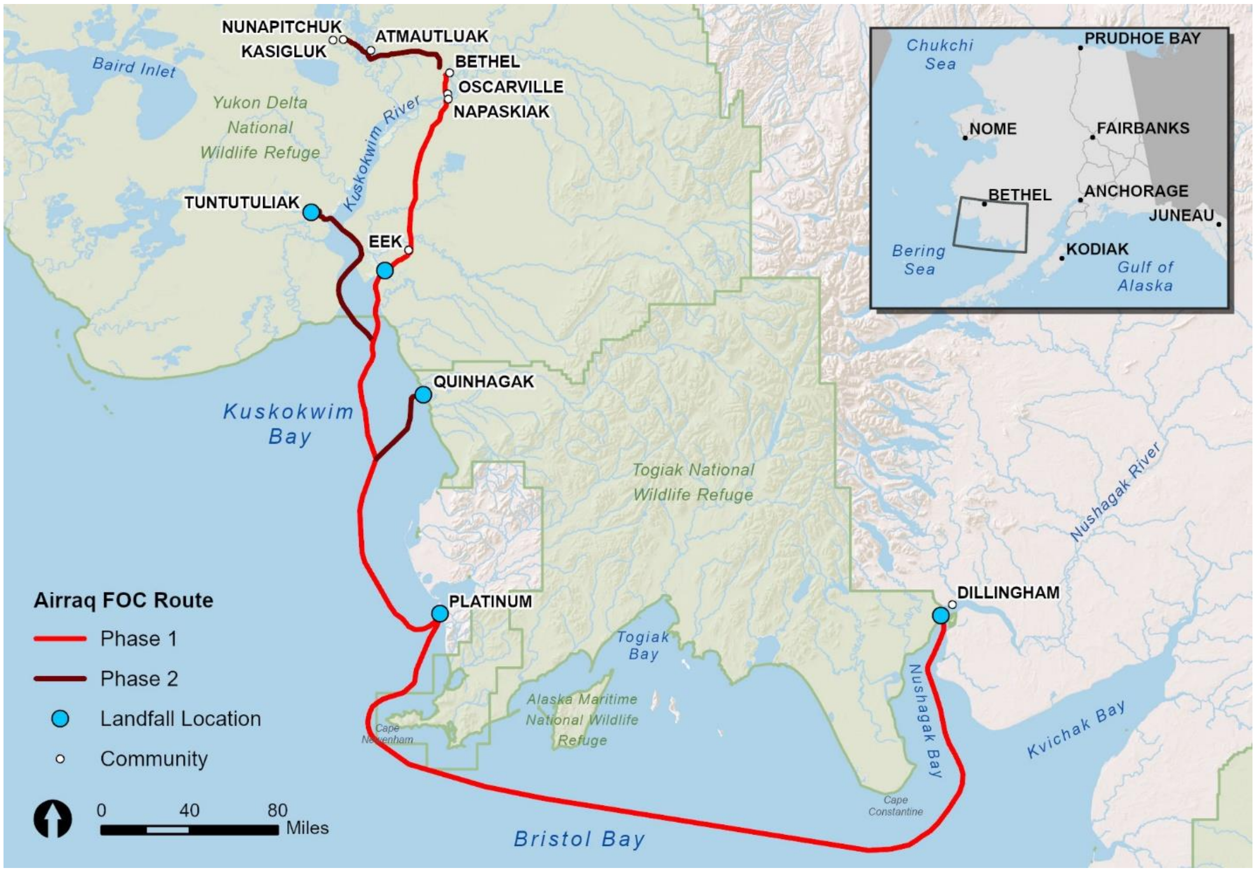
1.1 Background and Consultation History

This BA is the initial request for Section 7 ESA consultation with USFWS for this Project. A separate BA has been prepared for Section 7 ESA consultation with the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS).

2 Project Description

The Project will consist of two phases. Figure 2-1 provides an overview of the full Project.

Figure 2-1. Project Vicinity



Phase 1 will combine a 443-mi FOC build and Fiber to the Premise (FTTP) last mile network[1] upgrades within five communities: Platinum, Eek, Napaskiak, Oscarville, and Bethel. For the construction of Phase 1, Unicom has partnered with Bethel Native Corporation, which has been awarded a $42 million grant from the NTIA Tribal Broadband Connectivity Program.

Using a middle mile network[2], Unicom will interconnect with an FOC and microwave network within Dillingham to begin the Project. Phase 1 has an extensive marine component, extending FOC along the ocean floor from existing Unicom facilities within Dillingham to Platinum. This segment will be a 24-strand submarine FOC with a cable landing for signal regeneration in Platinum. From Platinum, the cable will continue along the marine route, paralleling the Kuskokwim Bay shoreline until it reaches a landfall location within the Eek River, immediately upstream of its confluence with the Kuskokwim River. This will begin the overland route to Eek. From Eek, the FOC route will continue the overland route to Napaskiak, where it will cross the

[1] Last mile network refers to any broadband infrastructure that connects directly to an end-user location.
[2] Middle mile network refers to any broadband infrastructure that does not connect directly to an end-user location.

Kuskokwim River to Oscarville and end within Bethel. The Project will also establish a second FOC delivery technology, FTTP, within connected communities. FTTP local network access will provide high-speed broadband access to residences and businesses within the communities of Platinum, Eek, Napaskiak, and Oscarville. The existing hybrid fiber-coaxial access networks within Bethel will be upgraded to help facilitate broadband distribution within the community.

Phase 2 will include installation of 105 mi of FOC, which will be interconnected with Phase 1 by combining middle mile network transport segments and FTTP installation in five additional communities: Quinhagak, Tuntutuliak, Atmautluak, Kasigluk, and Nunapitchuk. This portion of the Project has been awarded federal grant funding from the U.S. Department of Agriculture through the Rural Utilities Service ReConnect Grant.

Phase 2 will build off the Phase 1 FOC route with both terrestrial and submarine components. Cable branching units (BU) originating from the Phase 1 FOC will connect the marine route within Kuskokwim Bay to the communities of Quinhagak and Tuntutuliak. A separate overland route will connect FOC from Bethel to Atmautluak and on to Nunapitchuk before it terminates in Kasigluk. Each community in Phase 2 will construct a FTTP network to bring high-speed broadband to the community.

Project activities include the following components:

- **Landfall Route:** This route involves installation of broadband submarine FOC at landfall locations between mean low water (MLW) and beach manhole (BMH) locations. BMHs are excavated manholes that provide connection points between submarine cable and either lightweight submarine or terrestrial cable. Landfall components between MLW and BMH locations are trenched.
- **Marine Route:** This route involves installation of broadband submarine FOC within marine environments below MLW, including segments extending from Kuskokwim Bay to Apogak and Tuntutuliak landfall locations. These segments are either trenched or laid on the seafloor.
- **Overland Route:** This route involves installation of broadband FOC along terrestrial landscapes, including wetlands, inland lakes, and stream crossings. Lightweight submarine cables will be used where crossing wetlands, and armored submarine cable will be used when crossing rivers. Each overland route segment will terminate at Connection Vaults (CV). CVs facilitate the splice between overland and terrestrial cable prior to connection with prefabricated Cable Landing Stations (CLSs) or existing utility poles.
- **Community Shore Route:** This route is the terrestrial FOC segment that connects BMHs or CVs with CLSs. CLSs house the infrastructure needed to convert incoming terrestrial cable to FTTP cable.
- **FTTP Route:** This route will bring cable from the CLSs, either trenched or attached to existing utility poles, to residential and commercial users. This segment will terminate the FOC route within each community.

Table 2-1 provides a Project summary. For the purposes of this BA, Phases 1 and 2 will be evaluated as a single Project.

Table 2-1. Project Summary

Project Component	Phase 1 Total Length (mi)	Phase 2 Total Length (mi)	Project Total Length (mi)	Phase 1 Associated Facilities	Phase 2 Associated facilities
Marine (below MLW)	328.4	62.1	390.5	None	None
Landfall (MLW to BMH)	0.7	0.1	0.8	BMH: 3	BMH: 2
Overland	49.2	27.7	76.9	CV: 7	CV:4
Community Shore Routes	1.2	0.4	2.0	CLS: 6	CLS: 5
FTTP	63.1	15.1	78.2	None	None
Total	**442.6**	**105.4**	**548.0**	**—**	**—**

2.1 Construction

The following sections describe the construction methods and equipment used for the Landfall Route, Marine Route, Overland Route, Community Shore Route, and FTTP. Unicom anticipates initiating terrestrial construction activities in fall 2023, conducting marine construction activities in 2024, and completing the Project in 2026. The anticipated construction schedule is provided in Section 2.2.

2.1.1 Landfall Locations

This section describes operations that occur between MLW and each landfall BMH. Landfall construction will occur concurrently with marine construction. Table 2-2 provides each Project landfall location.

Table 2-2. Project Landfall Locations

Landfall Location	Latitude (NAD 83)	Longitude (NAD 83)
Dillingham	59.003510°	-158.535688°
Platinum	59.010177°	-161.821189°
Apogak (Eek)	60.148601°	-162.183601°
Quinhagak	59.742126°	-161.929299°
Tuntutuliak	60.338149°	-162.662662°

Note: NAD 83 = North American Datum of 1983

At each landfall, the cable will be trenched within the shoreline between MLW and the BMH. A BMH is an enclosed structure that houses the splice between the incoming submarine cable and outgoing lightweight submarine or terrestrial cable that will connect to existing Unicom facilities. Each BMH will measure 3 ft by 4 ft by 4 ft, or 48 cubic ft (ft^3). Excavation dimensions may vary by shoreline, bank contour, and substrate but will not exceed 5 ft by 5 ft by 5 ft, or 125 ft^3. BMHs are positioned above the high tide line (HTL). Landfall trenching will be conducted with either a rock saw or backhoe. Rock saw trenches are typically 6 inches wide and 8 inches deep, while backhoe trenches are 3 feet (ft) wide and 3 ft deep. Excavated material from trench construction and excavation will be side cast temporarily (i.e., for less than 1 week) into wetlands and underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable.

While conducting landfall construction, care will be taken to protect the shoreline from future erosion. Additionally, best practices will be employed to address stormwater runoff concerns.

For all intertidal work (MLW to HTL), construction operations will occur only during low tide. When not constructing on shorelines with firm sediments such as large boulders, heavy equipment will be placed on mats to protect the substrate from slumping and erosion. Alterations to shorelines will be temporary.

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
- Landing craft similar to the marine vessel *Unalaq*

2.1.2 Marine Route

Marine portions of the Project route include cable-laying operations in waters below MLW. Both phases of the Project have marine components. Phase 1 will construct the primary marine cable route, while Phase 2 will build off Phase 1 with two BUs.

The path chosen for the marine routes were identified through desktop studies and a marine route benthic survey. These engineering and field practices assist in selecting routes that provide considerations for environmental and anthropogenic forms of disturbance on the cable system that may lead to cable fault. The International Cable Protection Committee has identified fishing activities as the primary cause for submarine cable faults and repairs. As such, the proposed route avoids high-impact fishing grounds where possible. When ground fishing areas cannot be avoided, the cable will be buried. Nearshore 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/turbid currents, and other geological hazards.

The marine route will rely on four or more vessels for construction operations. The vessel used for cable-laying operations will be dependent on local water depth, location, and cable-laying method. A cable ship (Figure 2-2) will be used for cable-laying operations within areas of the marine route with water depths exceeding 40 ft and will rely on dynamic positioning. Project elements in waters shallower than 40 ft will be conducted using either a tug and barge, a small landing craft stored on the cable ship, or a separate operation using an Alaska Vessel of Opportunity. Additionally, landfall locations will be assisted by a landing craft similar to the marine vessel *Unalaq*. These vessels will have a shallow draft, making shallow waters and landings accessible feasible. Segments of the cable routed into the Kuskokwim River will be laid with a cable-laying barge and tug when they reach a depth of 40 ft within Kuskokwim Bay. Tug and barge operations will continue for these segments until they reach a landfall location within

tributaries of the Kuskokwim River. The tug and barge will lay lightweight submarine cable while all other marine portions of the route will use either a single armor or double armor submarine cable. The submarine cable, measuring 1 inch in diameter, is constructed from benign materials and will not carry an electrical current.

Figure 2-2. *C.S. IT Intrepid*, Typical Cable Laying Ship

For marine components, the cable will either be laid on top of the seafloor or buried within a trench (i.e., trenching). Cable will be laid on the seafloor within areas identified as low risk to cable disturbance or when traversing seafloor substrates that do not allow for trenching. When placing cable on the seafloor, bathymetric conditions will 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, trenching will be used where there is significant risk of outside disturbance to the cable. Local reroutes or cable armoring will be implemented in high risk areas where the substrate does not allow for trenching.

Prior to trenching operations on the seabed, a pre-lay grapnel run (PLGR) will be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation will 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 along the route over the seabed. Any debris recovered by the grapnel will be discharged ashore upon completion of the operations and disposed in accordance with local regulations. If debris cannot be recovered, then a local re-route will be planned to avoid the debris. The PLGR operation will be conducted to industry standards employing towed grapnels, and the type of grapnel will be determined by the nature of the seabed.

Trench burial within waters deeper than 40 ft will be conducted using a cable plow. Trenching within deep sea segments will protect the FOC against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow

will be pulled along the seafloor by a tow wire connected to the cable ship. The cable will 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 will exit the lower aft end of the share blade, and the sediments will immediately collapse on top of the cable, behind the plow. This form of burial will eliminate side cast because the excavated substrate will be returned to the trench immediately after the cable is laid. As a result of the immediate burial, absence of side cast, and narrow excavation footprint, cable plow trenching incurs only minimal and temporary impacts.

In waters shallower than 40 ft, trenching will take place in areas where cable protection from other environmental conditions, such as surf action and ice scour, are needed. At these depths, 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 water used for jetting will be supplied from the surface by high pressure hoses. This system will allow for jetting pressure and flow rates to be manipulated based on local conditions. The pressurized water will be focused on the seafloor, liquifying the substrate. The cable will then sink within the trench without side cast. The elimination of side cast and narrow excavation footprint results in limited and temporary impacts. The jet sled will be accompanied by divers who will monitor trenching performance and assist in operations. Figure 2-3 shows a typical jet sled.

Figure 2-3. Typical Jet Sled

Phase 1 marine portions of the Project include sections of the route between the Dillingham MLW and Platinum MLW, followed by an additional segment between the Platinum MLW and MLW at the Apogak Landfall site. To reach that landing site, the cable will be routed up the Kuskokwim River and into the Eek River. The cable will be surface laid across the riverine areas so sediment transport can passively bury the cable.

Marine elements of Phase 2 consist of two BUs extending from the Phase 1 marine route. One of the BUs will supply submarine cable to Quinhagak, while the other will connect to Tuntutuliak. To reach Tuntutuliak, the cable will enter the Kuskokwim River and travel up the Kinak River. The cable will be surface laid within the thalweg of these two rivers. Sediment transport is

anticipated to self-bury the cable within the substrate. The marine portion of the BU will terminate when it reaches Tuntutuliak, above tidal influence at ordinary high water (OHW). The nearshore construction methods used at MLW at the other locations will be used at OHW adjacent to Tuntutuliak.

Upon completion of cable laying operations, a post-lay inspection and burial will be conducted using a ROVJET 207, or similar remotely operated vehicle (ROV). The purpose of the post-lay inspection and burial is to inspect portions of the cable ship route where laying operations may have encountered difficulties. These difficulties include plow failure, unplanned cable repair, uncontrolled cable payout, or other unplanned events. Where burial corrections need to be made, the ROV will use jet burial, similar to that of the jet sled, and trench the cable. The ROV will be operated remotely from the cable-laying ship; pulsed sounds will be generated from the ROV, and cameras will be used for positioning and orientation.

2.1.3 Overland Route Operations

The overland route is defined as segments of the FOC route that both begin and terminate within a BMH or CV. The overland route between Bethel and Oscarville will use pre-existing riser poles and other infrastructure; therefore, it will incur no additional surface impacts. The overland route between Nunapitchuk and Kasigluk will be conducted on existing infrastructure and will not result in surface impacts.

Inland communities not collocated with a marine landfall location will use a CV in lieu of a BMH. CVs house the splice between incoming lightweight submarine cable and outgoing terrestrial cable. Excavation dimensions and considerations for BMHs will be the same for CVs.

Overland route segments will be installed in the winter months, when the substrate is frozen, to minimize ground disturbance. The frozen ground helps protect vegetation while also being stable enough to support heavy equipment. Wetland segments will use a lightweight submarine cable provided in 20,000-foot segment spools that are towed by light tracked vehicles.

When crossing overland sections, the cable will either be laid across the ground surface or trenched. Placing the cable directly on the ground significantly reduces wetland impacts and is, therefore, the preferred installation method. The cable will be 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 riser 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 trenching activities will be conducted by a rock saw. Overland routes will be made between the locations shown in Table 2-3.

Table 2-3. Overland Route Surface Impacts

FOC Route Segment	Cable Surface Laid on Uplands (mi)	Cable Trenched in Uplands (mi)	Cable Surface Laid on Wetlands and Waterbodies (mi)	Cable Trenched in Wetlands (mi)	Cable Attached to Existing Aerials (mi)
Apogak BMH to Eek Village South CV	—	—	6.8	0.5	—
Eek Village North CV to Napaskiak CV	—	<0.1	34.9	1.3	—
Napaskiak CV to Oscarville CV	—	<0.1	0.9	0.1	—
Oscarville CV to Bethel South CV	—	—	—	—	4.7
Bethel CV to Atmautluak East CV	—	<0.1	19.7	0.6	—
Atmautluak West CV to Nunapitchuk CV	—	—	6.7	0.2	—
Nunapitchuk CV to Kasigluk CV	—	—	—	—	—
Quinhagak BMH to Quinhagak CV	—	—	—	0.5	—
Project Total	**—**	**<0.1**	**69.0**	**3.2**	**4.7**

The process of laying cable within wetlands will begin by removing deep snow from the cable route. Buried cable segments through wetlands will then be excavated and the cable laid directly within the trench. Side cast from trenching into wetlands will be underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable, and will be replaced when feasible (i.e., within less than 1 week). Trench depth will be targeted at 8 inches but will vary with the terrain. However, trench depth will always be contained within the organic vegetation mat, which balances allowing the trench to heal while providing sufficient protections for the cable.

When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface that will allow it to passively drop into the waterbody during spring break-up. When the cable sinks into the water body, the weight of the cable will allow it to self-bury within aquatic bed sediments. Submarine cable will be used to cross streams and rivers. The cable will be spliced with the overland route cable and buried into each stream bank below OHW. Best management practices will be used to avoid bank erosion and create drainage paths. Side cast will be replaced after the cable is laid (i.e., within less than 1 week).

Segments crossing major rivers (i.e., Pikmiktalik and Johnson Rivers) will use a landing craft to lay double armored submarine cable across the river. Sediment transport will passively bury the cable. Additionally, the cable will be equipped with an outer plastic covering to avoid frazil ice buildup. Care will be taken to position the crossings on stable banks to provide erosion protection.

During construction, heavy equipment will be placed on geotextile mats. The position of the laid cable will be recorded with a survey quality Global Positioning System. Post-lay inspection for terrestrial components will be conducted following snow and ice melt. Any cable left suspended after melt will be repositioned so as not to be hazardous for humans or animals. Cable

repositioning will be done manually by moving the installed slack cable accordingly. If needed, the cable can be pinned to the ground using small duckbill anchors that will be installed using a hammer and drive pin. Cable left on the vegetation will both sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Helicopter and walking inspections will be conducted on an annual basis to monitor erosion and bank failure.

In general, equipment used across overland routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Rock saw
- Chain trencher or cable plow (optional)
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Winch or turning sheave
- Small utility boat for larger rivers
- Splicing equipment, small genset, and splicing tent

2.1.4 Community Shore Routes

Community shore routes include segments of FOC between each community's BMH or CV and the CLS. The BMHs and CVs located adjacent to communities will house the splice between overland or marine route cable and terrestrial cable. The terrestrial cable will extend beyond these splicing houses to a CLS.

All cable segments within community shore routes will be trenched or attached to existing electrical distribution poles. Trenching will be excavated using backhoes and conventional trenching methods. When possible, the cable will be routed adjacent to existing roads. Excavated material will be temporarily side cast (i.e., for less than 1 week) next to the trench and used to bury the cable. Backhoes and standard trenching techniques will be used to re-grade the BMH or CV footprint as well as all trenched areas to original pre-existing contours. The trenching will employ best management practices to prevent erosion and water discharge.

Where possible, each CLS facility will be constructed adjacent to existing Unicom facilities. CLSs will be built on gravel pads that are 50 ft wide, 60 ft long, and 5 ft deep. Figure 2-4 shows a typical CLS facility.

Figure 2-4. Typical CLS Facility

In general, equipment used for community shore routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.1.5 FTTP

The way fiber is routed to the end user is dependent on what existing infrastructure is in place, if any. FTTP begins at the CLS, which houses the FTTP local access distribution equipment. FTTP is then routed throughout the community, connecting to local nodes, where splitters enable branching into feeder lines that deliver connectivity to the premise locations.

FTTP will be distributed throughout communities by trenching or attaching cable to existing utility poles. Unicom will not construct any new utility poles for the Project but will instead use existing utility poles where they are present. When utility poles are not present, the FTTP route will be trenched. When possible, this will occur along existing roads and rights-of-way. FTTP trenching will be conducted by a backhoe and standard trenching practices.

Upon construction completion, all trenched areas will be re-graded to original pre-existing contours. No excess material is anticipated to be produced that will require disposal.

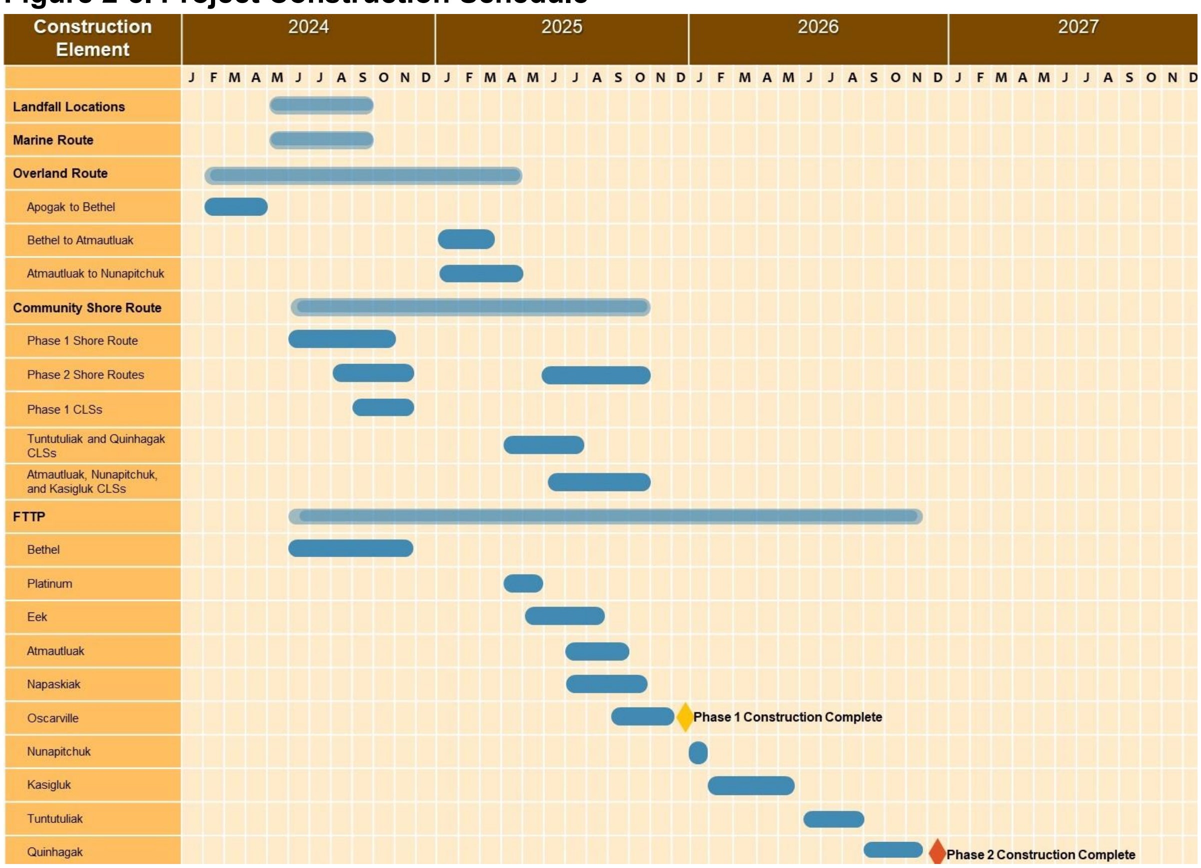
In general, equipment used for FTTP includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

2.2 Schedule

Project construction is anticipated to begin in 2024 and end in 2026 (Figure 2-5). It is anticipated that Phase 1 construction will be completed in winter 2024, and Phase 2 construction will be completed in spring 2026. Project construction schedule elements are detailed in Figure 2-5.

Figure 2-5. Project Construction Schedule



2.3 Avoidance and Minimization Measures

As part of the proposed Project, Unicom has committed to the following measures intended to avoid and minimize adverse impacts on ESA-listed species and their habitat:

- Vessels will be traveling at speeds less than 5 knots during cable laying operations, PLGR, and post-lay inspection and burial.
- Cable routing has been selected to avoid concentration areas where eiders and albatross occur to reduce potential behavioral or disturbance effects.
- The overland cable routes will be laid or trenched in winter, when protected bird species are not present onshore.
- Artificial lighting will be reduced or shielded so it is not projected skyward to reduce attracting birds.
- The cable-laying vessels will not discharge materials into the ocean that may attract seabirds, including short-tailed albatross.
- Bird strikes with vessels will be unlikely since marine cable-laying activities will occur in May through September, when long daylight hours occur.
- Prior to the start of cable-laying operations, Protected Species Observers (PSO) will clear the disturbance zone for a period of 30 minutes when activities have been stopped for longer than a 30-minute period. Clearing the zone means no marine mammals have been observed within the zone for that 30-minute period. If a marine mammal is observed within the zone, activities may not start until it:
    - Is visually observed to have left the zone; or
    - Has not been seen within the zone for 15 minutes in the case of pinnipeds, sea otters (*Enhydra lutris*), and harbor porpoises (*Phocoena phocoena*); or
    - Has not been seen within the zone for 30 minutes in the case of cetaceans.
- Consistent with safe navigation, Project vessels will avoid traveling within 3 nautical miles (nm; 5.6 kilometers [km]) of any of Steller sea lion (*Eumetopias jubatus*) rookeries or major haulouts (to reduce the risks of disturbance of Steller sea lions and collision with protected species).
- If travel within 3 nm (5.6 km) of major rookeries or major haulouts is unavoidable, transiting vessels will reduce speed to 9 knots (16.6 km/hour [hr]) or less while within 3 nm (5.6 km) of those locations. Vessels laying cables are already operating at speeds less than 3 knots (5.6 km/hr).
- The transit route for the vessels will avoid known Steller sea lion biologically important areas and designated critical habitat to the extent practicable. Vessels may not be operated in such a way as to separate members of a group of marine mammals from other members of the group.
- Vessels should take reasonable steps to alert other vessels in the vicinity of whale(s), and report any stranded, dead, or injured listed whale or pinniped to the Alaska Marine Mammal Stranding Hotline at 877-925-7773.
- Although take is not authorized, if a listed marine mammal is taken (e.g., struck by a vessel), it must be reported to NMFS within 24 hours. The following will be included when reporting take of a listed species:

- Number of listed animals taken
- Date, time, and location of the take
- Cause of the take (e.g., vessel strike)
- Time the animal(s) was first observed and last seen
- Mitigation measures implemented prior to and after the animal was taken
- Contact information for PSO, if any, at the time of the collision, ship's pilot at the time of the collision, or ship's captain.

Unicom will train crew members as PSOs on the cable-laying barge and ship to be on watch during all daylight hours when traveling at speeds greater than 5 knots (9.3 km/hr). Crew member PSOs will:

- Be trained in marine mammal identification and behaviors.
- Have no other primary duty than to watch for and report on events related to marine mammals, when observing.
- Work in shifts lasting no longer than 4 hours without breaks, and will not perform duties as a PSO for more than 12 hours in a 24-hour period (to reduce PSO fatigue).
- Have the following to aid in determining the location of observed listed species, take action if listed species enter the exclusion zone, and record these events:
    - Binoculars, range finder, Global Positioning System, and compass
    - Two-way radio communication with construction foreman/superintendent
- PSOs will record all mitigation measures taken to avoid marine mammals observed using NMFS-approved observation forms. Reported actions on sighting reports will include time, location, the vessels position, speed, and corrected bearing.
- Reports will be sent to NMFS at the end of Project activities.

Unicom has also committed to the following measures intended to reduce the potential for spills of hazardous substances and implement plans for spill response:

- All fuel and hazardous substances used by the Project will be handled and stored on site in compliance with state and federal regulatory guidance. All fuels and chemicals will be stored in appropriate primary containment areas. Secondary containment areas will be designed in compliance with all applicable permits and regulations.
- Fuels and other products will be transported to the action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.

3 Action Area

The action area defined by the ESA includes all areas directly or indirectly affected by the proposed action and not merely the immediate area involved in the action (50 Code of Federal Regulations [CFR] 402.02). The action area is based upon the maximum geographic extent of the physical, chemical, and biological effects resulting from the Project, including direct and indirect effects. The action area is defined differently for each Project component and is composed of separate underwater and in-air portions. The Project action area is shown in Figure 3-1.

Underwater sound propagation depends on many factors, including sound speed gradients in water, depth, temperature, salinity, and bottom composition. Additionally, the characteristics of the sound source such as frequency, source level, type of sound, and depth of the source, will also affect propagation. The terms in the spreading loss calculation were rearranged to estimate distances to thresholds:

$$R = D*10^{(TL/TLc)}$$

Where

- Transmission Loss (TL) is the difference between the reference sound level in decibels referenced to a pressure of 1 micro Pascal root mean square (dB re 1 µPa rms) and the harassment threshold in dB re 1 µPa rms;
- TL_c is the transmission loss coefficient;
- R is the estimated distance to where the sound level is equal to the harassment threshold; and
- D is the distance from the sound source at which the reference sound level was measured.

A cable-laying landing craft or barge and tug will be used to install cable in waters 40 ft (12 meters [m]) or shallower within Kuskokwim Bay, the Kuskokwim River, and Kuskokwim River tributaries. The distance to the 160 dB re 1 µPa rms threshold for either vessel was estimated using measurements taken from the tug, *Leo*, pushing a full barge, *Katie II*, near the Port of Alaska and recorded 149 dB re 1 µPa rms at 328 ft (100 m) when the tug was using its thrusters to maneuver the barge during docking. Assuming spherical spreading transmission loss (20 log), the distance to which noise will attenuate to ambient is calculated to be 92 ft (28 m) for the cable-laying landing craft or barge and tug.

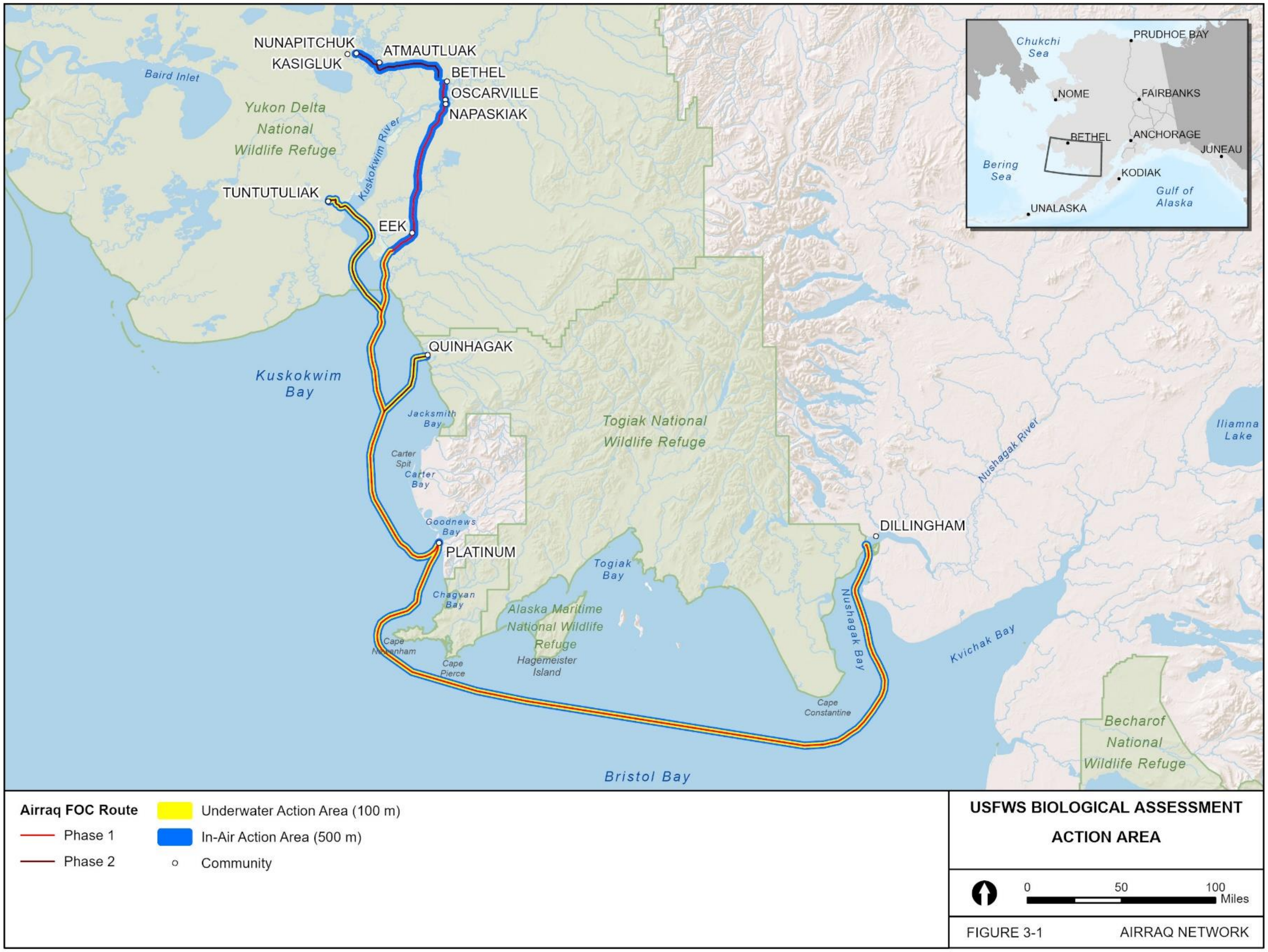
For the cable-laying ship installing cable for all waters except those listed above, the distance to the 160 dB re 1 µPa rms threshold was estimated using measurements taken from a vessel of similar size and class within the Chukchi Sea. In 2011, Statoil conducted geotechnical coring operations within the Chukchi Sea using the vessel *Fugro Synergy*. Measurements were taken using bottom founded recorders at 164 ft (50 m), 328 ft (100 m), and 0.6 mi (1 km) away from the borehole while the vessel used dynamic positioning thrusters. Sound levels measured at the recorder 0.6 mi (1 km) away ranged from 119 dB re 1 µPa rms to 127 dB re 1 µPa rms, with most acoustic energy in the 110 to 140 hertz (Hz) range (Warner and McCrodan 2011). A sound

propagation curve equation fit to the data and encompassing 90 percent of all measured values during the period of strongest sound emissions provided an estimate that sound levels will drop below 160 dB re 1 µPa rms at 20 ft (6 m).

The underwater portion of the action area is defined as the cable route plus a buffer of 328 ft (100 m) on each side of the route. This distance is conservative and, therefore, larger than the calculated distance to the potential acoustic harrassment disturbance threshold. This same rationale was used to inform tug and barge cable-laying operations within the shallow waters of Unalaska, Akutan, King Cove, Sand Point, Chignik Bay, and Larsen Bay for the Unicom AU-Aleutian Fiber Optic Cable Installation Project (USFWS Consultation #07CAAN00-2021-I-0196).

The in-air portion of the action area applies to the marine and terrestrial cable-laying route. This area is a 1,640-ft (500-m) buffer of the marine and terrestrial cable-laying route, and is the potential disturbance area due to the presence of the cable-laying vessel and terrestrial cable-laying equipment (Figure 3-1). This distance was used for the potential disturbance area from the presence of the vessel for the Unicom AU-Aleutian Fiber Optic Cable Installation Project (USFWS Consultation #07CAAN00-2021-I-0196).

Figure 3-1. Project Action Area



4 Species Descriptions

A list of ESA-listed species or populations that may be present within or near the action area was requested and received from the USFWS on February 2, 2023 (Appendix A). Species listed under the ESA that are known or suspected to occur within the action area include Steller's eider (*Polysticta stelleri*), spectacled eider (*Somateria fischeri*), short-tailed albatross (*Phoebastria albatrus*), and the Southwest Alaska Distinct Population Segment (DPS) of northern sea otter (*Enhydra lutris kenyoni*). No designated critical habitat for any of these species is located within the action area.

A summary of the existing biological information for each species is presented below, including distribution and life history, species status, presence within the action area, and critical habitat.

4.1 Steller's Eider

4.1.1 Distribution and Life History

The Steller's eider (*Polysticta stelleri*) is a sea duck and the smallest eider species, with behavioral and physical traits similar to dabbling duck species. Three breeding populations of Steller's eiders exist in the world, two of which occur within Arctic Russia, one within Alaska (USFWS 2021a). Nearly all Steller's eiders breed in eastern Russia and may number more than 128,000 individuals (ADF&G 2022, Hodges and Eldridge 2001).

Steller's eiders breed along the Arctic coast of Russia from the Yamal Peninsula to the Kolyma Delta and along the Arctic Coastal Plain of Alaska, primarily near Utqiaġvik, with a very small subpopulation also breeding on the Yukon- Kuskokwim Delta (Amundson et al. 2019, BirdLife International 2017, USFWS 2002, USFWS 2019b). Birds typically arrive to the breeding grounds by late May to June and depart in August (Fredrickson 2020, Kondratiev 1997). Eggs hatch in late June. Males typically depart from the breeding grounds beginning in late June or early July. Females that fail in their breeding attempts may remain in the Utqiaġvik area into late summer. Females and fledged young depart the breeding grounds in early to mid-September. In Alaska, Steller's eider nests on tundra habitats often associated with polygonal ground both near the coast and at inland locations (e.g., Quakenbush et al. 2004); nests have been found as far as 56 mi (90 km) inland (USFWS 2002). Emergent species of Carex and Arctophila provide important areas for feeding and cover.

After breeding, Steller's eiders move to marine waters to molt. Molting occurs throughout Southwest Alaska but is concentrated at four areas along the northern side of the Alaska Peninsula (USFWS 2002). Thousands of this species also use the Kuskokwim Shoals to molt (Martin et al. 2015, USFWS 2001a). Fall migration surveys conducted by the Bureau of Land Management have also recorded small numbers of Steller's eiders in mixed-species flocks within Carter Bay, the waters off Carter Spit, and Jacksmith Bay, to the southeast of the Kuskokwim Shoals (Seppi 1997). Individuals have also been recorded molting at St. Lawrence and Nunivak Islands, as well as along the coast of Bristol Bay (Martin et al. 2015). The estuaries and lagoons along the Alaska Peninsula are also used by this species for staging during fall migration.

The molting period occurs from approximately late July to late October (USFWS 2002). Molting areas are near breeding areas and tend to be shallow areas with eelgrass (*Zostera marina*) beds, intertidal sand flats, and mudflats (USFWS 2002). In these areas, Steller's eiders feed on marine invertebrates such as crustaceans and mollusks (e.g., Petersen 1980, 1981).

From approximately November through April, many Steller's eiders winter within the shallow, nearshore waters along the northern side of the Alaska Peninsula; however, many also disperse to the southern side of the Alaska Peninsula; the Aleutian Islands; and the western Gulf of Alaska, including Kodiak Island and Lower Cook Inlet (Martin et al. 2015, USFWS 2002). Steller's eiders, from both Alaska and eastern Russia, migrate to these areas for wintering as well as molting (Rosenberg et al. 2016). Wintering habitat includes shallow lagoons with extensive mudflats typically less than 30 ft (10 m) deep; however, satellite-tracked birds were found to frequently use deep bays and water up to 98 ft (30 m) almost exclusively at night (Fredrickson 2001; Martin et al. 2015). During winter months, this species feeds on marine invertebrates such as crustaceans, small mollusks, and gastropods that are closely associated with eelgrass, sea lettuce (*Ulva*), and brown seaweed (*Fucus)* habitat (Frederickson 2020).

Spring migration begins approximately mid to late April and typically continues into June (Fredrickson 2020). Most of the worldwide population of Steller's eider stage and migrate along the northern side of the Alaska Peninsula (Larned 2008, USFWS 2001a). They then cross western Bristol Bay and spend days to weeks staging in northern Kuskokwim Bay and small bays along its perimeter (Larned 2008, Rosenberg et al. 2016, USFWS 2001a). During this time, flocks of this species, numbering in the tens of thousands, congregate within the Kuskokwim Shoals, an extremely important staging area, prior to flying northward (USFWS 2001a). Some will also stage southeast of the Kuskokwim Shoals at Chagvan Bay, at Goodnews Bay, and within the waters offshore from Goodnews Bay northward to Jacksmith Bay (ADF&G 2020a, National Audubon Society 2023, Rosenberg et al. 2016). Flocks have also been recorded nearby within Carter Bay, the waters off Carter Spit, and Jacksmith Bay (ADF&G 2020a, Seppi 1997). Flocks of staging eiders also use the southern coast of Nunivak Island during spring migration (Larned et al. 1994, as cited in USFWS 2001a). Migrating eiders then travel northward through the Bering Strait between approximately mid-May to early June (Bailey 1943 and Kessel 1989, as cited in USFWS 2001a). Some subadults may stay behind within their wintering or migration route locations (USFWS 2001a). Staging eiders typically feed and rest within and near lagoons and shoals rich in benthic invertebrate prey and generally less than 33 ft (10 m) in depth (Larned 2012, USFWS 2002).

During the breeding season, non-breeding individuals have been documented using the nearshore waters within the Gulf of Anadyr and Amguema River (both in Russia), as well as the Kuskokwim Shoals in the eastern Bering Sea of Alaska and Hagemeister Island in northern Bristol Bay (Rosenberg et al. 2016). Non-breeding birds were found to stay for approximately 57 days on average (Rosenberg et al. 2016).

4.1.2 Species Status

The Alaska-breeding population of Steller's eider is currently listed as **threatened** under the ESA (USFWS 2022a) and was first listed in July 1997 due to the reduced number of breeding birds and suspected reduction in the breeding range in Alaska (USFWS 1997, 2019a). The

estimates of the breeding population within Alaska averaged 4,800 pairs between 1990 and 1998 (Fredrickson 2001) but is now thought to number less than 500 individuals (USFWS 2011, Stehn et al. 2013). The worldwide population of Steller's eider is thought to number approximately 130,000 to 150,000 individuals (BirdLife International 2022). Threats to the Alaska-breeding population include ingestion of lead, shooting, collisions with human structures, human disturbance in nesting areas, nest predation, and changes to the ecological community (USFWS 2021a).

4.1.3 Presence within Action Area

The Steller's eider's range overlaps with the action area (USFWS 2022b; Figure 4-1).

The in-air portion of the action area overlaps with Goodnews Bay, near the Platinum BMH. Aerial surveys conducted by USFWS from 1992 to 2012 have recorded concentrations of Steller's eiders numbering in the hundreds to thousands at Goodnews Bay during spring and summer (ADF&G 2020a, Larned 2012). Individuals staging at Goodnews Bay have been shown to stay within the area between mid-April and mid-May for approximately 8 days on average (Rosenberg et al. 2016).

Additionally, large congregations of Steller's eiders, numbering in the hundreds to thousands, have been observed in waters east of the action area, off Carter Spit northward to Jacksmith Bay (ADF&G 2020a, National Audubon Society 2023, Seppi 1997). Though records do not indicate how far offshore they tend to use this area, migrating and staging eiders are known to primarily use shallow waters less than 30 ft (10 m) in depth (Larned 2012). Coarse-scale bathymetry data (USGS 2018) indicate that the action area in this location will be in waters deeper than 49 ft (15 m); these data correlate with coarse-scale ADF&G (2020a) Steller's eider occurrence data, which indicate they are typically found closer to shore and outside the action area. During fall migration, small numbers of eiders in mixed flocks have been documented east of the action area, north of Goodnews Bay (Seppi 1997).

Steller's eiders have been recorded near Kuskokwim and Bristol Bays, but outside the action area. Birds have been recorded using Chagvan Bay, the waters off Cape Peirce, and the Kuskokwim Shoals critical habitat unit during spring and summer months (ADF&G 2020a). Non-breeding eiders have also been documented within the nearshore waters close to Hagemeister Island within Bristol Bay during summer months (Rosenberg et al. 2016), approximately 11 mi (18 km) north of the action area.

4.1.4 Critical Habitat

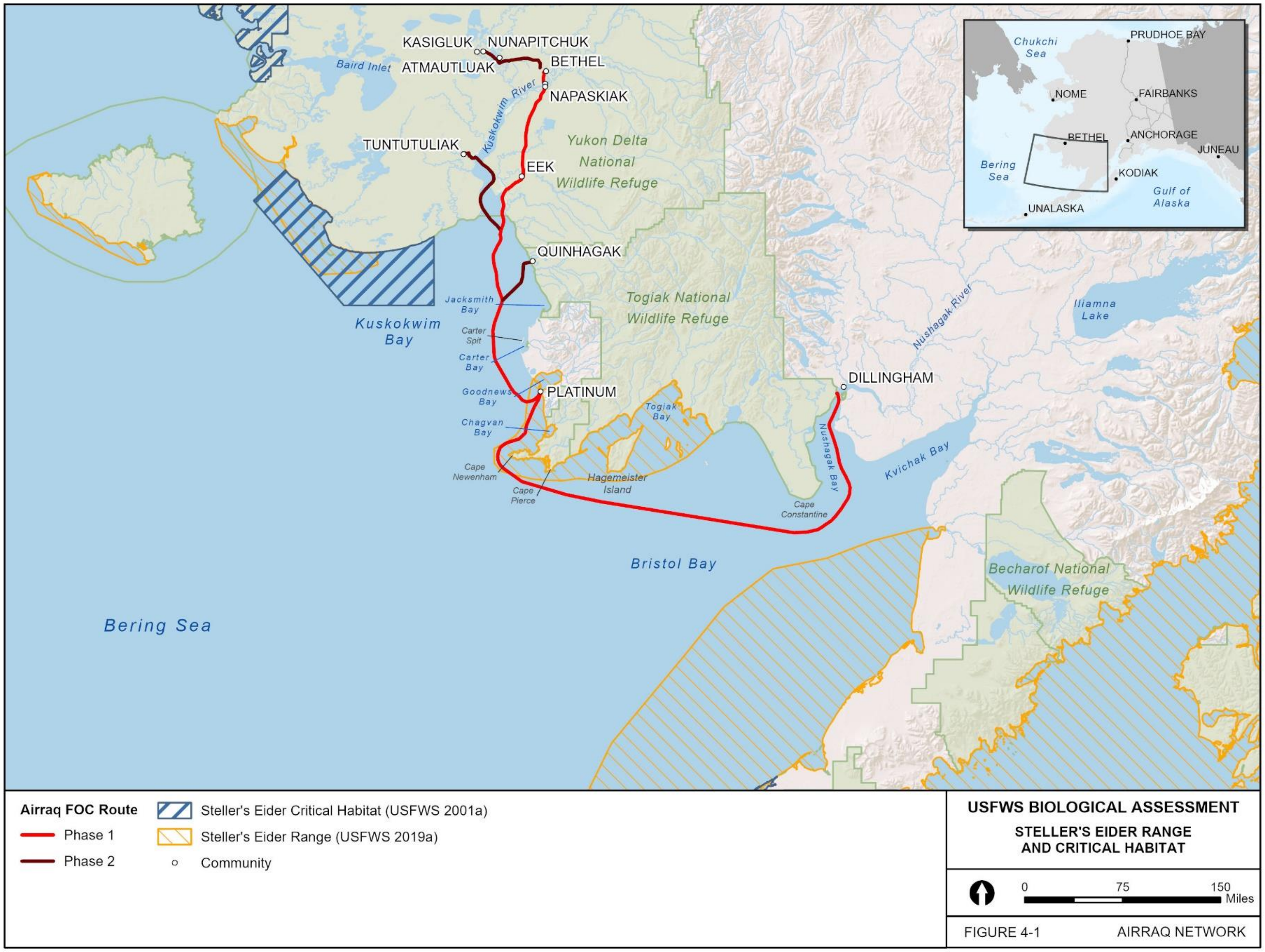
The final designation of critical habitat for the Steller's eider was issued in 2001 (USFWS 2001a). The USFWS has established Steller's eider critical habitat at the Seal Island, Nelson Lagoon, and Izembek Lagoon units on the Alaska Peninsula as well as the YK Delta nesting area and Kuskokwim Shoals unit in Southwest Alaska (USFWS 2001a; Figure 4-1). These areas were designated as critical habitat as they are used by large numbers of this species during breeding, molting, wintering, or staging for spring migration (USFWS 2002).

The YK Delta nesting area, Seal Island, Nelson Lagoon, and Izembek Lagoon units are well removed from the action area and will not be considered further. The Kuskokwim Shoals is the

only designated Steller's eider critical habitat located near the Project; however, this unit is more than 19 mi (30 km) west of the Project and outside the action area.

The Kuskokwim Shoals Steller's eider critical habitat unit covers part of northern Kuskokwim Bay from the mouth of the Kolavinarak River to near the village of Kwigillingok and extends approximately 11 to 24 mi (17 to 38 km) offshore. Approximately 1,472 square mi (mi^2; 3,813 square km [km^2]) of marine waters and approximately 115 mi (184 km) of shoreline (including the shoreline of barrier islands) are included within this unit (USFWS 2001a).

Figure 4-1. Steller's Eider Range and Critical Habitat



4.2 Spectacled Eider

4.2.1 Distribution and Life History

The spectacled eider (*Somateria fischeri*) is a large sea duck ranging from 20 to 22 inches (51 to 56 centimeters) long. They spend most of their life at sea (Peterson et al. 2020), where they forage on benthic prey by diving as well as dabbling on the surface (ADF&G 2022). In total, males spend approximately 11 months per year at sea, while females spend approximately 8 to 9 months; nonbreeding subadults are thought to remain at sea until they are 2 to 3 years old (Peterson et al. 2020).

Three distinct coastal breeding populations of spectacled eiders exist, one in Russia and two in Alaska. The Russia breeding population is much larger than the two Alaska breeding populations combined (Peterson et al. 2020). All populations winter in large, single-species flocks within the Bering Sea, south of St. Lawrence Island, using polynyas (i.e., large areas of open water surrounded by sea ice) and leads (i.e., linear areas of open water surrounded by sea ice) (Peterson et al.1999). The species only spends a few months each year on land, during the breeding season, and remains within the Bering Sea the rest of the year (Petersen et al. 2000, as cited in Flint et al. 2016).

In Alaska, spectacled eiders breed along the coast of the Arctic Coastal Plain and on the YK Delta in the western part of the state (Dau and Kistchinski 1977, Flint et al. 2016). Established pairs migrate together to their nesting grounds between May and June, generally within 12 mi (20 km) of the coast (Peterson et al. 2020, USFWS 2010a). Breeding generally lasts 4 to 5 days, and nests are built on the day the first egg is laid. The average time between arrival at the breeding grounds and nest initiation for the YK Delta population is estimated at 7.2 days (Dau 1974).

Females lay one egg per day for a clutch of three to nine oval, olive-green eggs at nest sites on tundra islands and peninsulas (ADF&G 2022, USFWS 2010a). Eggs are incubated for 24 to 28 days, and young fledge in late August (USFWS 2010a). Within a few weeks after arriving at the breeding grounds, males fly back to sea to undergo molt and will remain at sea for the rest of the year; females will remain with their young until fall migration (Peterson et al. 2020). While on land during the nesting season, they forage in ponds by diving as well as dabbling for aquatic insects, crustaceans, mollusks, and vegetation, but will also feed on arachnids, seeds, and berries (ADF&G 2022, BirdLife International 2022, Peterson et al. 2020).

During nesting, spectacled eiders disperse throughout much of their range, though they are considered semicolonial at some locations (Peterson et al. 2020). Annual surveys conducted since 1985 to assess the population status for the YK Delta breeding population have been focused on the coastal tundra habitats surrounding Hazen Bay, which is considered their core nesting area within this region (Fischer and Stehn 2015).

Following the breeding season, spectacled eiders migrate offshore along the Beaufort, Chukchi, and Bering Sea coasts to molt in the bays and other coastal areas of these waters, prior to moving to their wintering location within the Bering Sea (Peterson et al. 1999, 2020). Spectacled eiders typically spend the molting period between 1 and 28 mi (2 and 45 km) from shore

(Peterson et al. 2020). During molting, they primarily use Ledyard Bay, Mechigmenskiy Bay (in Russia), Indigirka/Kolyma River deltas (in Russia), Norton Sound, and the waters off eastern St. Lawrence Island (Petersen et al. 1999). Norton Sound is considered the primary molting location for females that breed on the YK Delta (Petersen et al. 1999).

After molting, spectacled eiders primarily winter within the Bering Sea, south of St. Lawrence Island (Peterson et al. 2020). During winter, they typically concentrate in large, dense flocks in openings in the sea ice. While at sea, they will dive down to feed on benthic mollusks and crustaceans in shallow waters (less than 262 ft [80 m] deep) or free-floating amphipods in deeper waters (ADF&G 2022).

From approximately March through May, spectacled eiders congregate in available open leads within the northern Bering Sea, Bering Strait, and Chukchi Sea for spring staging and migration (Dau and Kistchinski 1977), principally staging in Ledyard Bay and eastern Norton Sound (Petersen et al. 1999). During early May, the offshore coastal fringe of the YK Delta contains shore-fast ice connected to broken and drifting ice with open leads in it that are also used by many migrating eiders (Dau and Kistchinski 1977). In the Bering Strait, northern Bering Sea, and southern Chukchi Sea, where the May ice pack is more extensive, the periodic opening and closing of the leads dictate the location and concentration of the spring passage of eiders.

4.2.2 Species Status

The spectacled eider is currently listed as **threatened** under the ESA and was first listed in May 1993 due to the reduced number of breeding birds and reduction in the breeding range within western Alaska (USFWS 1993, 2022c). A 96 percent decline in the breeding population was documented on the YK Delta, which was thought to account for half of the world's breeding population, though the cause for the decline is still unknown. However, several threats have been identified, including lead poisoning and shooting as stressors of high concern; and collisions with human structures, human disturbance in nesting areas, nest predation, and changes to the ecological community as stressors of moderate concern (USFWS 2021a).

Since the species was listed, the YK breeding population has increased, with the population estimated to number more than 12,000 individuals (USFWS 2021b) The population in Russia, which is estimated to contain 90 percent of the breeding population, is numbered at approximately 140,000 individuals (ADF&G 2022, Warnock 2017). The species is estimated to have a worldwide population between 360,000 and 400,000 individuals (BirdLife International 2022, Wetlands International 2022).

4.2.3 Presence within Action Area

The current range of spectacled eider is shown in Figure 4-2. Based on anecdotal information, the historical breeding range for the spectacled eider was estimated to extend along the coastal areas of the YK Delta southward to the coastal areas along Kuskokwim Bay, several miles south of Tuntutuliak, and continuing south to Goodnews Bay (USFWS 1996). However, the YK Delta breeding range was drastically reduced following the species precipitous decline; in 1996, the southern limits of the YK breeding range were estimated to not extend south of roughly Nyctea Hills, approximately 50 mi (80 km) east of Tuntutuliak (USFWS 1996). Annual aerial and ground-based population surveys conducted between 1985 and 2014 by the USFWS have been

focused on the YK Delta coastal zone extending from the northern YK Delta south to areas near Kwigillingok, over 20 mi (32 km) southeast of Tuntutuliak (Fischer et al. 2018, Lewis et al. 2019). Since 2000, USFWS ground-based nesting survey efforts have shifted focus to only include the YK breeding population's "core nesting area," where it is thought that the majority of all pairs on the YK Delta nest (Fischer and Stehn 2015). The core nesting area on the YK Delta includes the coastal habitats surrounding Hazen Bay (Fischer and Stehn 2015) and is located more than 62 mi (100 km) to the northeast, and well outside the action area. The species' Recovery Plan notes that low-density breeding may still occur outside confirmed breeding pair occurrence locations (USFWS 1996); however, spectacled eider nesting within the action area will be extremely rare.

Though no records exist of spectacled eiders nesting within the action area, a record exists of a single individual crossing Kuskokwim Bay then spending a few weeks in Chagvan Bay, on the perimeter of eastern Kuskokwim Bay, during winter 2011 (USGS 2019). However, Chagvan Bay is located approximately 12 mi (20 km) east and well removed from the action area.

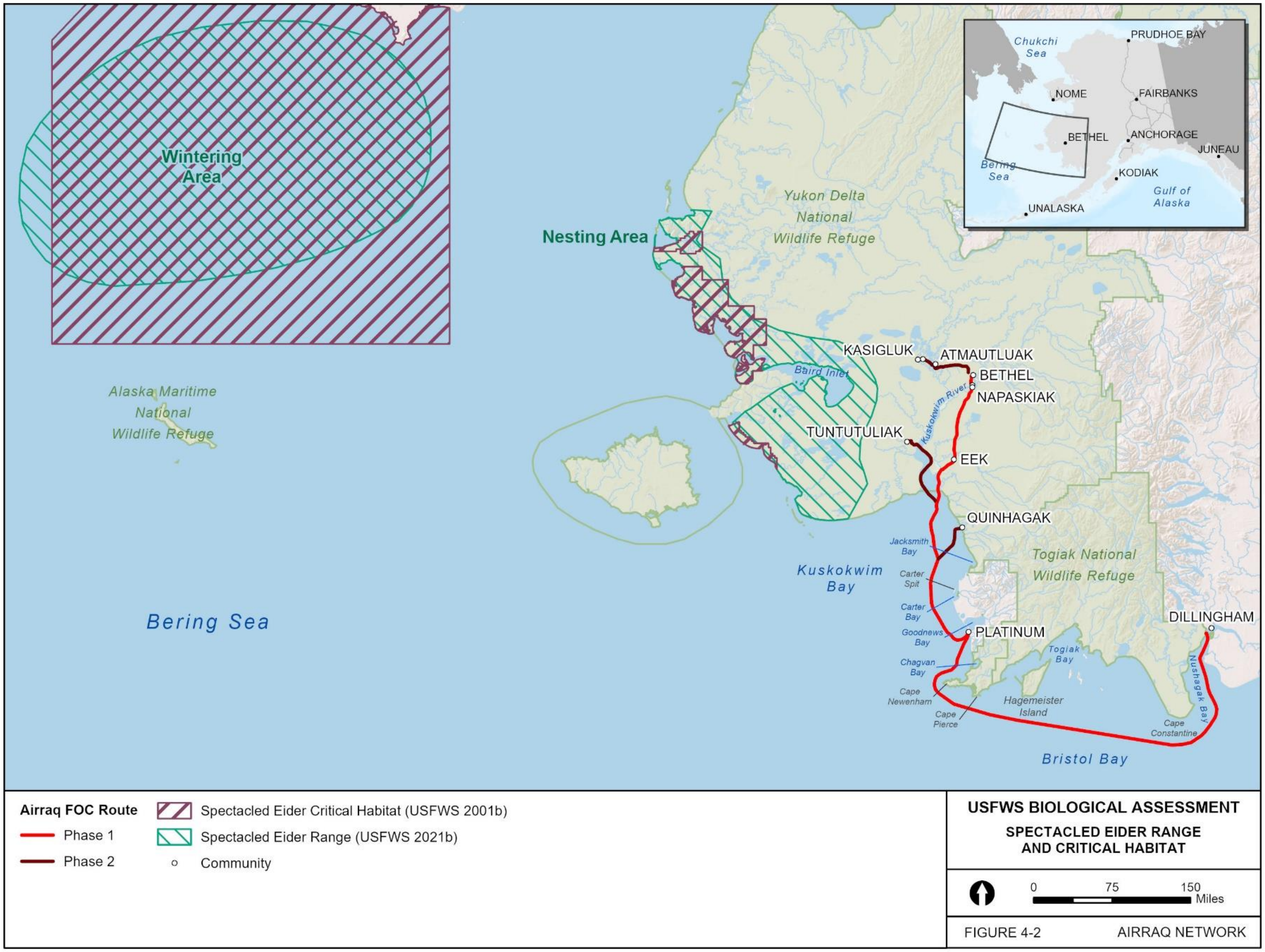
4.2.4 Critical Habitat

The final designation of critical habitat for the spectacled eider was issued in 2001 (USFWS 2001b). The USFWS has established spectacled eider critical habitat within the Central YK Delta, the Southern YK Delta, Norton Sound, Ledyard Bay, and the Wintering Area unit (Figure 4-2). The Project action area is not located within any of these critical habitat units.

The Central YK Delta, the Southern YK Delta, Norton Sound, Ledyard Bay, and the Wintering Area units are well removed from the action area and will not be considered further. The Southern YK Delta unit is approximately 62 mi (100 km) west of the action area. This critical habitat unit covers the vegetated intertidal zone along the coast from Nelson Island south to Chefornak (USFWS 2001b).

As described in Section 4.1.4, critical habitat Primary Constituent Elements (PCE) are those habitat components that are essential for the primary biological needs of feeding, nesting, brood rearing, roosting, molting, migrating, and wintering (USFWS 2001b). The PCEs for the Southern YK Delta unit include the vegetated intertidal zone and all open water inclusions within this zone; the vegetated intertidal zone includes all lands inundated often enough by tidally influenced water that it affects plant growth, habit, or community composition (USFWS 2001b). Areas within the unit boundary that are not within the vegetated intertidal zone (e.g., barren mudflats and lands that are above the highest HTL) are not considered critical habitat; nor are areas with existing human development within the unit (USFWS 2001b).

Figure 4-2. Spectacled Eider Range and Critical Habitat



4.3 Short-tailed Albatross

4.3.1 Distribution and Life History

The short-tailed albatross (*Phoebastria albatrus*) is a large, pelagic seabird with an average wingspan of 7.5 ft (2.3 m) and body length of 3 ft (1 m). They spend most of their life at sea, over the continental shelf edge foraging on squid, shrimp, crustaceans, and fish (USFWS 2008). This species forages either alone or in groups and primarily capture prey at the surface- (USFWS 2022a).

Historically, the species had 14 known breeding colonies within the northwestern Pacific and potentially within the North Atlantic. However, current breeding colonies exist primarily on two small islands within the North Pacific, with 80 to 85 percent of short-tailed albatross nesting on Torishima Island, Japan (USFWS 2008). Most of the remaining population of breeding birds are believed to use the Senkaku Islands; however, nest searches have not occurred since 2002 (USFWS 2022a). China, Japan, and Taiwan all claim ownership of the islands, which are therefore politically difficult to access. There have been early successes in establishing a colony at Mukojima in the Ogasawara (Bonin) Islands, Japan, after translocation efforts from 2008 to 2012; a breeding pair at the Midway Atoll, Hawaii, fledged a chick each in 2011, 2012, and 2014 (Deguchi et al. 2016).

Satellite tagging of breeding adults in 2006 to 2008 and juveniles in 2008 to 2012 provided marine distribution information for the species. Both adult and juvenile short-tailed albatross extensively used areas of the western Pacific east of Japan as well as the waters surrounding the Kuril Islands, Aleutian Islands, and the outer Bering Sea continental shelf (USFWS 2014a). The outer Bering Sea shelf was used most during summer and fall, moving to the northern submarine canyons in late summer and fall (USFWS 2014a). The birds moved south during winter, but continued to use the southeastern Bering Sea, Aleutian Islands, and Gulf of Alaska. Juveniles traveled much more widely throughout the North Pacific than adults, moving through nearly the entirety of the species' range and spending more time within the Sea of Okhotsk, western Bering Sea, transition zone between Hawaii and Alaska, and Arctic regions of the Bering Strait (USFWS 2014a, 2020).

Short-tailed albatross nest on isolated, windswept, offshore islands that have limited human access. Nest sites may be flat or sloped, with sparse or full vegetation. The majority of birds on Torishima Island nest on a steep site with loose volcanic ash; however, a new, growing colony on the island is situated on a gentle, vegetated slope. The vegetation consists of clump-forming grass (*Miscanthus sinensis* var. *condensatus*) that helps stabilize the soil, provides protection from the weather, and acts as a visual barrier between nesting pairs. The limited vegetation allows for safe, open takeoffs and landings (USFWS 2008). Females will lay a single egg in a nest on the ground in October or November, and eggs hatch in late December through early January. The chicks are nearly full grown by late May to early June, and the adults begin to leave the colony, with the chicks heading out to sea soon thereafter. By mid-July, the colony is empty (USFWS 2001c). Non-breeders and failed breeders disperse during late winter through spring (USFWS 2018).

The short-tailed albatross relies on waters of the North Pacific characterized by upwelling and high productivity, in particular regions along the northern edge of the Gulf of Alaska, Aleutian Island chain, and Bering Sea shelf break from the Alaska Peninsula toward St. Matthew Island. Strong tidal currents combined with the abrupt, steep shelf break promote upwelling, and primary production remains high throughout summer within these areas. Tagged adult and subadult birds frequented waters greater than 3,280 ft (1,000 m) deep more than 70 percent of the time, and juveniles spent approximately 80 percent of their time within these shallower waters (USFWS 2008). Adults spent less than 20 percent of their time over waters exceeding 9,842 ft (3,000 m) deep (USFWS 2008). Waters around the Aleutian Islands also appear to be important for feeding while the species is undergoing an extensive molt (USFWS 2020).

4.3.2 Species Status

The short-tailed albatross was listed as **endangered** as a foreign species under the ESA; on July 31, 2000, the short-tailed albatross was listed as **endangered** throughout its range under the ESA (USFWS 2014a). The biggest threat to this species is the limited breeding distribution; other threats include commercial fisheries, shipping traffic, and changes in prey distribution resulting from climate change (USFWS 2020).

Thought to be extinct in the 1940s, the species is making progress toward meeting some of the recovery criteria for delisting, with the current worldwide population (7,365 individuals) exceeding the criteria of 4,000 individuals. Following the 2018 to 2019 breeding season, their population was estimated to be increasing at an average annual rate of 8.9 percent (USFWS 2020). There is potential for the species to be down listed from endangered to threatened by 2028, if the Ogasawara Islands breeding population maintains an average annual growth rate of 8.9 percent with greater than 50 breeding pairs, and with confirmation that the population on the Senkaku Islands has met recovery criteria (USFWS 2020).

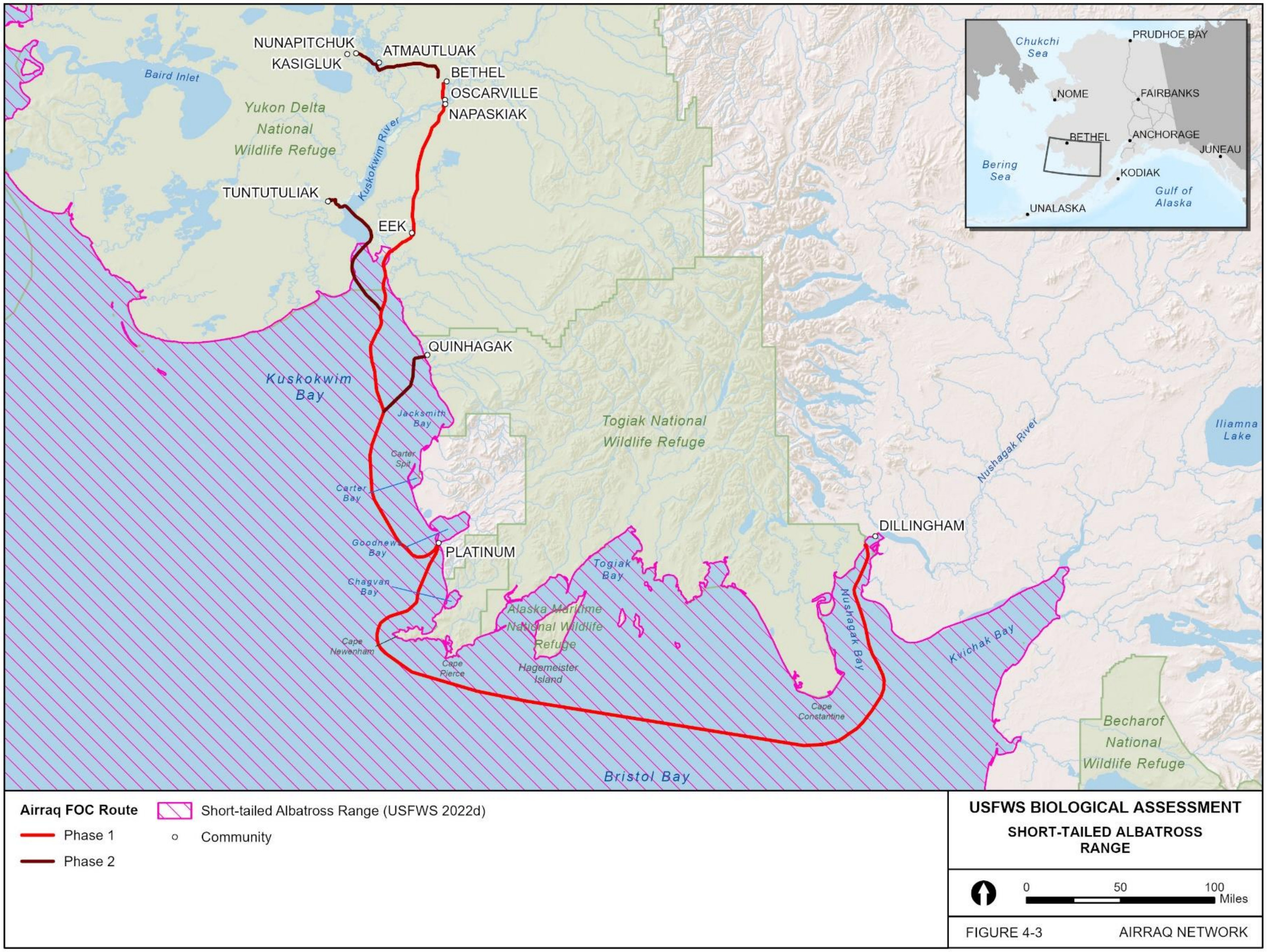
4.3.3 Presence within Action Area

The short-tailed albatross' potential range overlaps the action area (USFWS 2022d; Figure 4-3). However, review of the compiled North Pacific Pelagic Seabird Database for short-tailed albatross sightings from 1940 to 2004 did not show the species present within the action area (Hyrenbach et al. 2013, Piatt et al. 2006). As described in Section 4.3.1, this is because their preferred prey and foraging waters are deeper than available within the action area. Satellite tagging data of juveniles from 2008 to 2012 showed that individuals have been recorded within Bristol Bay, south of the action area (USFWS 2014a). The species nests far outside the action area and are likely rarely found within the action area.

4.3.4 Critical Habitat

Critical habitat has not been designated for the short-tailed albatross. The USFWS determined that it was not prudent to designate critical habitat due to the lack of habitat-related threats, areas that could be identified as meeting the definition of critical habitat within U.S. jurisdiction, and recognition or educational benefits to the American public as a result of such a designation (USFWS 2008).

Figure 4-3. Short-tailed Albatross Potential Range



4.4 Northern Sea Otter

Three stocks of northern sea otters (*Enhydra lutris kenyoni*) exist within Alaska: Southeast, Southcentral, and Southwest (USFWS 2014b). Individuals that could occur within the proposed action area are from the threatened Southwest Alaska DPS.

4.4.1 Distribution and Life History

Historic sea otter (*Enhydra lutris*) habitat ranged from the northern islands of Japan within the western Pacific; through the Kuril Islands and Kamchatka Peninsula within Russia; through the Aleutian Islands; toward the eastern Pacific; following the coast of Alaska, Canada, and the contiguous United States; to central Baja California in Mexico (Wilson et al. 1991). Following their decline, fragmented populations are present within Alaska, Russia, British Columbia, Washington, and California (Davis et al. 2019, ADF&G 2023a).

The northern sea otter (*Enhydra lutris kenyoni*) is a subspecies of sea otter whose habitat ranges from Washington in the south, north toward British Columbia, following along the coast of Southeast and Southcentral Alaska before continuing west to the Aleutian Islands (Wilson et al. 1991). The range of the Southwest Alaska DPS spans from the western edge of Cook Inlet to the Aleutian Islands, and includes the Alaska Peninsula and Bristol Bay coasts as well as the Aleutian, Barren, Kodiak, and Pribilof Islands (Figure 4-4).

Following the near extinction of sea otters, Kenyon (1969) found the Southwest Alaska DPS of northern sea otter from the central to outer Aleutians to be one of the most rapidly growing populations. Following the recovery of sea otters within the Aleutian Islands, Kenyon (1969) observed several fluxes in population due to rapid growth when resources were available, and rapid decline due to starvation and emigration. Kenyon (1969) estimated that a stable population density of sea otters is 10 to 15 individuals per square mile, and the Alaska Peninsula has the potential to support a population of 50,000 to 74,000 individuals.

Sea otters generally occur in shallow (less than 115 ft [35 m]), nearshore waters within areas with sandy or rocky bottoms, where they feed on a wide variety of slow-moving benthic invertebrates (Rotterman and Simon-Jackson 1988), including sea urchins, abalone, clams, mussels, and crabs (Riedman and Estes 1990). They can also feed on epibenthic fish within areas where otter populations are near equilibrium density (Riedman and Estes 1990). They typically forage at depths between 7 and 98 (2 and 30 m) but can dive as deep as 322 ft (100 m) (Kenyon 1969, Bodkin et al. 2004).

Sea otters in Alaska are generally not migratory and do not disperse over long distances. However, individual sea otters are capable of long-distance movements of more than 60 mi (100 km) (Garshelis and Garshelis 1984), although movements are likely limited by geographic barriers, high energy requirements of animals, and social behavior. Data within Alaska regarding sea otter movement and home ranges are limited (Gorbics and Bodkin 2001). Garshelis and Garshelis (1984) found that female sea otters within Prince William Sound had home ranges between 0.4 and 1.9 mi^2 (1.0 to 4.8 km^2), and males had much larger home ranges ranging from 1.8 to 4.2 mi^2 (4.6 to 11.0 km^2). Despite limited home ranges, male sea otters within Prince William Sound traveled up to 60 mi (100 km) to breeding areas. Gorbics and Bodkin (2001) estimated 30 mi (50 km) to be the maximum interisland distance that sea otters

will travel, but translocated sea otters have been found to travel up to 250 mi (400 km) (Monnett et al. 1990).

Sea otters do not have specific breeding and pupping habitat; rather, they appear to conduct all aspects of their life history within the same places (USFWS 2009). In Alaska, most pups are born in late spring (Bodkin and Monson 2002). Assuming a 6- to 8-month gestation, including 2 to 4 months of delayed implantation, breeding likely occurs in late summer or fall.

The energy of in-air sea otter vocalizations is concentrated at 3 to 5 kilohertz (kHz; McShane et al. 1995, Thomson and Richardson 1995). Sea otter vocalizations are considered to be most suitable for short-range communication among individuals (McShane et al. 1995). However, Ghoul and Reichmuth (2012) noted that the in-air "screams" of sea otters are loud signals (source level up to 113 dB re 20 μPa rms) that may be used over larger distances and have dominant frequencies of 4 to 8 kHz. Ghoul and Reichmuth (2012) examined the hearing abilities of sea otters using a behavioral approach. They found that the in-air upper-frequency hearing limit was at least 32 kHz, and the lower-frequency limit was less than 0.125 kHz. Ghoul and Reichmuth (2016) reported that sea otter hearing is most sensitive underwater at 8 to 16 kHz; however, their hearing is not specialized to detect sounds in background noise.

4.4.2 Species Status

Sea otter population estimates were once as high as 300,000 (Davis et al. 2019), but maritime fur trade in the eighteenth and nineteenth centuries reduced numbers to as low as 1,000 to 2,000 (Kenyon 1969). The current estimated population size for the Southwest Alaska DPS stocks of northern sea otter is 54,771 (USFWS 2014b). The Southwest Alaska DPS sea otter population has declined by 56 to 68 percent since the mid-1980s (Burn and Doroff 2005). In the Aleutian archipelago, sea otters have declined by as much as 70 percent since 1992 (Doroff et al. 2003). Unlike the declines observed within the Aleutian Islands, Shumagin Islands, and western Alaska Peninsula, other portions of the Southwest Alaska DPS stock have not shown signs of decline, including the Kodiak Archipelago, the eastern coast of the Alaska Peninsula from Castle Cape to Cape Douglas, and Kamishak Bay in Lower Cook Inlet (Burn and Doroff 2005, USFWS 2014b). Surveys conducted from 2003 to 2005 show continued declines within the Aleutian Islands (Estes et al. 2005). The main threat to sea otter recovery, and the primary reason for the decline, is likely attributable to increased predation, particularly by killer whales (*Orcinus orca*) (Estes et al. 1998, 2005; USFWS 2010b).

The first legal protections of sea otters began before most marine mammals, when the North Pacific Fur Seal Treaty of 1911 was signed (Kenyon 1969). The treaty banned commercial hunting of both sea otters and North Pacific fur seals (*Callorhinus ursinus*). Sea otters received additional protections in 1972 when the Marine Mammal Protection Act was passed. The Southwest Alaska DPS of northern sea otter was listed as **threatened** under the ESA in 2005 (71 *Federal Register* [FR] 46864).

4.4.3 Presence within Action Area

The historical range of sea otters extends into Bristol Bay; however, it does not include the action area (Figure 4-4; Davis et al. 2019). This is possibly due to the historical range of sea ice extent (Pease et al. 1982) and the unsuitability of sea ice for sea otter habitat (Schneider and

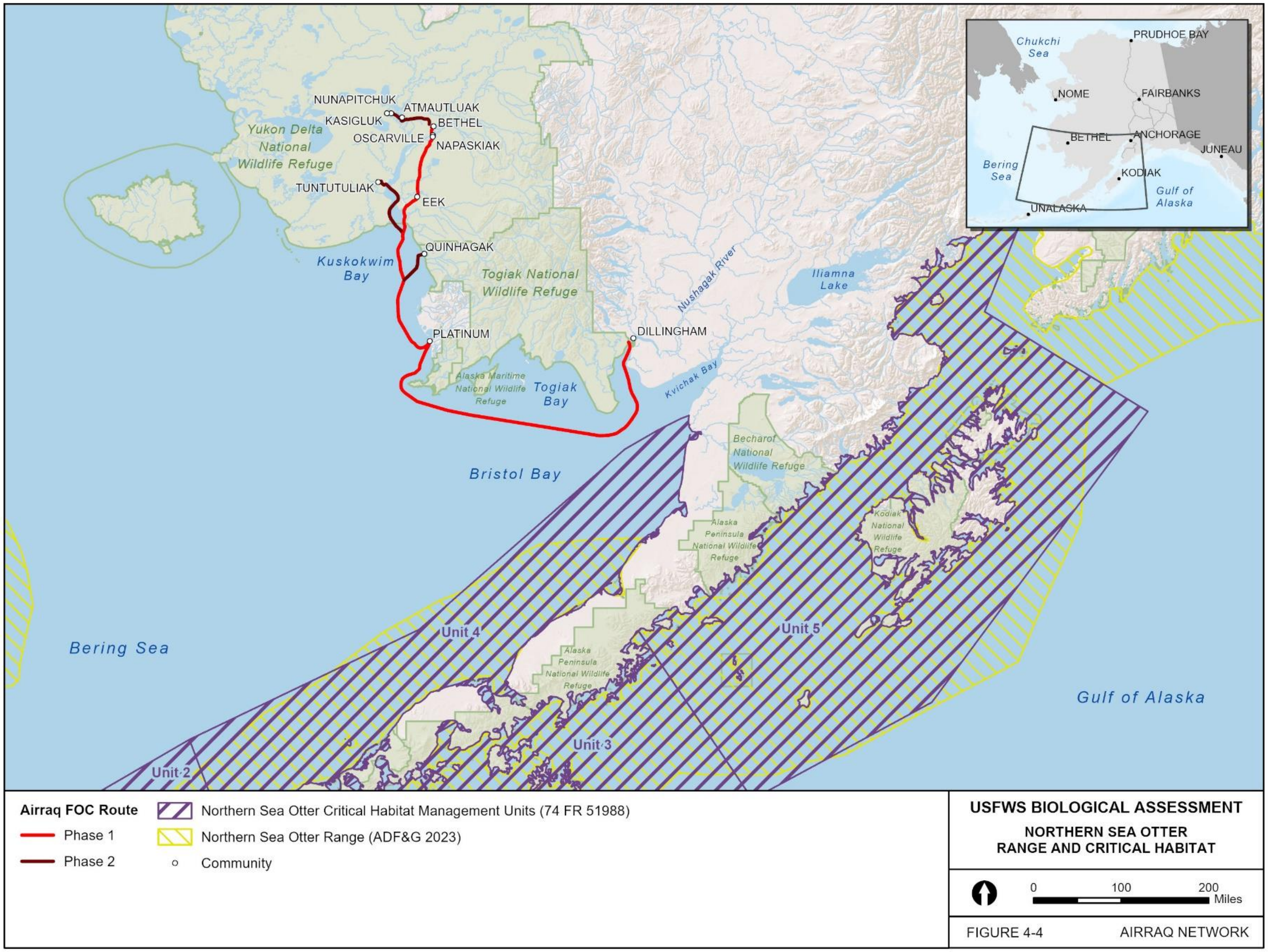
Faro 1975). The current sea otter range does not include the action area (ADF&G 2023b). Bristol Bay may provide suitable habitat for sea otters, but they do not frequently emigrate outside their home ranges (Kenyon 1969).

4.4.4 Critical Habitat

Critical habitat for the Southwest Alaska DPS of northern sea otter was designated in November 2009 and includes an area of 5,855 mi^2 (164 km^2; 74 FR 51988). The critical habitat primarily consists of shallow water areas less than 66 ft (20 m) deep and nearshore water within 328 ft (100 m) of the mean tide line (Figure 4-4). No designated critical habitat exists for the northern sea otter within the action area.

In the Northern Sea Otter Recovery Plan (USFWS 2013), the Southwest Alaska DPS of northern sea otter is divided into five management units: Western Aleutian (Unit 1); Eastern Aleutian (Unit 2); South Alaska Peninsula (Unit 3); Bristol Bay (Unit 4); and Kamishak, Kodiak, Alaska Peninsula (Unit 5). The action area does not fall into one of the management units but is closest to the Bristol Bay Management Unit.

Figure 4-4. Northern Sea Otter Range and Critical Habitat



5 Environmental Setting

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the condition of the listed species or its designated critical habitat within the action area (included in this section). The environmental baseline also includes the past and present impacts of all federal, state, or private actions and other human activities within the action area; the anticipated impacts of all proposed federal projects within the action area that have already undergone formal or early Section 7 consultation; and the impact of state or private actions that are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are also part of the environmental baseline (50 CFR 402.02).

The action area is composed of diverse marine environments, stretching from the northernmost extent of Nushagak Bay along the coast to the mouth of the Kuskokwim River. The coastline includes part of the Alaska Maritime National Wildlife Refuge, the Togiak National Wildlife Refuge, and the Cape Newenham State Game Refuge, while falling primarily within the Bering Sea and Kuskokwim Bay. The action area will reach a maximum distance of approximately 51 mi (82 km) from shore and will occur within areas up to approximately 147 ft (45 m) deep.

Flood tides influence the Bering Sea through Aleutian Island passes, creating the Aleutian North Shore Current. East of Unimak Pass, the marine current flows northeastward, composing the Bering Coastal Current along the Alaskan Peninsula and into Bristol Bay. At this point, the current creates a counterclockwise gyre (NMFS 2013). Currents then primarily flow northward and westward around Cape Newenham toward Kuskokwim Bay, while also flowing eastward to the inner bay.

Six major watersheds drain into Bristol Bay: the Togiak, Nushagak, Kvichak, Naknek, Egegik, and Ugashik River watersheds. The Nushagak and Kvichak River watersheds are the largest among them, occupying approximately 50 percent of the region’s watershed. They comprise five distinct physiographic divisions: the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak–Bristol Bay Lowland (EPA 2014). These watersheds are turbid and dominated by seasonal runoff. In summer, during periods of significant freshwater out welling, the ebb tide currents often substantially exceed the flood tides. This input keeps the Nushagak and Kvichak Bays colder in spring relative to the rest of Bristol Bay. As terrestrial waters warm later in summer with increasing ambient temperatures, so do the bays. The turbidity weakens primary production within the bay, but high nutrient levels are driven by out welling discharge from detritus, dissolved organic material, and salmon-derived nutrients (NMFS 2013). In addition to fish and invertebrates, the nutrients help support aquatic vegetation such as eel grass and kelp species. The two watersheds are composed of the Ahklun Mountains, Southern Alaska Range, Aleutian Range, Nushagak-Big River Hills, and Nushagak-Bristol Bay Lowland, all of which play a major role in dividing the region’s watersheds. These features range from sea level to 9,186 ft (2,800 m) and contain more than 33,554 mi (54,000 km) of streams (NMFS 2013).

The Kuskokwim River Basin is the largest river basin providing freshwater input to Kuskokwim Bay. It is drained by the Kuskokwim River and many of its tributaries, from Cape Newenham State Game Refuge to the Ninglick River (BLM n.d.). The region is contained within the Alaska Range to the south and east, with the Kuskokwim Mountains on the north and west. The bay experiences some of the largest tides in Southwest Alaska, and it is assumed that tidal influence is present up to river mile 97 of the Kuskokwim River. Tidal amplitude begins to subside to the north and outside the bay. In winter, annual ice tends to cover Kuskokwim Bay in its entirety and includes portions of Bristol Bay. At a minimum, the sheet ice will also include the Bering Sea shelf and the entire Chukchi Sea (USFWS 2012). During this time, the Kuskokwim Bay can reach 29 degrees Fahrenheit (-2 degrees Celsius).

The Kuskokwim Bay and Bering Sea region is subject to a large number of earthquakes. This is the result of the presence of six fault systems within the area: the Tintina-Kaltag Fault, the Iditarod-Nixon Fork Fault, the Denali-Farewell Fault, the Lake Clark-Castle Mountain Fault System, the Bruin Bay Fault, and the Border Ranges Fault. Some sections along these faults are seismically active and have generated earthquakes (EPA 2014). Seasonal weather changes are often drastic within the region and have consequences for marine life. The Bering Sea is subject to circulation patterns from both the north and south. These circulation patterns bring in strong winds, which influence ice movement, but keep air temperatures relatively mild. The prevailing circulation pattern may last months to decades. Bering Sea summer weather tends to be mild. Skies remain somewhat clear for long periods, which can cause sea temperatures to rise. Additionally, occasional moderate summer storms produce winds that are responsible for ocean mixing. The state of the Bering Sea influences the YK Delta's climate, where there is a strong inland gradient in coastal temperature.

5.1 Coastal Development

At its southernmost extent, the action area includes the community of Dillingham. It then traverses through Nushagak Bay to Bristol Bay, and around Cape Newenham National Wildlife Refuge to Kuskokwim Bay. It then enters the Kuskokwim River, where it splits. Two boroughs are included within the action area: the Dillingham Census Area and Bethel Census Area. Both boroughs combined cover the Alaska coastline from Kvichak Bay in the south to the coastline directly west of Newtok in the north and include extensive inland components. Due to the region's remoteness, it is largely undisturbed from human development.

The Bethel Census Area includes 18,207 residents. Bethel is the largest community within the region, with a population of 6,500 residents. A majority of Bethel's economy originates from regional services such as government administration, transportation, freight, and social services. One of the few non-government sources of revenue for the region is commercial fisheries. The Coastal Villages Region Fund is a non-profit group that allocates revenue from fishing rights from the federal government to create jobs, build infrastructure, and fund education (Agnew Beck Consulting 2011).

The Dillingham Census Area includes 4,673 residents across 10 communities, the largest of which are Dillingham (population 2,327), Togiak (population 873), Manokotak (population 483), New Stuyahok (population 476), and Aleknagik (population 208) (Robinson et al. 2020). The region's economy is predominately seasonal employment and composed of the harvesting and

processing of local salmon fisheries. Each year, 70 percent of the fish returning to the Bristol Bay area are harvested. In addition to fisheries, tourism plays a part in the local economy as Dillingham provides an entry point to Togiak National Wildlife Refuge and Wood-Tikchik State Park. Table 5-1 provides a summary of regional economic expenditures, expressed in 2009 dollars.

Table 5-1. Summary of Regional Economic Expenditures Based on Salmon Ecosystem Services

Economic Sector	Estimated Direct Expenditure (sales per year, in $ millions)
Commercial Fisheries, Wholesale Value	300.2
Sport Fisheries	60.5
Sport Hunting	8.2
Wildlife Viewing/Tourism	104.4
Subsistence Harvest	6.3
Total	**479.6**

Source: EPA 2014

5.2 Transportation

None of the communities serviced by the Project are accessible to the rest of the state by road. The existing road network is discontinuous and limited to the areas surrounding a few communities; therefore, water and air are the primary modes of inter-community transportation. The Alaska Marine Highway System does not serve the communities within or near the action area. Aviation is the principal means of transporting people to communities throughout the region. Except Oscarville, each serviced community has an Alaska Department of Transportation and Public Facilities or other government-controlled public airport, as well as numerous additional Federal Aviation Administration-registered public and private runways (DOT&PF 2017).

Marine waters within the action area experience varying levels of marine-based vessel traffic. Marine vessels are typically associated with freight, fishing, transportation, and fuel delivery (USACE 2008). In particular, Nushagak Bay experiences very high vessel traffic from spring through fall during the commercial salmon fishing season. Due to a lack of interconnecting roads, the region’s local communities rely on barges for local commerce and shipment of items not feasible to transport by air (USACE 2009).

5.3 Fisheries

Both state and federally managed fisheries occur within the action area. Two state fishery management areas overlap the action area: the Kuskokwim Management Area (KMA) and Bristol Bay Management Area (BBMA) (Smith and Gray 2022, Tiernan et al. 2022). Within these management areas are sport, commercial, subsistence, and personal use fisheries. Additionally, federally managed fisheries within the action area supply subsistence and commercial opportunities.

Alaska Statute 16.05.258, *Subsistence Use and Allocation of Fish and Game*, establishes the subsistence use priority for reasonable harvest opportunity consistent with sustained yield when resources are not abundant enough to provide for all consumptive uses (Smith and Gray 2022). The Alaska National Interest Lands Conservation Act of 1980 provided a priority for rural Alaska

residents for taking fish and wildlife on federal public lands and called for creation of regional advisory councils to provide rural residents' input into the Federal Subsistence Program. These policies have made subsistence user groups the priority in management throughout the State of Alaska. For the KMA, 2010 to 2014 surveys identified that salmon contributed 40 percent of the total subsistence resource harvest within Kuskokwim River communities, broken up as 65 percent within middle and upper river communities and 25 percent within lower river communities (Smith and Gray 2022).

Fishing efforts in state fisheries are primarily focused on salmon. The BBMA supports the largest wild sockeye salmon (*Oncorhynchus nerka*) fishery in the world, providing approximately 46 percent of the average global abundance of wild sockeye salmon (EPA 2023). Within the BBMA, one of the five commercial salmon districts occur within the action area, the Nushagak District. Fishing gear types within the Nushagak District include set gillnet and drift gillnet. Harvest diversity includes sockeye, Chinook (*O. tshawytscha*), chum (*O. keta*), pink (*O. gorbuscha*), and coho (*O. kisutch*) salmon. Sockeye salmon are the most harvested salmon within the district and provide significant economic benefits to the region. Between 2018 and 2022, three of the largest sockeye salmon harvests ever recorded for the district occurred, and its systems repeatedly ranked among the highest recorded for escapement numbers. Due to dwindling Chinook salmon returns for the district, the Alaska Department of Fish and Game is recommending it be listed as a stock of concern within the Nushagak District (Tiernan et al. 2022).

The KMA is composed of three active commercial salmon fishing districts, all of which occur within the action area: District 1, District 4, and District 5. Sockeye, Chinook, chum, pink, and coho salmon have been harvested within the KMA. In recent years, Chinook and chum salmon returns within the Kuskokwim River have been inconsistent. Chinook salmon runs in 2012, 2013, and 2014 were the lowest three on record. Escapement made a slight rebound, reaching a nearly average run total in 2019, only to significantly decline again in 2020 and 2021. Chum salmon return numbers remained near average between 2007 and 2019. However, 2020 numbers were well below average, and 2021 was the lowest on record. Sockeye salmon abundance in 2021 was mixed throughout the Kuskokwim River drainage and ranged from average to below average. Reliable coho salmon return numbers are not available for the region, but available data suggests that returns have been average to below average since 2016 (Smith and Gray 2022).

Other state-managed fisheries within the KMA include subsistence herring, while the BBMA includes a herring sac roe fishery, which is composed of seine, gillnet, and hand harvests (Tiernan et al. 2022). The Bering Sea Aleutian Islands Management Area (BSAIMA), a state-managed area for shellfish, has several registration areas overlapping the action area that target tanner (*Chionoecetes bairdi*), snow (*C. opilio*), Dungeness (*Metacarcinus magister*), and king (Lithodidae) crabs as well as scallops (Pectinidae) (Nichols and Shaishnikoff 2022). Federal subsistence and commercial fisheries also occur off the western coast of Alaska, along the action area. These fisheries occur within the federally managed BSAIMA, which are both commercial and subsistence groundfish fisheries. Commercial opportunities include trawl, longline, jig, and pot fisheries. These fisheries have 19 different target species, with walleye pollock (*Gadus chalcogrammus*) being the most popular among them. Walleye pollock account

for a majority of the harvest in terms of both metric tons and ex-vessel value. Subsistence harvests are very small relative to that of commercial harvests and target cod, halibut, rockfish, and other species in nearshore waters (NPFMC 2020). These commercial fisheries have the potential to compete with marine mammals for resources.

5.4 Tourism

The recreational tourism economy provides significant benefits for residents of the Bristol Bay region. In addition to being a source of employment, it helps support an economy that provides essential goods to Bristol Bay residents. Recreational tourism is responsible for 15 percent of jobs within the region (EPA 2014). In addition to tourism related to the local salmon ecosystem, access to the Nushagak and Kvichak River watersheds as well as the Togiak National Wildlife Refuge and Cape Newenham State Park via air, boat, snowmachine, and foot are largely regulated by the local tourism industry (USFWS 2009).

Tourism within the YK Delta is limited. This is partially due to high costs associated with transportation as well as limited accommodations and tourism-centric infrastructure, and inconsistent and unreported weather that can restrict air travel. Despite this, the region offers many forms of recreation and ecotourism, including access to the Yukon Delta National Wildlife Refuge, the largest wildlife refuge in the United States; fishing; and events such as the Kuskokwim 300 sled dog race (Agnew Beck Consulting 2011).

5.5 Vessel Traffic

Vessel traffic within the action area is closely linked to commercial fisheries. The average number of salmon permit holders fishing in District 4 within the KMA since 1980 is 223. Participation has ranged between 67 and 408 during this time. In 2021, participation was the lowest on record, with 74 individual permit holders. The only season with lower participation was 2020 (Smith and Gray 2022). A significant decrease in participation has been mirrored across all KMA districts. Permit registration within the BBMA has been more consistent and significantly exceeds that within the KMA. Participation in the salmon fisheries for both management areas is shown in Table 5-2.

Passenger water transportation services are limited within the action area and are largely related to sightseeing, guiding services, and general transportation support.

Table 5-2. Permits Fished by District and Gear Type within the KMA and BBMA, 2001–2021

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2001	412	159	32	1,566	834
2002	318	114	30	1,183	680
2003	359	114	34	1,389	714
2004	390	116	29	1,426	797
2005	403	145	29	1,526	829
2006	373	132	24	1,567	844
2007	366	125	28	1,621	836
2008	374	146	25	1,636	850
2009	342	179	39	1,642	855
2010	433	241	48	1,731	861
2011	413	219	48	1,747	878

Year	KMA Districts			BBMA Area Gear Types	
	1	4	5	Drift Gillnet[a]	Set Gillnet
2012	379	179	58	1,740	883
2013	378	197	71	1,709	854
2014	358	194	61	1,751	881
2015	283	189	61	1,744	885
2016	—[b]	—[b]	—[b]	1,715	858
2017	—[b]	—[b]	—[b]	1,728	881
2018	—[b]	—[b]	—[b]	1,735	879
2019	—[b]	—[b]	—[b]	1,767	893
2020	—[b]	67	17	1,724	841
2021	—[b]	74	13	1,753	870
2001–2011 Average	**380**	**153**	**33**	**1,529**	**82**
2011–2021 Average	**140**	**90**	**28**	**1,736**	**90**
Average	**265**	**123**	**31**	**1,632**	**86**

Source: Smith and Gray 2021, Tiernan et al. 2022
[a] Two drift permit holders may concurrently fish from the same vessel.
[b] Confidential due to three or fewer permits fished, processors, or buyers. Included as 0 in averages.

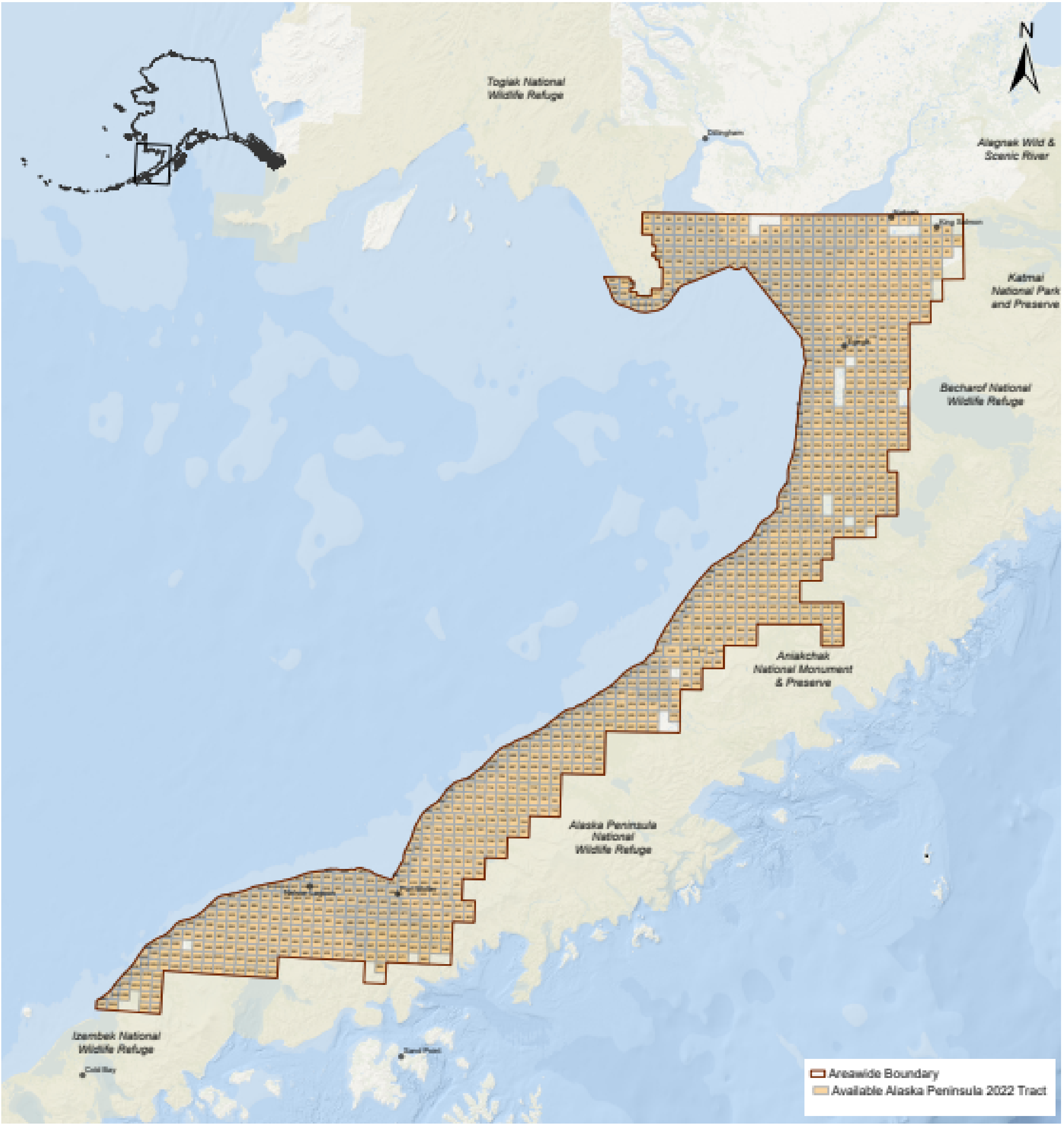
5.6 Resource Extraction

The Bristol Bay area contains significant mineral deposits, which creates mining potential for the region. The most popular among these deposits are porphyry copper and gold (EPA 2014). The only mining project currently within the Bristol Bay watershed is the Pebble Project. On January 30, 2023, the U.S. Environmental Protection Agency issued a Final Determination under its Clean Water Act Section 404(c) authority to limit actions related to the development of the Pebble Deposit in order to protect salmon resources (EPA 2023). Other large potential mine operations within the Bristol Bay region include Big Chunk South, Big Chunk North, Groundhog, Audn/Iliamna, and Humble (EPA 2014).

The only current project within the Kuskokwim River Watershed is Donlin Gold. Donlin Gold is pursuing an open pit gold mine 10 mi (16 km) north of Crooked Creek (ADNR 2023). Crooked Creek is approximately 190 mi (307 km) from the mouth of the Kuskokwim River. To meet project energy demands, a 312-mi (502-km) long pipeline is proposed to be buried to bring natural gas from Cook Inlet to the mine site. Historically, the Kuskokwim River Basin has been an active mining region. Platinum placer mines have occurred intermittently within the area surrounding Goodnews Bay since the 1920s. Platinum mining has ceased within the Goodnews Bay area since 2012. The most recent platinum mine within the region was shut down due to the misuse of wastewater ponds and pollution of nearby waters.

The North Aleutian Basin Outer Continental Shelf (OCS) overlaps the eastern portion of the action area. Within the OCS, oil and gas leases exist, beginning on the western side of Nushagak Bay, east around Bristol Bay, and south to the Alaskan Peninsula (Figure 5-1). Past exploration has not yielded any commercial production within the region (ADNR 2014). Additionally, no bids on leases have occurred within the region in recent years.

Figure 5-1. Alaska Peninsula Oil and Gas Lease Tract Map



Source: ADNR 2022

Oil and gas exploration within the western and northern portions of the action area have been primarily focused on the Bethel and Holitna Basins. With the exception of deep well exploration near Bethel in the 1980s, the region has not focused on subsurface exploration. Additionally, research suggests a very low probability for the occurrence of conventional, economically recoverable oil resources within the region (Nuvista 2015).

6 Effects of the Action

Effects of the action are all consequences, including those from other activities, to listed species or critical habitat that are caused by the proposed action. A consequence is caused by the proposed action if it will not occur but for the proposed action and 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, as amended by 83 FR 35178).

Effects that are common to seabirds generally are described in Section 6.1. Effects that pertain to a particular seabird species are described in Sections 6.2, 6.3, and 6.4. Effects on northern sea otters are described in Section 6.5. Indirect effects for all species included in this BA are described in Section 6.6.

6.1 Seabirds

6.1.1 Noise

Very little information is available about the underwater hearing of seabirds; to date only studies on great cormorants (*Phalacrocorax carbo*) have been published. Great cormorants were found to respond to underwater sounds and may have special adaptations for hearing underwater (Hansen et al. 2016, Johansen et al. 2016). The in-air hearing of a number of seabirds (including loons, scaups, gannets, and ducks) has been investigated by Crowell (2016), and the peak hearing sensitivity was found to be between 1.5 and 3 kHz. The best hearing frequency for the common eider (*Somateria mollissima*) was 2.4 kHz (Crowell 2016).

The effects of underwater noise on birds in general have not been well studied, but could include masking, behavioral disturbance, and hearing impairment. One study on the effects of underwater seismic survey sound on molting long-tailed ducks (*Clangula hyemalis*) within the Beaufort Sea showed little effect on their behavior (Lacroix et al. 2003). However, the study did not consider potential physical effects on the ducks. The authors suggested caution in interpreting the data because of their limited utility to detect subtle disturbance effects, and recommended studies on other species to better understand the effects of seismic airgun sound on seabirds. Stemp (1985) conducted opportunistic observations on the effects of seismic exploration on seabirds; he did not observe any effects of seismic testing but warned that his observations should not be extrapolated to areas with large concentrations of feeding or molting birds.

Seabirds are not known to communicate underwater or use underwater hearing during feeding activities. Therefore, masking from underwater noise is unlikely to be a concern, but research on this issue is lacking. No data is available about the physiological effects of underwater noise on birds (e.g., temporary threshold shifts [TTS] or permanent threshold shifts [PTS]). However, comparative studies of in-air hearing of many bird species have shown that TTS may occur when exposed to continuous noise (12 to 24 hours) between 93 and 110 dB re 20 μPa rms (Dooling and Popper 2016); this will roughly translate to 119 to 136 dB re 1 μPa rms as measured underwater. In air, PTS occurred when birds were exposed to continuous noise above 110 dB re 20 μPa rms or to single impulse sounds above 140 dB re 20 μPa rms (Dooling and Popper 2016). Underwater, those limits will be approximately 136 dB re 1 μPa rms for

continuous noise and 176 dB re 1 μPa rms for single impulse sounds. However, it is not clear if values determined from in-air studies can be applied to seabirds in the water, especially given that they spend only a small portion of their time underwater.

6.1.2 Vessel Traffic

Investigations into the effects of disturbance by vessel traffic on birds are limited. Schwemmer et al. (2011) examined the effects of disturbance by ships on seabirds in Germany. In areas with vessel traffic channels, sea ducks appeared to habituate to vessels. Four species of sea ducks examined had variable flushing distances, which was related to flock size; common eiders had the shortest flush distance. Flushing distances varied for the common scoter (*Melanitta nigra*), with larger flocks flushing at distances of 0.6 to 1.2 mi (1 to 2 km), and smaller flocks flushing at 0.6 mi (less than 1 km). Loons were found to avoid areas with high vessel traffic (Schwemmer et al. 2011). During boat surveys, Steller's eiders flushed when approached by a small skiff at distances between 328 and 656 ft (100 and 200 m) in January and 984 ft (300 m) in March (LGL 2000, HDR 2004).

Speckman et al. (2004) reported that marbled murrelets (*Brachyramphus marmoratus*) appeared to habituate to small boat traffic during surveys, with only a few birds flying away when approached by a skiff; most birds merely paddled away, while others dove and resurfaced before moving away. However, fish-holding murrelets were found to swallow the fish when approached by a boat, a behavior that could have consequences for the chicks the prey was intended for (Speckman et al. 2004). Lacroix et al. (2003) noted that molting, flightless ducks frequently dove and swam away short distances when approached by a small research vessel but resurfaced quickly after the vessel passed. Even when long-tailed ducks were experimentally disturbed by a small research vessel doing transits every other day, they showed relatively high site fidelity; however, all ducks showed a disturbance response at distances less than 328 ft (less than 100 m; Flint et al. 2004).

Lacroix et al. (2003) did not detect any effects of nearshore seismic exploration on molting long-tailed ducks within the inshore lagoon systems of Alaska's North Slope. Both aerial surveys and radio-tracking indicated the proportion of ducks that stayed near their marking location from before to after seismic exploration was unaffected by proximity to seismic survey activities. No large-scale movement from the seismic area occurred, even though the vessel transited the same area numerous times throughout the survey over the course of approximately 3 weeks. Nonetheless, several studies have shown that some bird species avoid areas with high levels of disturbance. Kaiser et al. (2006) reported that common scoters avoided areas with high levels of shipping traffic. Similarly, Johnson (1982 in Lacroix et al. 2003) reported that long-tailed ducks moved from one habitat to another in response to vessel disturbance. Similarly, Thornburg (1973), Havera et al. (1992), and Kenow et al. (2003) reported that staging waterfowl were displaced from foraging areas by boating, but some of these areas had high levels of boating activity. Merkel et al. (2009) showed reduced feeding and increased movement by common eiders when disturbed by fast-moving, open boats. The degree of disturbance was related to the number of boats within the area. However, the eiders did attempt to compensate for lost feeding opportunities by feeding at different, perhaps less favorable, times of the day (Merkel et al. 2009).

Similar results were obtained by Velando and Munilla (2011), who found that foraging by European shags (*Phalacrocorax aristotelis*) was reduced by boat disturbance. Agness et al. (2008) suggested changes in behavior of Kittlitz's murrelets (*Brachyramphus brevirostris*) in the presence of large, fast-moving vessels, and the possibility of biological effects because of increased energy expenditure by the birds. In contrast, Flint et al. (2003) reported that boat disturbance did not affect the body condition of molting long-tailed ducks.

6.1.3 Artificial Lighting

Artificial lighting will be used on the cable-laying vessel for routine vessel safety and navigation purposes. Several bird species are attracted to bright lights on ships at night and collide with the ship (e.g., Ryan 1991, Black 2005, Merkel and Johansen 2011). Birds that spend most of their lives at sea are often highly influenced by artificial light (Montevecchi 2006, Montevecchi et al. 1999, Gauthreaux and Belser 2006, Ronconi et al. 2015). In Alaska, crested auklets (*Aethia cristatella*) mass-stranded on a crab fishing boat. An estimated 1.5 tons of crested auklets either collided with or landed on the brightly lit fishing boat at night (Dick and Donaldson 1978).

It has also been noted that seabird strandings seem to peak around the time of the new moon, when moonlight levels are lowest (Telfer et al. 1987, Rodríguez and Rodríguez 2009, Miles et al. 2010). Birds are more strongly attracted to lights at sea during fog and drizzle conditions (Telfer et al. 1987, Black 2005). Moisture droplets in the air refract light, increasing illumination and creating a glow around vessels at sea. Birds may be confused or blinded by the contrast between a vessel's lights and the surrounding darkness. During the confusion, a seabird may collide with the vessel's superstructure, resulting in injury or death. They may also fly at the lights for long periods and tire or exhaust themselves, decreasing their ability to feed and survive (Ryan et al. 2021).

Many seabirds have great difficulty becoming airborne from flat surfaces. Once on a hard surface, stranded seabirds tend to crawl into corners or under objects, such as machinery, to hide. While there, they may die from exposure, dehydration, or starvation over hours or days. Once stranded on a deck, a seabird's plumage is prone to oiling from residual oil often present in varying degrees on ship decks. Even a dime-sized spot of oil on a bird's plumage is sufficient to breach the thermal insulation essential for maintaining vital body heat. Therefore, even if rescued and released over the side of the vessel, a bird may later die from hypothermia (Ryan et al. 2021, Howard 2021).

6.1.4 Spills

The vessels that will be used for the cable-laying operations will have hazardous chemicals, including hydrocarbons, present. If petroleum or other hazardous material were to spill during Project activities, the level of impact on seabirds will depend on the size of the spill, location, time of year, and number of seabirds present. As noted in Section 6.1.3, even a very small amount of oil on a bird's plumage can result in injury or mortality. Oil spills can be lethal to waterbirds, particularly divers, which spend a lot of time sitting on the surface of the water where the oil floats (International Bird Rescue 2023). Eiders are especially vulnerable to oil spills due to their large flock sizes, distance to shore, and use of moderate ice areas (Smith et al. 2017). Persistent oil contamination is a major threat for eiders within areas near shipping lanes, such

as the Aleutian Islands, Bering Sea and Strait, and Chukchi and Beaufort Seas (Smith et al. 2017).

However, hazardous chemicals associated with the Project will be in small quantities and properly contained, following all regulations, so the occurrence of a spill or leak from Project vessels will be very unlikely. If a spill occurred, it will likely be of a low volume and quickly contained.

6.1.5 Habitat Disturbance

This Project will cause some disturbance to the benthic community through seafloor clearing, plowing, and trenching to bury the cable. Trawling and dredging are known to reduce habitat complexity and reduce productivity. The benthic community can recover from these disturbances, but recovery times could range from a few months to several decades depending on the location, substrate, original ecosystem, and scale of the disturbance (National Academy of Sciences 2002). In one Alaska example, it took the benthic community 4 years to recover after underwater mining in Norton Sound (Jewett and Naidu 2000).

Overland cable-laying activities will result in minor, temporary, tundra habitat disturbance. These activities will take place in winter using vehicles that will not cause surface damage to the tundra, and all trenched segments will be backfilled with native soil. Cable laid directly on the tundra surface or within waterbodies will not preclude the use of these habitats for any birds, including ESA-listed species.

6.2 Steller's Eider

The Steller's eider is known to occur within a portion of the action area, near Goodnews Bay, as well as the waters off Carter Spit northward to Jacksmith Bay, located easterly adjacent to the action area. The potential for Project activities to cause behavioral disturbance or displacement, injury or mortality, or habitat disturbance is described in the following sections.

6.2.1 Behavioral Disturbance and Displacement

Steller's eiders stage in Goodnews Bay and have been recorded there in large numbers during spring and summer months (ADF&G 2020a, Larned 2012). Additionally, Steller's eiders, numbering in the hundreds to thousands, have been observed within waters easterly adjacent to the action area offshore of Carter Spit northward to Jacksmith Bay during summer, as well as in small numbers in fall (ADF&G 2020a, National Audubon Society 2023, Seppi 1997). There is also potential that some non-breeding birds may stay behind at stopover locations (USFWS 2001a).

The in-air portion of the action area overlaps with Goodnews Bay. The cable-laying route is located west of the waters off Carter Spit and Jacksmith Bay, and will not run through the shallower nearshore waters that is likely be preferred by Steller's eiders (i.e., typically less than 32 ft [10 m] in depth; Larned 2012).

If eiders remain within the action area, in Goodnews Bay or nearby waters, during spring and summer months, disturbance due to vessel traffic will occur. Behavioral disturbances resulting from vessel traffic will likely occur at relatively short distances from the vessel. As described in

Section 6.1.2, Steller's eiders may flush within 656 ft (200 m) of a fast-moving skiff. However, the cable-laying vessels will be operating at slow speeds (typically 0.5 to 2 knots [1 to 4 km/hr]) and are therefore much less likely to cause a flushing response. Disturbance to staging or non-breeding Steller's eiders is unlikely given the short duration of cable-laying activities within their potential summer range. Any disturbance will only be temporary, given the continual movement of Project activities along the cable route; therefore, potential effects from disturbance caused by the vessel are discountable.

Intertidal cable-laying activities near Goodnews Bay will occur near a previously developed area within the village of Platinum. Disturbance or displacement caused by equipment noise and the presence of humans within the area will only occur temporarily during Project activities and will be of short duration. Therefore, the Steller's eider is not expected to be affected by intertidal cable-laying activities.

The overland cable installation activities will occur during winter months, when the species will not occur within the action area or use terrestrial habitat. Therefore, the overland route is not expected to result in behavioral disturbance or displacement.

6.2.2 Injury or Mortality

Although the effect of underwater sound on eiders has not been studied, noise produced by the proposed Project activities could affect the behavior of the Steller's eider along the cable-laying route. However, masking and hearing impairment are unlikely during the proposed activities because the continuous sound sources (e.g., dynamic positioning [DP] thrusters) have lower frequencies than the range of peak hearing sensitivity for seabirds, and the impulse sounds (e.g., echosounders) have most of their energy at frequencies well above the range of peak hearing sensitivity for seabirds. Additionally, the duration of potential exposure to these low-level sounds will be insufficient to affect hearing abilities.

The Steller's eider is not expected to be affected by artificial lighting on vessels. Eiders are primarily diurnal (McNeil et al. 1992), although they may feed at night when disturbed during the day or in winter when daylight is limited (Merkel et al. 2009, Merkel and Mosbech 2008). In a study of the effects of artificial lighting from gas-flaring at Northstar Island in the Alaska Beaufort Sea, only one eider flock was observed, and they showed no reaction to the flaring (Day et al. 2015). Though collisions with fishing vessels resulting in mortality to eiders, including Steller's eiders, have been anecdotally reported on numerous occasions within Alaska; nearly all these documented strikes with eiders occurred during hours of complete darkness in late winter and early spring, and involved bright lighting (Funk 2008).

The Steller's eider is not expected to be impacted by spills. As described above in Section 6.1.4, eiders are particularly vulnerable to oil spills, and even a very small amount has the potential to result in injury or mortality. However, the likelihood of a spill resulting from Project activities will be extremely low and of small quantity.

6.2.3 Habitat Disturbance

The Steller's eider is primarily a benthic feeder, with most of its diet composed of small bivalves, gastropods, and crustaceans (Bustnes and Systad 2001, Fredrickson 2001). Some disturbance

to the benthos from cable-laying activities will occur along the area that will be dragged or trenched; this may, in turn, affect food supply over a very small area. However, given that this will be a one-time action along a relatively narrow strip and well away from critical habitat areas, it will likely have little impact on eider feeding efficiency.

The action area for this proposed Project does not occur within designated critical habitat of Steller's eider; therefore, it will not impact any defined PCEs.

As described in Sections 6.1.5 and 6.6.1, potential adverse effects on Steller's eider prey species from Project activities are very unlikely.

6.3 Spectacled Eider

Although the action area is within the historical breeding range of the spectacled eider, the species has not been observed within the action area in surveys performed by USFWS between 1985 and 2014 (Fischer and Stehn 2015). Current breeding activity within the region is concentrated along the coastal portions of the YK Delta, near Hazen Bay (Fischer and Stehn 2015), located well outside the action area. However, the possibility exists for low-density breeding to occur outside confirmed breeding pair occurrence locations, though it would be extremely rare. During the non-breeding seasons, spectacled eiders are found within the Bering Sea, far from the action area. The potential for Project activities to cause behavioral disturbance or displacement, or habitat disturbance is described in the following sections.

6.3.1 Behavioral Disturbance and Displacement

If spectacled eiders nested within the action area, behavioral disturbance or even displacement from overland Project activities could occur. However, overland activities for the Project will only occur in winter when eiders will not be nesting or located near the action area. Therefore, the spectacled eider is not expected to be affected by overland Project activities.

6.3.2 Habitat Disturbance

During nesting, the spectacled eider typically forages within ponds by diving and dabbling for aquatic insects, crustaceans, mollusks, and vegetation. Ground disturbance from overland cable installation could impact potential nesting habitat within the action area near Tuntutuliak, which is several miles north of the spectacled eider's historical breeding range. However, overland cable installation through potential nesting habitat will occur in winter months, when spectacled eiders will not be present. Installation of cable in winter will minimize impacts to vegetation. Additionally, the action area is outside the historical and current breeding range for the YK Delta nesting population; therefore, nesting by this species within the action area will be extremely rare. As such, impacts to spectacled eider nesting habitat are not expected.

The action area does not occur within designated critical habitat for the spectacled eider; therefore, the Project will not impact any defined PCEs.

6.4 Short-tailed Albatross

The short-tailed albatross forages widely across the North Pacific, and the species may move through the action area, though it would be rare. The potential for Project activities to cause behavioral disturbance or displacement, injury or mortality, or habitat disturbance is described in the following sections.

6.4.1 Behavioral Disturbance and Displacement

Noise produced by the proposed Project activities could affect the behavior of short-tailed albatross along the cable-laying route, should they move through the action area. However, masking and hearing impairment are unlikely during the proposed activities because the continuous sound sources (e.g., DP thrusters) have lower frequencies than the range of peak hearing sensitivity for seabirds, and the impulse sounds (e.g., echosounders) have most of their energy at frequencies well above the range of peak hearing sensitivity for seabirds. Additionally, the duration of potential exposure to these low-level sounds will be insufficient to affect hearing abilities.

If short-tailed albatross occur within the action area, behavioral disturbance or displacement due to vessel traffic could occur, although at relatively short distances from the vessel, which may cause birds to move to less ideal habitats to travel and forage. However, this disturbance will only be temporary, given the continual movement of Project activities along the cable route. The slow operating speeds of the vessel (typically 0.5 to 2 knots [1 to 4 km/hr]) will also be less likely to disrupt behavior.

The short-tailed albatross primarily hunts by seizing prey from the water surface (USFWS 2022a). Therefore, the likelihood of underwater impacts from Project activities resulting in disturbance to feeding abilities is extremely low.

6.4.2 Injury or Mortality

The short-tailed albatross is generally more active during the day, and birds within the action area are not expected to be affected by artificial lighting on the vessels (USFWS 2008). Additionally, injury or mortality of this species resulting from artificial lighting is unlikely, given the rarity of this species within the action area, the reduction in the outward radiation from artificial lighting, and slow operating speeds of the vessel (typically 0.5 to 2 knots [1 to 4 km/hr]).

6.4.3 Habitat Disturbance

The short-tailed albatross feeds primarily on squid, shrimp, and crustaceans. These birds are very strong, wide-ranging fliers that are not restricted to a limited foraging area (USFWS 2008). The species is considered a continental shelf-edge specialist and is well documented along the Bering Sea shelf edge, although historical accounts suggest the species may have been relatively common nearshore, including near Kodiak, the Aleutians, and St. Lawrence Islands during conditions of highly productive upwellings (Piatt et al. 2006). Therefore, given the mobility and preferred foraging habitat of this species, vessel traffic and cable-laying activities within the action area are unlikely to impact albatross feeding. Cable laying activities will disturb the benthos along the seafloor that is dragged or trenched, which has the potential to affect a small portion of prey species within that area. However, this is a one-time action along a relatively

narrow strip of water outside of prime foraging habitat along the Bering Sea shelf edge (Piatt et al. 2006, USFWS 2022a).

As described below in Section 6.6.1, potential adverse effects on short-tailed albatross prey species from Project activities would be extremely limited given their large range.

6.5 Northern Sea Otter

The Southwest Alaska DPS of northern sea otter's range does not encompass the action area, and their use of the action area during the single marine cable-laying season is unlikely. However, since potential suitable habitat exists within the action area, a small number of sea otters could experience behavioral disturbance and displacement, injury or mortality, and habitat disturbance.

6.5.1 Behavioral Disturbance and Displacement

Vessels will use main drive propellers and/or DP thrusters to maintain position or move slowly during cable-laying operations. During these activities, non-impulse sounds will be generated by the collapse of air bubbles (cavitation) created when propeller blades move rapidly through the water. Several acoustic measurements of vessels conducting similar operations using these types of propulsion have been made within Alaska waters in previous years. While sea otters are not likely to be exposed to these sounds within the action area, general information on the effects of vessel noise on marine mammals is provided in this section.

Project activities may also include the production of pulsed sounds from single-beam navigational echo sounders and positioning beacons (transceivers and transponders) used to determine the location of trenching or ROV equipment on or near the seafloor. These acoustic sources typically produce pulsed sounds at much higher frequencies than those produced by vessel thrusters; in narrow frequency bands; and in some cases (e.g., navigational echosounders), with narrow downward directed beamforms. For example, positioning beacons measured within the Chukchi Sea operated with center frequencies of 27 kHz (most energy between 26 and 28 kHz), 32 kHz (most energy between 25 and 35 kHz), and 22 to 23 kHz or 21 to 21.5 kHz (most energy between 20 and 25 kHz). For directional sources, the difference between in-beam and out-of-beam sound pressure levels at the same distance ranged from 5 to 15 dB re 1 μPa rms. Because high-frequency sounds attenuate more quickly within water, distances to threshold levels that may elicit behavioral responses in marine mammals were in the teens to several tens of meters, even within the narrow in-beam sound fields (Warner and McCrodan 2011). For this reason, and because the species considered in this BA have less sensitive hearing at these higher frequencies, potential impacts from non-impulsive vessels sounds are likely to subsume potential impacts from these sonar sources, and they are not addressed further below.

Marine mammals, including sea otters, rely heavily on the use of underwater sounds to communicate and gain information about their surroundings. Experiments and monitoring studies also show that they hear and may react to many types of anthropogenic sounds (e.g., Richardson et al. 1995, Gordon et al. 2004, Nowacek et al. 2007, Tyack 2008).

The effects of sound from vessel noise on marine mammals are highly variable, and can be generally categorized as follows (adapted from Richardson et al. 1995):

- The sound may be too weak to be heard at the animal's location (i.e., lower than the prevailing ambient sound level, the hearing threshold of the animal at relevant frequencies, or both).
- The sound may be audible but not strong enough to elicit any overt behavioral response (i.e., the animal may tolerate it, either without or with some deleterious effects such as masking or stress).
- The sound may elicit behavioral reactions of variable conspicuousness and variable relevance to the wellbeing of the animal; these can range from subtle effects on respiration or other behaviors (detectable only by statistical analysis) to active avoidance reactions.
- Upon repeated exposure, the animal may exhibit diminishing responsiveness (habituation/sensitization), or disturbance effects may persist; the latter is most likely with sounds that are highly variable in characteristics, unpredictable in occurrence, and associated with situations that the animal may perceive as a threat.
- Any anthropogenic sound that is strong enough to be heard has the potential to reduce (mask) the ability of marine mammals to hear natural sounds at similar frequencies, including calls from conspecifics, echolocation sounds of odontocetes, and environmental sounds due to wave action or (at high latitudes) ice movement. Marine mammal calls and other sounds are often audible during the intervals between pulses, but mild to moderate masking may occur during that time because of reverberation.
- Very strong sounds have the potential to cause temporary or permanent reduction in hearing sensitivity (temporary and permanent threshold shift), or other physical or physiological effects. Received sound levels must far exceed the animal's hearing threshold for any temporary threshold shift to occur. Received levels must be even higher for a risk of permanent hearing impairment.

It is very unlikely that sea otters will be found within the action area. However, if present, some sea otters may exhibit minor, short-term disturbance responses to underwater sounds from cable-laying activities. Based on expected sound levels produced by the activity, any potential impacts on otter behavior will likely be localized to within an area around the vessels in use.

6.5.2 Injury or Mortality

Due to the low-intensity and non-impulsive nature of sounds produced by cable-laying activities, strandings or mortality resulting from acoustic exposure is highly unlikely. Any potential effects of this nature are more likely to come from ship strikes (e.g., Redfern et al. 2013). Areas where high densities of marine mammals overlap with frequent transits by large and fast-moving ships present high-risk areas. Wiley et al. (2016) concluded that reducing ship speed is one of the most reliable ways to avoid ship strikes. The collision risk of a cable-laying vessel with marine mammals exists but is extremely unlikely because of the relatively slow operating speed (typically 0.5 to 2 knots [1 to 4 km/hr]) of the vessel and the generally straight-line movement (Laist et al. 2001, Vanderlaan and Taggart 2007). For these reasons, collisions are unlikely between sea otters and vessels proposed for use during Project activities. Additionally, sea otters generally respond to an approaching vessel by swimming away from the area, further

reducing the risk of collision. According to the USFWS (2013), injury by vessel strikes is likely to be rare within areas with limited boat traffic.

6.5.3 Spills

The vessels that will be used for the cable-laying operations will have hazardous chemicals, including hydrocarbons, present. If petroleum or other hazardous materials spilled during Project activities, the level of impact on northern sea otters will depend on the size of the spill, location, time of year, and number of sea otters present.

Sea otters are particularly vulnerable to oil spills, and even a small amount has the potential to result in injury or mortality. Unlike many other marine mammals, sea otters do not rely on blubber for insulation, but rather on their fur and a high metabolism to thermoregulate. Fur contaminated by oil loses its ability to properly insulate, resulting in increased metabolic rates in the sea otter. Additionally, detergent used to wash sea otters after oil contamination also temporarily (minimum 8 days) reduces the water repellency feature of sea otter fur, compounding the energy expense for the otter.

The acute effects of oiling on sea otters can result in death from causes such as hypothermia and pneumonia (Costa and Kooyman 1982). For months following the *Exxon Valdez* oil spill in 1989, sea otter deaths from acute effects ranged from 1,000 to several thousands (Ballachey et al. 2014). Sea otter recovery following the spill was delayed due to continued reduction in sea otter survival rates. A study conducted by Bodkin et al. (2012) found that sea otters in Prince William Sound were still being exposed to oil from the *Exxon Valdez* oil spill on a weekly to monthly basis nearly two decades after the spill occurred. According to Ballachey et al. (2014), it took 24 years for sea otter populations in western Prince William Sound to recover from this oil spill. Sea otters are not expected to be impacted by spills caused by the proposed action. Hazardous chemicals associated with the Project will be in small quantities and properly contained, following all regulations, so the occurrence of a spill or leak from Project vessels is unlikely. If a spill occurred, it will be of a low volume and quickly contained.

6.5.4 Habitat Disturbance

Sea bottom disturbance from cable installation activities, route clearance, and plowing could affect sea otters if they are present within the action area. A brief and limited increase in turbidity from suspension of sediments is expected to have minimal effect on sea otters. Cable laying may also disturb the benthic community, which could, in turn, affect food supply over a small area. Sea otters feed on a wide variety of benthic invertebrates (Rotterman and Simon-Jackson 1988), including sea urchins, abalone, clams, mussels, and crabs (Riedman and Estes 1990). The disturbance effects on the benthos will be localized, short-term, and likely indistinguishable from naturally occurring disturbances. Given the brief duration of this activity, likelihood of no sea otters being present, and relatively small area impacted, no impact on sea otter feeding efficiency is anticipated.

No designated critical habitat for the Southwest Alaska DPS of northern sea otter occurs within the action area.

6.6 Indirect Effects of the Action

The proposed activities will result in primarily temporary indirect impacts to the listed species through their food sources. Although activities affect individual prey species, it is not expected that prey availability for the Steller's eider, spectacled eider, short-tailed albatross, and northern sea otter will be significantly affected.

Potential effects of the noise and bottom disturbance produced by Project activities on fish and invertebrates are summarized below. Any effects on these potential prey species could indirectly affect listed species within the action area.

6.6.1 Impacts to Prey Species

Exposure to anthropogenic underwater sounds has the potential to cause physical and behavioral effects on marine invertebrates and fish. Studies that conclude physical and physiological effects occur typically involve captive subjects that are unable to move away from the sound source and are, therefore, exposed to higher sound levels than they will be under natural conditions. Comprehensive literature reviews related to auditory capabilities of fish and marine invertebrates as well as the potential effects of noise include Hastings and Popper (2005), Popper and Hastings (2009a, 2009b), and Hawkins et al. (2015).

6.6.1.1 INVERTEBRATES

The sound detection abilities of marine invertebrates are the subject of ongoing scientific inquiry. Aquatic invertebrates, except aquatic insects, do not possess the equivalent physical structures present in fish and marine mammals that can be stimulated by the pressure component of sound. It appears that marine invertebrates respond to vibrations (i.e., particle displacement) rather than pressure (Breithaupt 2002).

Among the marine invertebrates, decapod crustaceans and cephalopods have been the most intensively studied in terms of sound detection and the effects of exposure to sound. Crustaceans appear to be most sensitive to low-frequency sounds (i.e., less than 1,000 Hz) (Budelmann 1992, Popper et al. 2001). Both cephalopods (Packard et al. 1990) and crustaceans (Heuch and Karlsen 1997) have been shown to possess acute infrasound (i.e., less than 20 Hz) sensitivity. Some studies suggest that invertebrate species, such as the American lobster (*Homarus americanus*), may also be sensitive to frequencies greater than 1,000 Hz (Pye and Watson 2004). A recent study concluded that planktonic coral larvae can detect and respond to sound, the first description of an auditory response in the invertebrate phylum Cnidaria (Vermeij et al. 2010).

Currently, no studies suggest that invertebrates are likely to be harmed by, or show long-term responses to, brief exposures to vessel sounds similar to those that will occur during this Project.

6.6.1.2 FISH

Marine fish are known to vary widely in their abilities to detect sound. Although hearing capability data only exist for fewer than 100 of the 27,000 fish species (Hastings and Popper 2005), current data suggest that most fish species detect sounds with frequencies less than 1,500 Hz (Popper and Fay 2010). Some marine fish, such as shad and menhaden, can detect sound at frequencies greater than 180 kHz (Mann et al. 1997, 1998, 2001).

Numerous papers about the behavioral responses of fish to marine vessel sounds have been published in the primary literature. They consider the responses of small pelagic fish (e.g., Misund et al. 1996, Vabo et al. 2002, Jørgensen et al. 2004, Skaret et al. 2005, Ona et al. 2007, Sand et al. 2008), large pelagic fish (Sarà et al. 2007), and groundfish (Engås et al. 1998, Handegard et al. 2003, De Robertis et al. 2008). Generally, most studies indicate fish typically exhibit some level of reaction to the sound of approaching marine vessels, the degree of reaction being dependent on a variety of factors, including fish activity at the time of exposure (e.g., reproduction, feeding, migration), vessel sound characteristics, and water depth. Simpson et al. (2016) found that vessel noise and direct disturbance by vessels raised stress levels and reduced anti-predator responses in some reef fish and, therefore, more than doubled mortality by predation. This response has negative consequences for fish but could be beneficial to marine mammals that prey on fish.

However, given the routine presence of other vessels within the region and the lack of significant effects on fish species from their presence, indirect effects to listed species from exposure of fish to Project vessel sounds is expected to be very unlikely.

7 Cumulative Effects

Cumulative effects are those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR 402.2). Since the Determination of Effects for each species is either no effect or not likely to adversely affect (see Section 8), cumulative effects are not described in this BA.

8 Determination of Effects

This BA evaluates the potential impacts of the Project on Steller's eider, spectacled eider, short-tailed albatross, and Southwest Alaska DPS of northern sea otter. To reach a conclusion, Project impacts are not considered in isolation, but are placed in the context of the current status of the species and critical habitat, the environmental baseline, and cumulative effects. Consistent with ESA guidance, a "may affect, but is not likely to adversely affect" determination means that all effects are beneficial, insignificant, or discountable. For purposes of this BA, "may affect, but is not likely to adversely affect" suggests that any potential effects are highly unlikely; will be of short duration; will not have any adverse effects to the species or critical habitat; and will not be measurable, or are considered insignificant or discountable. A "may affect, and is likely to adversely affect" determination means that listed resources are likely to be exposed to the action or its environmental consequences, and may respond in a negative manner to this exposure. After considering these aggregate effects on the species, the recommended effect determinations are described in the following sections.

8.1 Steller's Eider

The Project **may affect, but is not likely to adversely affect** Steller's eider. A **may affect** determination is warranted because the action area is located within the species' range, and Steller's eiders have been observed within the action area in the past. A **not likely to adversely affect** determination is warranted because the low levels and low frequency of the noise associated with construction is not likely to result in disturbance or injury. The eiders are unlikely to be disturbed by the presence of vessels due to their slow speeds. The artificial lighting on the vessels is unlikely to disturb eiders because marine-based cable laying will occur during summer. The short-term disturbance of the benthic habitat in which eiders may feed will have an insignificant impact on eider foraging ability or efficiency.

8.2 Spectacled Eider

While the historical range of the spectacled eider has been observed within the action area in the past, a **no effect** determination is warranted because the probability of spectacled eiders occurring within the action area is so low as to be discountable.

8.3 Short-tailed Albatross

A **no effect** determination is warranted because the probability of short-tailed albatross occurring during cable-laying activities between May and June is so low as to be discountable.

8.4 Southwest Alaska DPS of Northern Sea Otter

A **no effect** determination is warranted because the action area is not within the current known range of the Southwest Alaska DPS of northern sea otter, so the probability of this species occurring within the action area is so low as to be discountable.

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2022d Short-tailed Albatross (*Phoebastria albatrus*) Range Information. Updated May 26, 2022. Accessed at https://ecos.fws.gov/ecp/species/433#rangeInfo on January 13, 2023.

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Appendix A. ESA-listed Species/Populations Present within/near the Action Area (USFWS, February 2, 2023)

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IPaC

U.S. Fish & Wildlife Service

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS offce(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

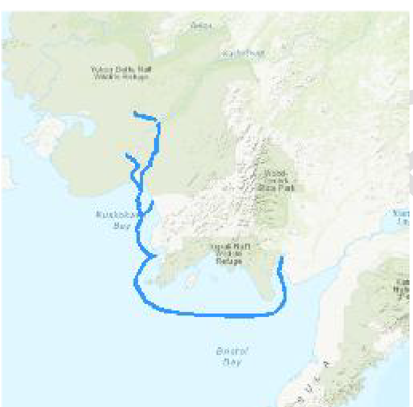
Project information

NAME

Airraq Phase 1 and 2

LOCATION

Bethel and Dillingham counties, Alaska



DESCRIPTION

None

Local office

Anchorage Fish & Wildlife Field Office

Phone (907) 271-2888

Fax (907) 271-2786

4700 Blm Road

Anchorage, AK 99507

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local offce and a species list which fulfills this requirement can only be obtained by requesting an offcial species list from either the Regulatory Review section in IPaC (see directions below) or from the local field offce directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an offcial species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are not shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Sea Otter Enhydra lutris kenyoni There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/2884	Threatened Marine mammal
Wood Bison Bison bison athabascae Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8362	Threatened

Birds

NAME	STATUS
Short-tailed Albatross Phoebastria (=Diomedea) albatrus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/433	Endangered
Spectacled Eider Somateria fischeri Wherever found There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/762	Threatened
Steller's Eider Polysticta stelleri There is final critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/1475	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing

appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take- migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation- measures.pdf

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

Please refer to Alaskas Bird Nesting Season for recommendations to minimize impacts to migratory birds, including eagles.

NAME	BREEDING SEASON
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Feb 1 to Sep 30

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4- week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the

week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds

across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (I)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

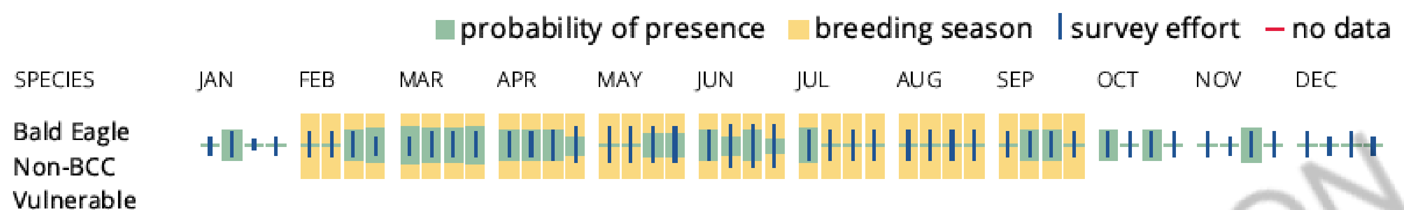
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science

datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Offce if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

There are migratory birds in your project area. Please refer to Alaska's Bird Nesting Season for recommendations to minimize impacts to migratory birds, including eagles.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds

https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take- migratory-birds

- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

Name	Breed Season
Aleutian Tern Sterna aleutica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9599	Breeds May 1 to Aug 31
American Golden-plover Pluvialis dominica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 15
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities	Breeds Feb 1 to Sep 30
Black Scoter Melanitta nigra This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Name	Breed Season
Black Turnstone Arenaria melanocephala This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska	Breeds May 15 to Jul 31
Black-legged Kittiwake Rissa tridactyla This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Common Loon gavia immer This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/4464	Breeds Apr 15 to Oct 31
Dunlin Calidris alpina arcticola This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds May 20 to Jul 20
Hudsonian Godwit Limosa haemastica This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Jul 31
Long-tailed Duck Clangula hyemalis This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/7238	Breeds elsewhere
Pomarine Jaeger Stercorarius pomarinus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Name	Breed Season
Red Phalarope Phalaropus fulicarius This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-breasted Merganser Mergus serrator This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-necked Phalarope Phalaropus lobatus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Red-throated Loon Gavia stellata This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere
Short-billed Dowitcher Limnodromus griseus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9480	Breeds Jun 1 to Aug 10
White-winged Scoter Melanitta fusca This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds elsewhere

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4- week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

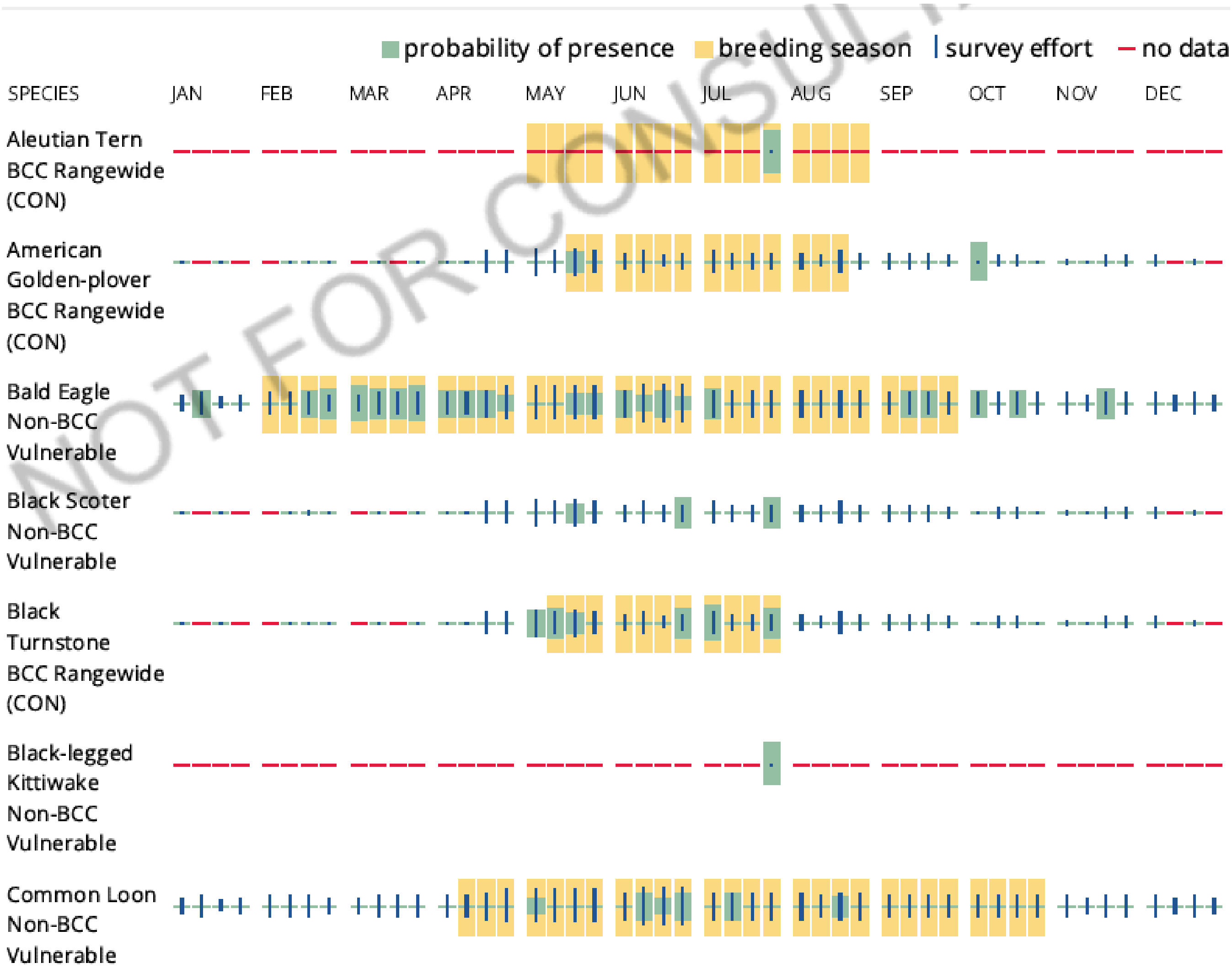
No Data (−)

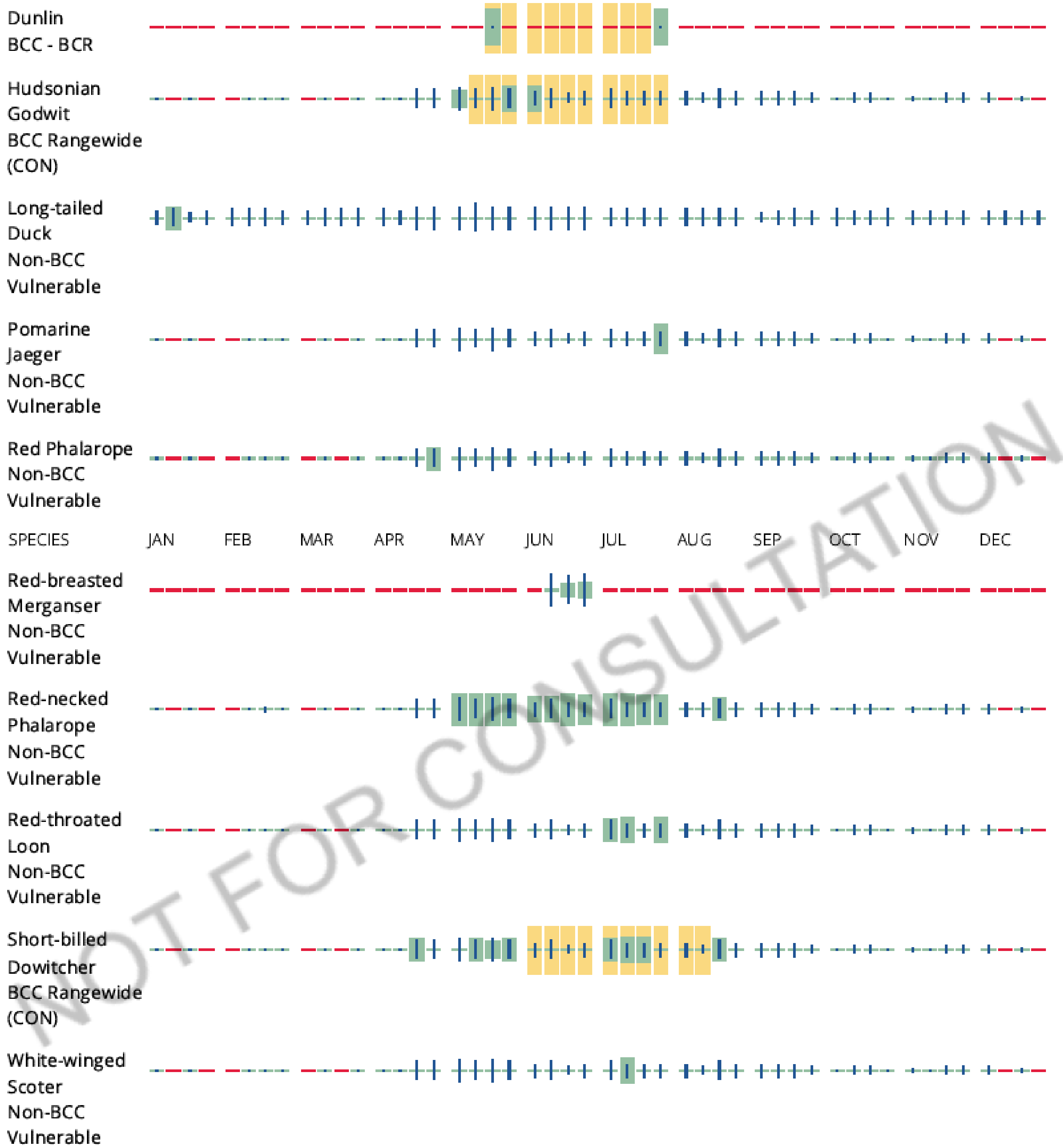
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant

information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your

list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Marine mammals

Marine mammals are protected under the Marine Mammal Protection Act. Some are also protected under the Endangered Species Act[1] and the Convention on International Trade in Endangered Species of Wild Fauna and Flora[2].

The responsibilities for the protection, conservation, and management of marine mammals are shared by the U.S. Fish and Wildlife Service [responsible for otters, walruses, polar bears, manatees, and dugongs] and NOAA Fisheries[3] [responsible for seals, sea lions, whales, dolphins, and porpoises]. Marine mammals under the responsibility of NOAA Fisheries are not shown on this list; for additional information on those species please visit the Marine Mammals page of the NOAA Fisheries website.

The Marine Mammal Protection Act prohibits the take (to harass, hunt, capture, kill, or attempt to harass, hunt, capture or kill) of marine mammals and further coordination may be necessary for project evaluation. Please contact the U.S. Fish and Wildlife Service Field Office shown.

1. The Endangered Species Act (ESA) of 1973.
2. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is a treaty to ensure that international trade in plants and animals does not threaten their survival in the wild.
3. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an offce of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following marine mammals under the responsibility of the U.S. Fish and Wildlife Service are potentially affected by activities in this location:

NAME

Northern Sea Otter Enhydra lutris kenyoni

https://ecos.fws.gov/ecp/species/2884

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

This location overlaps the following National Wildlife Refuge lands:

LAND	ACRES
TOGIAK NATIONAL WILDLIFE REFUGE	28,553,452.44 acres
YUKON DELTA NATIONAL WILDLIFE REFUGE	10,145,825,325.27 acres

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

NO DATA AVAILABLE - This area (or portions of it) has not been surveyed by the NWI. For more information, please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

NOTE: This initial screening does not replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the

information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies.

Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

USFWS Guidance to Prevent Incidental Take of Pacific Walruses and Northern Sea Otters for the Airraq Network Project Phases 1 and 2

The geographic area specified in the Airraq Project falls within the range of Pacific walruses (*Odobenus rosmarus divergens*) and is adjacent to the range of northern sea otters (*Enhydra lutris kenyoni*). These species are protected under the Marine Mammal Protection Act (MMPA), which prohibits the take (i.e., hunting, killing, capture, and/or harassment) of marine mammals. Project activities, such as vessel transits between communities and the work vessels, have the potential to disturb Pacific walruses and northern sea otters, which can result in unauthorized incidental take of this species. The U.S. Fish and Wildlife Service (referred to as "the Service" hereafter) has created a list of guidelines intended to prevent incidental take of Pacific walruses and northern sea otters during this project. Application of these guidelines neither guarantees that take will not occur, nor indemnifies project personnel from legal consequences in the event that take of a marine mammal does occur.

Measures to Prevent Interference with Subsistence Harvest by Alaska Native People

Operators who do not hold authorizations for Incidental Take are not bound to conduct community consultations or develop Plans of Cooperation to ensure the availability of marine mammals for subsistence harvest by Alaska Native people. However, we would strongly encourage non-holders to watch for subsistence harvest activity and avoid areas where people are hunting. Additionally, we would recommend that project personnel listen for radio traffic regarding planned subsistence harvest activity.

Pacific Walrus Guidelines

The project area is within the range of Pacific walruses. Walruses range throughout the continental shelf waters of the Bering and Chukchi Seas. During summer months, the majority of the population will migrate into the Chukchi Sea. However, several thousand walruses, primarily adult males, use areas in the Gulf of Anadyr, Russia, Bering Strait, and Bristol Bay, Alaska, as coastal haulouts (USFWS 2014a). It is likely that walruses may be swimming near the project area and hauled out on land in or near the project area. For more information about Pacific walruses, please refer to the most recent stock assessment report available at: https://www.fws.gov/ecological-services/species/stock-assessment-reports.html.

Noise generated by project activities, whether stationary or mobile, has the potential to disturb walruses. Potential impacts of noise include displacement of walruses from preferred foraging areas, increased stress and energy expenditure, interference with feeding, and masking of communications (Garlich-Miller et al. 2011). Most impacts of noise on walruses are likely to be limited to a few groups or individuals rather than the population due to their geographic range and seasonal distribution. However, walruses disturbed by noise at a coastal haulout can trigger a stampede toward the water. These disturbance-related stampedes could result in trampling injuries or cow-calf separations, both of which are potentially fatal. Calves and young animals at the perimeter of the herds appear particularly vulnerable to trampling injuries (Garlich-Miller et al. 2011, USFWS 2017). Reactions of walruses to noise sources, particularly mobile sources such as helicopters and vessels, vary. Reactions also depend on the individual's prior exposure to the disturbance source, its need or desire to be in the particular habitat or area where it is exposed to the noise, and visual presence of the disturbance sources.

Vessels transporting project personnel or materials to the work sites may encounter aggregations of walruses hauled out onto land. The sight, sound, or smell of humans and machines could potentially displace these animals from coastal haulouts. The reaction of walruses to vessel traffic is dependent upon vessel type, distance, speed, and previous exposure to disturbances. Generally, walruses react to vessels by leaving the area, but we are aware of at least one occasion in 2009 where an adult walrus used a vessel as a haulout platform. Walruses in the water appear to be less readily disturbed by vessels than walruses hauled out on land or sea ice, and noise and disturbance from vessels are usually expected to have localized, short-term effects. Nevertheless, there is potential for disturbance events which can result in walrus injuries, mortalities, or cow-calf separations. This potential for injuries, though unlikely, is expected to increase with the size of affected walrus aggregations.

Vessels should take all practical measures (i.e., reduce speed, change course heading) to maintain a minimum 805-m (0.5-mi) operational exclusion zone around groups of 12 or more walruses encountered in the water. We note that we reviewed the data on Industry encounters with walruses during 1989, 1990, and 2006-2012 and calculated the average size of groups of walruses which was 16 in 1989, 13 in 1990, and 7 from 2006-2012 resulting in a mean of 12. Observations of 12 or more walruses at the surface of the water likely represent a larger number of walruses in the immediate area that are not observed (possibly 70 or more). Vessels may not be operated in such a way as to separate individual walruses from a group. Industry vessels should adjust speed to reduce the likelihood of injuring a walrus during low-visibility conditions. To prevent instances of take of walruses by vessel activities, the Service recommends the following guidelines:

- Vessels should post a lookout for walruses whenever possible.
- Vessels shall remain at least 5.6 kilometers (3 nautical miles) from known walrus haulouts when safe and practicable.
- Vessel operators will avoid using loud equipment and speakers near walrus haul-outs.
- Vessels should always maintain the maximum distance possible from concentrations of walruses.

- Vessels should never approach within an 805-m (0.5 mile) radius of walruses in the water unless changes to vessel speed and course are precluded by safety concerns or sea conditions.
- Vessel operators should take every precaution to avoid harassment of concentrations of feeding walruses when a vessel is operating near these animals.
- Vessels should reduce speed when walrus are spotted unless changes to vessel speed and course are precluded by safety concerns or sea conditions.
- Vessel operators should avoid separating members of a group of walruses, encircling walruses, and impeding movement of walruses. If a walrus approaches, and it is safe to do so, put the engine in neutral and allow the walrus to pass at its own volition.
- Vessel operators shall practice speed reductions during times of limited visibility in areas where walruses may be present unless changes to vessel speed and course are precluded by safety concerns or sea conditions.

Aircraft overflights may disturb walruses. Reactions to aircraft vary with range, aircraft type, and flight pattern as well as walrus age, sex, and group size. Adult females, calves, and immature walruses tend to be more sensitive to aircraft disturbance. Fixed-winged aircraft are less likely to elicit a response than helicopter overflights. Walruses are particularly sensitive to changes in engine noise and are more likely to stampede when planes turn or fly low overhead. Researchers conducting aerial surveys for walruses in sea-ice habitats have observed little reaction to fixed-winged aircraft above 457 m (1,500 ft) (USFWS unpubl. data). Although the intensity of the reaction to noise is variable, walruses are probably most susceptible to disturbance by fast-moving and low-flying aircraft (100 m (328 ft) above ground level) or aircraft that change or alter speed or direction. In the Chukchi Sea, there are recent examples of walruses being disturbed by aircraft flying in the vicinity of haulouts. It appears that walruses are more sensitive to disturbance when hauled out on land versus sea ice.

Stand-off distances have been established between walruses and aircraft to minimize impacts and limit disturbance. The Service recommends that aircraft operators conduct their activities at the maximum distance possible from concentrations of walruses. In past regulations, the minimum altitude recommended for rotary-winged aircraft was 1,500 ft. However, the Service has determined that walruses at land-based haulouts are more susceptible to disturbance and have increased the height restriction, which in turn should decrease the possibility of disturbance. These operating conditions are intended to mitigate the potential for walruses to be flushed from haulouts:

- Aircraft operators should avoid taking off and landing within 0.5 mile of a walrus haulout for single-engine aircraft and within 1 mile of a walrus haulout for multi-engine aircraft and helicopters.
- Single-engine aircraft and Unmanned Aerial Systems (UAS) devices should remain 0.5 mile away from a walrus haulout when safe and practicable.
- If weather or aircraft safety require flight operations within 0.5 mile of a walrus haulout, single-engine aircraft and UAS devices should maintain a minimum altitude of 2,000 feet within 0.5 mile of a walrus haulout when safe and practicable.
- Multi-engine aircraft and helicopters should not fly over or within 1 mile of a walrus haulout when safe and practicable.
- If weather or aircraft safety require flight operations within 1 mile of a walrus haulout, multi- engine aircraft and helicopters should maintain a minimum altitude of 3,000 feet within 1 mile of a walrus haulout when safe and practicable.
- Aircraft operators should avoid unnecessary turning of the aircraft or circling when in the vicinity of walruses hauled out on land or ice.

Northern Sea Otter Guidelines

The project area is adjacent to the range of the Southwest Alaska Northern Sea Otter Stock. This stock's range includes the Alaska Peninsula, Bristol Bay coasts, and the Aleutian, Barren, Kodiak, and Pribilof Islands. This species is currently listed as Threatened under the Endangered Species Act (ECOS, USFWS 2014b). For more information about this stock, please refer to the most recent stock assessment report available at: https://www.fws.gov/ecological-services/species/stock-assessment-reports.html.

The project activities, such as transportation of personnel or materials by helicopter or vessel, have the potential to result in take of sea otters by harassment from noise. Here, we characterize "noise" as sound released into the environment from human activities that exceeds ambient levels or interferes with normal sound production or reception by sea otters. The terms "acoustic disturbance" or "acoustic harassment" are disturbances or harassment events resulting from noise exposure. Potential effects of noise exposure are likely to depend on the distance of the sea otter from the sound source and the level of sound the sea otter receives. Temporary disturbance or localized displacement reactions are the most likely to occur.

Whether a specific noise source will affect a sea otter depends on several factors, including the distance between the animal and the sound source, the sound intensity, background noise levels, the noise frequency, the noise duration, and whether the noise is pulsed or continuous. The actual noise level perceived by individual sea otters will depend on distance to the source, whether the animal is above or below water, atmospheric and environmental conditions as well as aspects of the noise emitted.

To prevent instances of take of sea otters by aircraft activities, the Service recommends the following guidelines:

- Aircraft should maintain a minimum altitude of 305 m (1,000 ft) to avoid unnecessary harassment of sea otters, except during takeoff and landing, and when a lower flight altitude is necessary for safety due to weather or restricted visibility.
- Aircraft should not be operated in such a way as to separate individual sea otters from a group of sea otters.
- UAS devices or drones should not cause take by harassment of sea otters.

To prevent instances of take of sea otters by vessel-based activities, the Service recommends the following guidelines:

- Vessel operators should take every precaution to avoid harassment of sea otters when a vessel is operating near these animals.
- Vessels should not approach within 100 meters (328 feet) of individual sea otters.
- Vessels should remain at least 500 m from rafts of sea otters (groups of 10 or more sea otters) unless safety is a factor.
- Vessels should reduce speed and maintain a distance of 100 m (328 ft) from all sea otters unless safety is a factor.
- Vessels should not be operated in such a way as to separate individual sea otters from a group of sea otters.
- When weather conditions require, such as when visibility drops, vessels should adjust speed accordingly to reduce the likelihood of injury to sea otters.
- Vessels in transit should use established navigation channels or commonly recognized vessel traffic corridors, and they should avoid alongshore travel in shallow water (<20 m) whenever practicable.

Guidelines During Observations of Pacific Walruses or Sea Otters

If sea otters or walruses are observed in the project area, the Service would appreciate receiving the following information:

- Date, time, and location of the marine mammal observation;
- Number of individual marine mammals by sex and age, if possible;
- Observer name and contact information;
- Weather, visibility, and ice conditions at the time of the marine mammal observation;
- Estimated closest point of approach for the marine mammal from personnel and facilities/equipment;;
- Project activity at time of the marine mammal observation and possible attractants if present
- Marine mammal behavior;

- Description of the encounter with the marine mammal;
- Duration of the encounter with the marine mammal;
- Actions taken to mitigate take of the marine mammal;

If walruses are observed during personnel transits by aircraft or vessel, it would be helpful if project personnel record the following information:

- Aircraft or vessel heading;
- Aircraft or vessel speed;
- Aircraft altitude;
- Initial behaviors of the marine mammals before being aware of or responding to the aircraft or vessel;
- A description of any apparent reactions from the marine mammals to the aircraft or vessel.

If an incident with a walrus or sea otter were to occur, incident reports should include all of the previously requested information, a full written description of the encounter with the animal, and the actions taken by project personnel to mitigate take of the animal. Project personnel must immediately report an incidental lethal take or injury of a walrus or sea otter to the Service. Information on walrus observations can be submitted to the Service by email to fw7_mmm_reports@fws.gov.

If injured, dead, or distressed walruses or sea otters are observed that are not associated with project activities (e.g., walruses or sea otters found outside the project area, previously wounded walruses or sea otters, or carcasses with moderate to advanced decomposition or scavenger damage), please report this information to the Service as soon as possible. Photographs, video, location information, or any other available documentation would be appreciated. Project personnel may contact the Service at 1-800-362-5148 during business hours or the Alaska SeaLife Center in Seward at 1-888-774-7325 (24-hours).

References

ECOS (U.S. Fish and Wildlife Service Environmental Conservation Online System). Northern sea otter (*Enhydra lutris kenyoni*). Available at: https://ecos.fws.gov/ecp/species/2884.

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Garlich-Miller, J., J. G. MacCracken, J. Snyder, R. Meehan, M. Myers, J. M. Wilder, E. Lance, and A. Matz. 2011. Status review of the Pacific walrus (*Odobenus rosmarus divergens*). Marine Mammals Management, U.S. Fish and Wildlife Service,Anchorage, Alaska, USA.

USFWS (U.S. Fish and Wildlife Service). 2014a. Pacific walrus (*Odobenus rosmarus divergens*): Alaska Stock. U.S. Fish and Wildlife Service, Region 7, Anchorage, Alaska, USA.

USFWS (U.S. Fish and Wildlife Service). 2014b. Northern sea otter (*Enhydra lutris kenyoni*): Southwest Alaska Stock. U.S. Fish and Wildlife Service, Region 7, Anchorage, Alaska, USA.

USFWS (U.S. Fish and Wildlife Service). 2017. Final species status assessment for the Pacific walrus (*Odobenus rosmarus divergens*). U.S. Fish and Wildlife Service, Region 7, Anchorage, Alaska, USA.

Appendix F. NMFS Essential Fish Habitat Coordination

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THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Fish and Game

HABITAT SECTION
Southcentral Regional Office

333 Raspberry Road
Anchorage, Alaska
Main: 907.267.2342
Fax: 907.267.2499

FISH HABITAT PERMIT FH23-II-0071

AMENDMENT I

ISSUED: February 7, 2024
EXPIRES: December 31, 2027

Unicom, Inc./GCI Communications Group
Attn: Chris Mace
2550 Denali St
Anchorage, AK 99503

RE: Fiberoptic Cable Installation and Stream Crossing
Nushagak River (Water Body No. 325-30-10100)
Section 36, T 13 S, R 56 W, SM
Location: 59.0013173 N, 158.508569 W

Dear Chris Mace:

Pursuant to the Anadromous Fish Act at AS 16.05.871 (b), the Alaska Department of Fish and Game (ADF&G) Habitat Section has reviewed your request to amend Fish Habitat Permit FH23-II-0071 to allow in-water work in the Nushagak River to begin July 25, 2024.

In accordance with AS 16.05.871(d), FH23-II-0071is hereby amended to allow the in-water work window in the Nushagak River to begin July 25, 2024.

All other terms and conditions of Fish Habitat Permit FH23-II-0071 remain in full force and effect. Please attach this amendment to the original permit and retain them both on site for your reference.

You may appeal this permit decision relating to AS 16.05.871 in accordance with the provisions of AS 44.62.330-630.

Please direct questions about this permit to Habitat Biologist Andrew Kastning at 907-267-2813 or andrew.kastning@alaska.gov.

Sincerely,
Doug Vincent-Lang
Commissioner

Ron Benkert

By Ron Benkert
Southcentral Regional Supervisor

Email cc:

A. Ott, ADF&G-HAB
L. Borden, ADF&G-SF
J. Chythlook, ADF&G-SF
T. Sands, ADF&G-CF
N. Smith, ADF&G-CF
C. Larson, ADNR DMLW
ADNR - TWUA
J. Rypkema, ADEC
USACE, Regulatory
DPS/AWT, Dillingham
DPS/AWT, Bethel
Togiak National Wildlife Refuge
Yukon/Kuskokwim Delta National Wildlife Refuge

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802-1668

May 8, 2023

Amanda Pereira
Environmental Program Officer
National Telecommunications and Information Administration
Office of Internet Connectivity and Growth
1401 Constitution Ave., N.W.
Washington, D.C. 20230

Re: NTIA-Bethel Native Corp: Unicom-Airraq Project; NMFS ECO No. AKRO-2023-00545

Dear Amanda Pereira:

The National Marine Fisheries Service has reviewed the Airraq Network Phases 1 and 2 Essential Fish Habitat assessment provided on April 6, 2023, regarding the above referenced project. The purpose of this project is to extend the existing fiber-optic cable network from Dillingham to ten Western Alaska communities, bringing high-speed broadband internet service to the Yukon-Kuskokwim Delta. The proposed scope of work includes installing fiber optic cable within marine habitats below mean high water, freshwater habitats below ordinary high water, and five landfall locations. Construction is anticipated to start in early 2024 and be complete in 2027 as part of the Airraq Network Project.

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 essential fish habitat (EFH) and other aquatic resources. The EFH consultation process is guided by our EFH regulation at 50 CFR 600 Subpart K, which mandates the preparation of EFH assessments and generally outlines each agency's obligations in this consultation process. 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.

Essential Fish Habitat

The North Pacific Fishery Management Council has identified EFH for nearshore marine waters, running between and making landfall in Dillingham, Platinum, Quinhagak, EeK, and Tuntutuliak for Chinook, chum, pink, sockeye, and coho salmon (NPFMC 2021). The Alaska Department of Fish and Game's Anadromous Waters Catalog identifies the Kuskokwim, Eek, Kinak, Kuskokwim, and Nushagak Rivers as supporting anadromous fish, including all five species of Pacific salmon (Giefer and Graziano 2022). Juvenile salmon use nearshore habitat during spring and early summer for feeding and predator avoidance prior to migration out to sea. The proposed project locations are also designated as EFH for groundfish and crab, including arrowtooth flounder, flathead sole, great sculpin, red king crab, and tanner crab, among others (NPFMC 2020).

In addition, the Nearshore Fish Atlas of Alaska indicates that many species use the nearshore habitat in the vicinity of the project, such as rainbow smelt, Alaska plaice, and Arctic flounder (NMFS 2021).

Assessment of Effects to EFH

Your agency has concluded that the proposed project activity may adversely affect EFH in the project area. You also concluded those effects would be minimal in nature and short-term. Your proposed action includes implementation of best management practices to avoid and minimize potential construction related impacts to habitat. 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 information provided during early coordination, we agree with your conclusion of potential adverse effects to EFH. Implementation of your proposed conservation measures and best management practices will mitigate those potential effects. 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. Charlene Felkley charlene.felkley@noaa.gov is available to answer questions or discuss further actions.

Sincerely,

Jonathan M. Kurland
Regional Administrator

cc: Amanda Pereira, apereira@ntia.gov
Erin Cunningham, Erin.Cunningham@hdrinc.com
Keja Whiteman, kwhiteman@ntia.gov
Andrew Bielakowski, andrew.bielakowski@firstnet.gov
Valerie Haragan, vharagan@gci.com
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Malcolm Salway, malcolm.salway@hdrinc.com

References

Giefer, J., and S. Graziano. 2022. Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Arctic Region, effective June 15, 2022, Alaska Department of Fish and Game, Special Publication No. 22-01, Anchorage. https://www.adfg.alaska.gov/static-sf/AWC/PDFs/2022arc_CATALOG.pdf

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North Pacific Fishery Management Council (NPFMC). 2020. Fishery Management Plan for the Groundfish of the Bering Sea and Aleutian Islands Management Area. NPFMC, Anchorage, AK. Accessed at: https://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf

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Airraq Network

PHASES 1 AND 2

Essential Fish Habitat Assessment

Unicom, Inc

MARCH 2023

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Contents

Tables

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Appendices

Acronyms and Abbreviations

ADF&G	Alaska Department of Fish and Game
AWC	Anadromous Waters Catalog
BSAI	Bering Sea and Aleutian Islands Management Area
EFH	essential fish habitat
FMP	federal fishery management plan
FOC	fiber optic cable
HAPC	habitat areas of particular concern
HTL	high tide line
Magnuson-Stevens Act	Magnuson-Stevens Fishery Conservation and Management Act
MHW	mean high water
MLW	mean low water
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
NTIA	National Telecommunications and Information Administration
OHW	ordinary high water
PLGR	pre-lay grapnel run
Project	Airraq Network
Unicom	Unicom, Inc.
USACE	U.S. Army Corps of Engineers

1 Introduction

Unicom, Inc. (Unicom), a wholly-owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim Delta as part of Airraq Network (Project). In doing so, Unicom will extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 Western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk. These communities that the Project proposes to service are home to the Yup'ik, with at least 74 percent of their population being Alaska Native.

Estuarine and marine habitats within the Bering Sea support fish species managed under federal fishery management plans (FMPs) and are designated as essential fish habitat (EFH) for some of these species. Habitats identified by the Anadromous Waters Catalog (AWC) as supporting Pacific salmon (*neqaraq*) [1] are also considered EFH for the salmon species listed.[2] Installing FOC between Dillingham and the other communities will require in-water work below the mean high water (MHW) or ordinary high water (OHW) elevations, and some Project components have the potential to affect federally managed fish species and EFH.

In April 2023, the National Telecommunications and Information Administration (NTIA), the lead federal agency for this Project, submitted a Department of Army permit application to the U.S. Army Corps of Engineers (USACE) requesting Section 404/10 authorization under Nationwide Permit 57 (Electric Utility Line and Telecommunications Activities) for this Project. NTIA understands that consultation with the National Oceanic and Atmospheric Administration (NOAA) Fisheries is required when a federal agency works within an area that may affect EFH.

In accordance with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act),[3] this abbreviated EFH assessment describes proposed Project components that may affect designated EFH and/or managed fish species (Section 2), identifies species and lifestage for which EFH is designated (Section 3), presents an analysis of potential impacts on EFH and managed fish species (Section 4), identifies proposed measures to minimize potential effects (Section 5), and summarizes NTIA's determination of effects (Section 6). NTIA will be using an abbreviated consultation procedure because the proposed Project will not result in substantial adverse effects to EFH.[4]

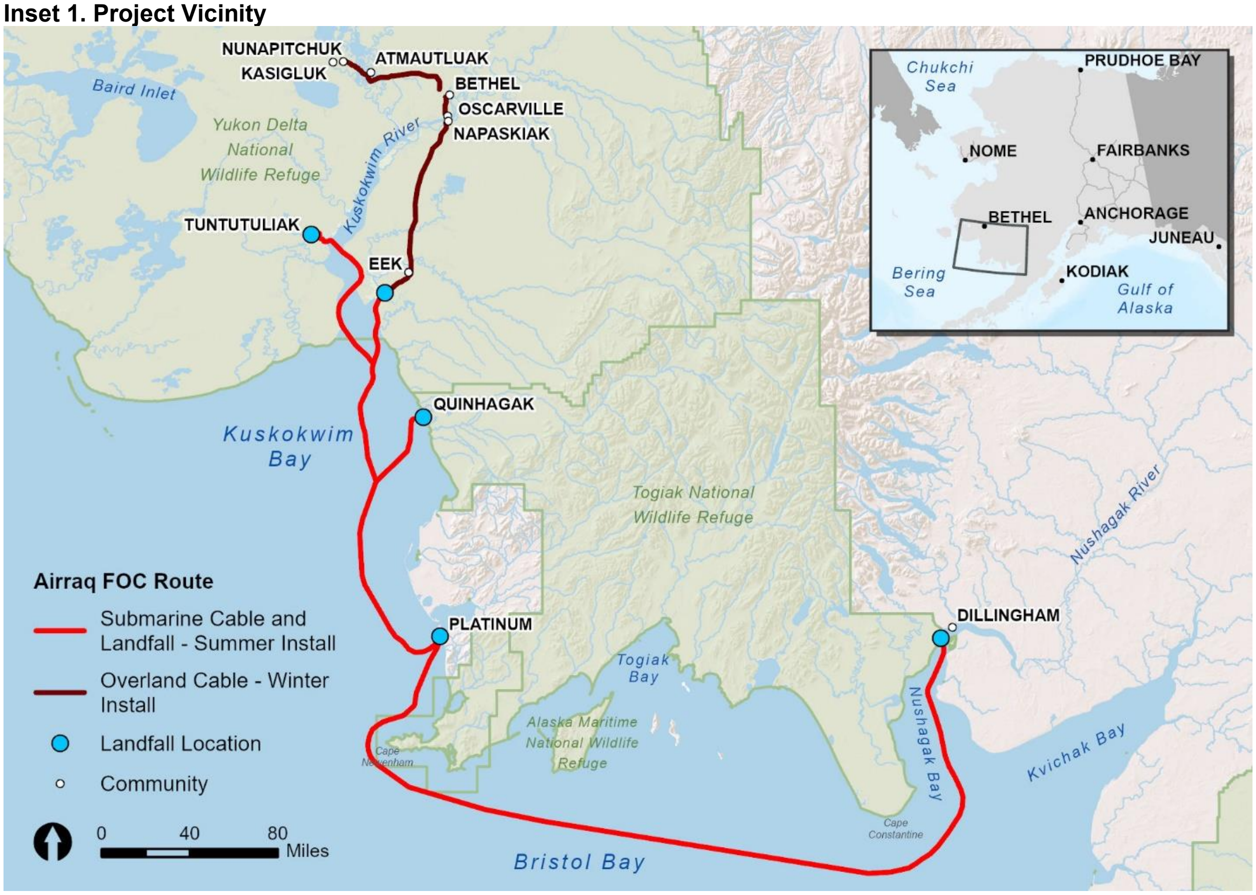
[1] The Yup'ik name for salmon is *neqaraq* (SASAP 2023).
[2] The AWC specifies which streams, rivers, and lakes are important to anadromous fish species and therefore afforded protection under Alaska Statute 16.05.871.
[3] The Magnuson-Stevens Act defines EFH as "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." A provision of the Act requires that Fisheries Management Councils identify and protect EFH for fish species managed by a federal FMP (U.S. Code 1853(a)(7)).
[4] Substantial adverse effects are those that may pose a relatively serious threat to EFH and typically could not be alleviated through minor modifications to the proposed action (NMFS 2004).

2 Proposed Action

Unicom anticipates construction will start in early 2024 and be complete in 2027. Installing FOC within marine habitats below MHW and select freshwater habitats below OHW are the primary Project activities that will intersect EFH. The subsections below summarize activities that will intersect EFH. Appendix A provides a detailed description for all Project components.

The inset below provides an overview of the Project, identifying the 5 landfall locations, the overland and marine routes for the FOC, and the 10 communities to be serviced.

Inset 1. Project Vicinity



2.1 Overland Route (Winter)

Unicom plans to install FOC within the overland route during winter conditions, starting with the segment from Eek to Bethel in winter (February through April) 2024. This work will include laying cable across the frozen ground surface, where it will self-bury over time, and burying the cable into streambanks below OHW at crossings (using a backhoe). Care will be taken to position crossings on stable banks for erosion protection. When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface so it can passively drop into the waterbody during spring break-up and self-bury within aquatic bed sediments.

2.2 Marine Route/Landfall Locations (Summer)

Unicom plans to install submarine cable between the five landfall locations (Dillingham, Platinum, Apogak [Eek], Quinhagak, and Tuntutuliak) in summer (June through August) 2024. The cable will either be placed on the seafloor's surface or buried beneath it to protect the cable from ice scour, wave action, and/or human activity. As the route approaches each of the five landfall locations, Unicom will bury the cable for protection. Unicom will conduct geophysical investigations in 2023 to assess bathymetric conditions along the marine route and identify areas necessary for trenching.[5] The Project will use one of three trenching methods to bury the cable, depending on seafloor substrate, water depth, and distance from shore.

Where trenching is needed in deep waters (more than 40 feet), cable will be fed through a cable plow's share blade and installed within its 1-foot-wide (up to 5-foot deep) excavated trench.[6] Sediments will immediately collapse on top of, and bury, the cable, as the plow is pulled by the cable ship. In deep waters (more than 40 feet), Unicom anticipates that approximately 20 percent of the cable will be surface laid, and the other 80 percent will be buried for protection. [7]

Where cable burial is needed in waters less than 40 feet deep, a jet sled will focus highly pressurized water onto the seafloor to liquify substrate, and the cable will sink into its 8-inch-wide (up to 1-foot-deep) trench. Divers will accompany the jet sled to monitor trenching performance and assist in operations.

Standard trenching in intertidal areas will be conducted with a backhoe during low tidal conditions to connect cable from marine waters to a beach maintenance hole (above the high tide line [HTL]) at each landfall location. Standard trenching dimensions are 3 feet wide and 3 feet deep with a temporary (1 week) side cast area of 5 feet.

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

[6] Trenching within deep sea segments will protect the cable against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes, where necessary.

[7] After install, post-lay inspections in select areas where initial cable installation encountered difficulty (e.g., plow failure, uncontrolled cable payout, etc.), using a remotely operated vehicle, to facilitate issue resolution. Where needed, the remotely operated vehicle will use jet burial to bury the cable.

3 Essential Fish Habitat

The Magnuson-Stevens Act defines EFH as “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” It notes:

> …for the purpose of interpreting the definition of EFH, ‘waters’ include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic 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; and ‘spawning, breeding, feeding, or growth to maturity’ covers a species full life cycle.

EFH is defined by textual and spatial descriptions in the FMPs developed by Fishery Management Councils. The North Pacific Fishery Management Council (NPFMC) identifies marine habitat in the Eastern Bering Sea as essential for several Pacific salmon[8], groundfish, and crab species (NPFMC 2020, 2021a, 2021b). Freshwater streams, lakes, ponds, wetlands, and other water bodies that support Pacific salmon, as identified by the Alaska Department of Fish and Game (ADF&G) AWC, are also designated as EFH.

3.1 FMP-Managed Species

The NPFMC (2020) reports the Eastern Bering Sea as one of the most biologically productive areas of the world. Estuarine and marine waters along the proposed submarine cable route provide EFH for mature adult Chinook (*Oncorhynchus tshawytscha*), chum (*O. keta*), coho (*O. kisutch*), sockeye (*O. nerka*), and pink (*O. gorbuscha*) salmon (NPFMC 2021a).[9] These waters are also designed as EFH for chum, coho, pink, and sockeye salmon during their marine juvenile lifestage as well as for Chinook, chum, and sockeye salmon during their immature adult lifestage (NOAA 2023).[10]

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[8] Marine EFH for salmon within Alaska includes estuarine and marine areas used by salmon of Alaska origin, extending from the influence of tidewater and tidally submerged habitats to the limits of the U.S. Exclusive Economic Zone (NMFS 2005).

[9] Yu’pik names for Chinook salmon: *kiagtaq*, *taryaqvak*; chum salmon: *aluyak*, *iqalluk*, *kangitneq*, *mac’utaq*, *teggmaarrluk*; coho salmon: *caayuryaq*, *qakiiyaq*, *qavlunaq*, *uqurliq*; sockeye salmon: *cayak*, *sayak*; and pink salmon: *amaqaayak*, *amaqsuq*, *cuqpeq*, *terteq* (SASAP 2023).

[10] Bristol Bay supports the largest population of sockeye salmon in the world. Scientists have confirmed an increase in adult sockeye salmon returns in Bristol Bay between 2015 and 2022. Adult Chinook, chum, and coho salmon runs have declined by substantial and unprecedented levels throughout the Arctic-Yukon-Kuskokwim region in recent years (Siddon 2022). The decline in Chinook and chum salmon numbers within this region was evident by the 1990s. Subsistence harvest within the Kuskokwim area was historically the second-largest subsistence fishery in Alaska, with the Yukon River supporting the largest (SASAP 2023). Recent sampling efforts (2015 to 2022) have also confirmed a steady decline of juvenile Chinook salmon abundance within the northern Bering Sea (Siddon 2022).

The submarine cable route also intersects EFH designated for several species (and lifestages) of groundfish and crab, in addition to Pacific salmon.[11] Table 3-1 identifies FMP-managed groundfish with marine EFH designations within 1 mile of the proposed Project (NOAA 2023). The FMPs detail life history and habitat requirements for each species.

Table 3-1. Groundfish and Crab EFH Designations within 1 Mile of the Project

Common Name	Latin Name	EFH Designation Timing and Lifestage
Alaska plaice	*Pleuronectes quadrituberculatus*	Spring: Adult Summer: Adult, Egg, Larvae
Alaska skate	*Bathyraja parmifera*	Summer: Juvenile
Aleutian skate	*Bathyraja aleutica*	Spring: Adult
Arrowtooth flounder	*Atheresthes stomas*	Summer: Adult, Juvenile
Flathead sole	*Hippoglossoides elassodon*	Summer: Adult, Juvenile, Egg
Great sculpin	*Myoxocephalus polyacanthocephalus*	Spring: Adult Summer: Juvenile
Kamchatka flounder	*Atheresthes evermanni*	Summer: Juvenile
Northern rock sole	*Lepidopsetta polyxystra*	Spring: Adult Summer: Adult, Juvenile, Larvae
Octopus[a]	*Enteroctopus dolfeini*	Spring: Adult
Pacific cod	*Gadus macrocephalus*	Spring: Adult Summer: Adult, Juvenile
Red king crab	*Paralithodes camtschaticus*	Spring and Summer: Adult
Rex sole	*Glyptocephalus zachirus*	Summer: Egg
Rougheye rockfish	*Sebastes aleutianus*	Spring, Fall, and Winter: Adult
Sablefish	*Anoplopoma fimbria*	Summer: Juvenile
Snow crab	*Chionoecetes opilio*	Summer: Adult
Southern rock sole	*Lepidopsetta billineta*	Spring, Summer, and Fall: Adult Summer: Adult, Juvenile, Larvae
Tanner crab	*Chionoecetes bairdi*	Summer: Adult
Walleye pollock	*Theragra chalcogrammus*	Spring: Adult Summer: Adult, Juvenile, Larvae, Egg
Yellow Irish lord	*Hemilepidotus jordani*	Summer: Juvenile
Yellowfin sole	*Limanda aspera*	Spring: Adult Summer: Adult, Juvenile, Larvae, Egg

Sources: NOAA 2023; NPFMC 2020, 2021b
[a] At least eight species of octopus occur within Alaska, with the giant octopus listed in this table.

The NPFMC (2020) identifies habitat areas of particular concern (HAPC) within the Bering Sea and Aleutian Islands Management Area (BSAI), including the Bowers Ridge Habitat Conservation Zone and select areas of Skate egg concentration.[12] However, no designated HAPCs occur within the Project vicinity.

Sheltered bays and other habitats within the BSAI support large stands of eelgrass (*Zostera marina*), which is also considered EFH. Based on review of the Alaska Shorezone data (NOAA 2022), the Project would not intersect nor otherwise affect mapped eelgrass. The Alaska ShoreZone database identifies approximately 5 linear miles of mapped eelgrass beds within Goodnews Bay, adjacent to Platinum. The cable would make landfall in Platinum but not enter Goodnews Bay nor affect the mapped eelgrass beds.

[11] The Eastern Bering Sea's relatively shallow but expansive continental shelf supports approximately 300 fish species, more than 150 crustacean and mollusk species, 50 seabird species and 25 mammal species (Livingston and Tjelmeland 2000). The North Pacific Ocean deposits plant nutrients as it flows northward over the Bering Sea's shallow continental shelf, through the Bering Strait, and over the Chukchi Sea Shelf into the Arctic Ocean (Stabeno et al. 2005).
[12] Amendment 104 established six areas of skate egg concentration as HAPCs in 2015 (NPFMC 2020).

3.2 EFH Intersections – Marine, Landfall, and Overland Routes

Table 3-2 summarizes Project activities proposed to occur within fish habitat, focusing on activities that intersect EFH designated for FMP-managed fish species. Figure 3-1 through Figure 3-7 display proposed activities within the marine route, at landfall locations, and areas where the overland route crosses streams that support salmon.

Table 3-2. Summary of Proposed Project Activities and Intersections with EFH

Figure ID	Project Element	Waterbody Name (AWC Number)	In-Water Activity (Timing)	FMP-Managed Species with EFH Designations
3-1	Marine and Landfall routes	Eastern Bering Sea	Surface lay/trench cable (Summer)[a]	Chum, coho, Chinook, pink, and sockeye salmon; crab and groundfish (Table 3-1)
3-2	Dillingham Landfall	Unnamed Stream (325-30-10100-2013)	Trench submarine cable (Summer)	Coho, Chinook, pink, and sockeye salmon
3-3	Dillingham Landfall to Nushagak Bay	Nushagak River (325-30-10100)	Trench cable at low tide, surface lay cable below MLW (Summer)	Chum, coho, Chinook, pink, sockeye salmon
3-4	Platinum Landfall	Eastern Bering Sea [a]	Surface lay/trench below MHW (Summer)	Chum, coho, Chinook, pink, and sockeye salmon
3-5	Quinhagak Landfall	Eastern Bering Sea [b]	Surface lay/trench below MHW (Summer)	Chum, coho, Chinook, pink, and sockeye salmon
3-6	To Tuntutuliak Landfall	Kuskokwim River (335-10-16000)	Surface lay within channel (Summer)	Chum, coho, Chinook, pink, and sockeye salmon
3-7	Tuntutuliak Landfall	Kinak River (335-10-16600-2151)	Surface lay within channel; trench below OHW within streambank (Summer)	*No FMP-managed species (supports other anadromous fish species)*
3-8	Apogak/Eek River Landfall	Kuskokwim Delta/Bay	Trench cable at low tide; surface lay cable below MHW (Summer)	Chum, coho, Chinook, pink, and sockeye salmon
3-9	Overland: Eek to Napaskiak	Eek River (335-10-16700)	Surface lay within channel; trench below OHW into banks (Winter)	Chum, coho, Chinook, pink, and sockeye salmon
3-9	Overland: Eek to Napaskiak	Eenayarak River (335-10-16695)	Surface lay within channel at multiple sites (Winter)	*No FMP-managed species (supports other anadromous fish species)*
3-10	Overland: Napaskiak to Oscarville	Kuskokwim River (335-10-16000)	Trench below OHW of banks; surface lay within channel (Winter)	Chum, coho, Chinook, pink, and sockeye salmon
3-11	Overland Route: Bethel to Atmautluak	Pikmiktalik River (335-10-16600-2197-3115)	Trench below OHW within banks; surface lay within channel (Winter)	*No FMP-managed species (supports other anadromous fish species)*
3-11	Overland Route: Atmautluak to Nunapitchuk	Nunavakanukakslak Lake (335-10-16600-2197-0040)	Surface lay (Winter)	Not listed by the AWC; NOAA identifies habitat as Pacific salmon EFH
3-11	Overland Route: Nunapitchuk to Kasigluk	Johnson River (335-10-16600-2197)	Trench below OHW within banks; surface lay within channel (Winter)	Not listed by the AWC; NOAA identifies habitat as Pacific salmon EFH

Source: Giefer and Graziano 2022a, 2022b; NOAA 2023; NPFMC 2020, 2021b
Notes: ID = Identification Number
[a] The Project will not intersect nearby Smalls River (335-00-10870), which supports coho and sockeye salmon stream.
[b] The Project will not intersect nearby Kanektok River (335-00-10600), which supports five salmon species.

Figure 3-1. Essential Fish Habitat – Project Overview

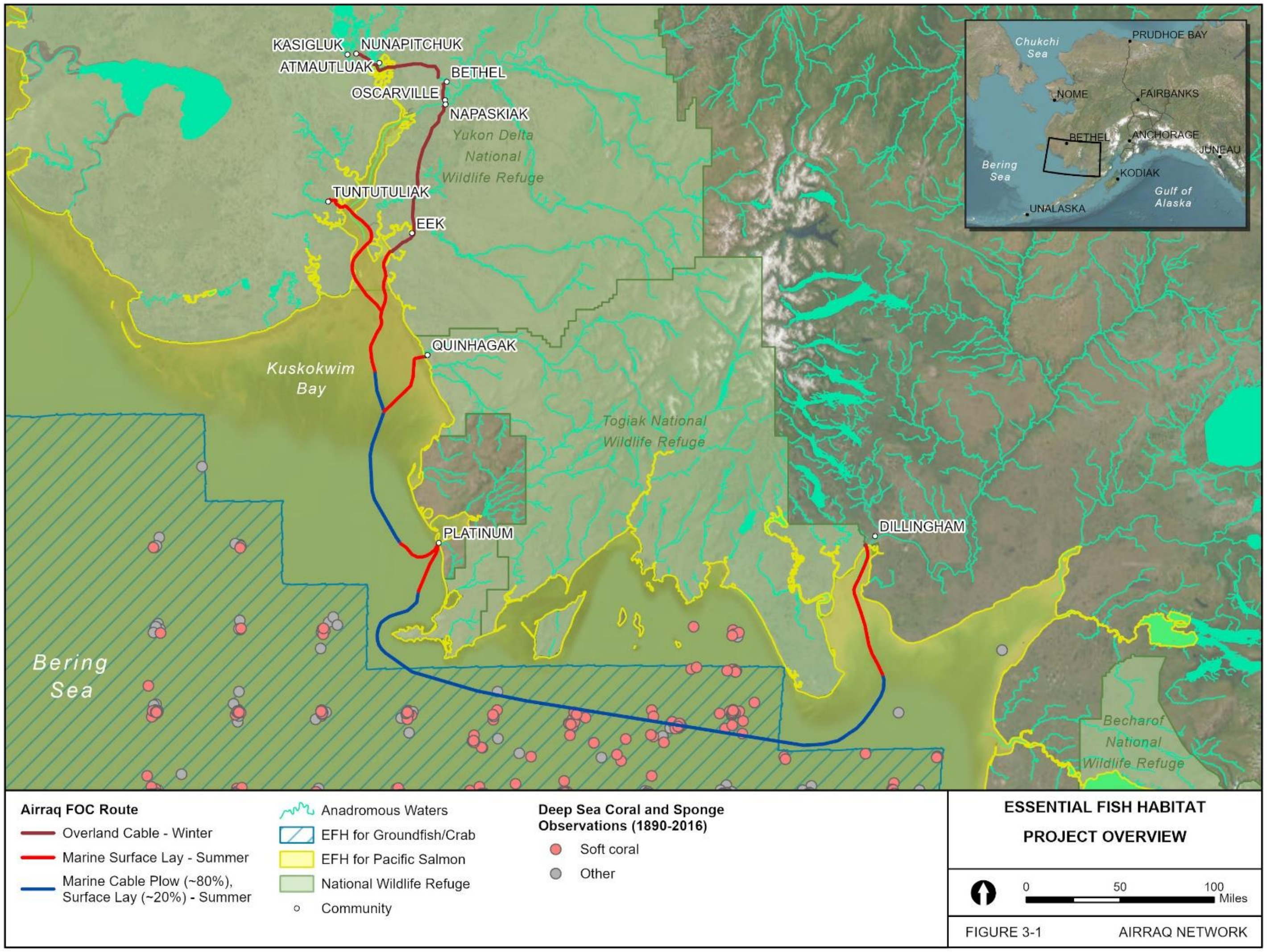


Figure 3-2. Dillingham Landfall Location

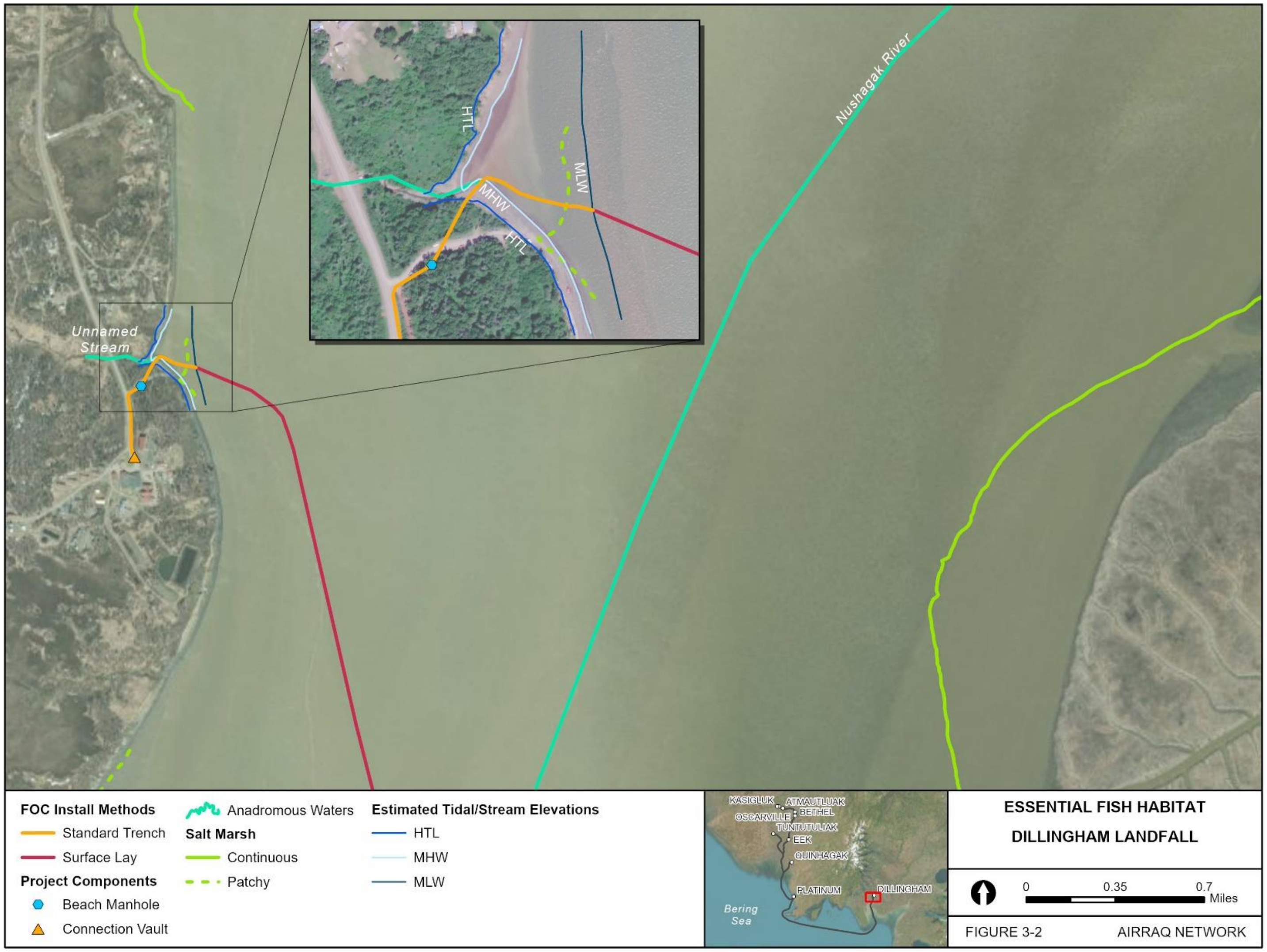


Figure 3-3. Dillingham Landfall through Nushagak Bay

Figure 3-4. Platinum Landfall Location

Figure 3-5. Quinhagak Landfall Location

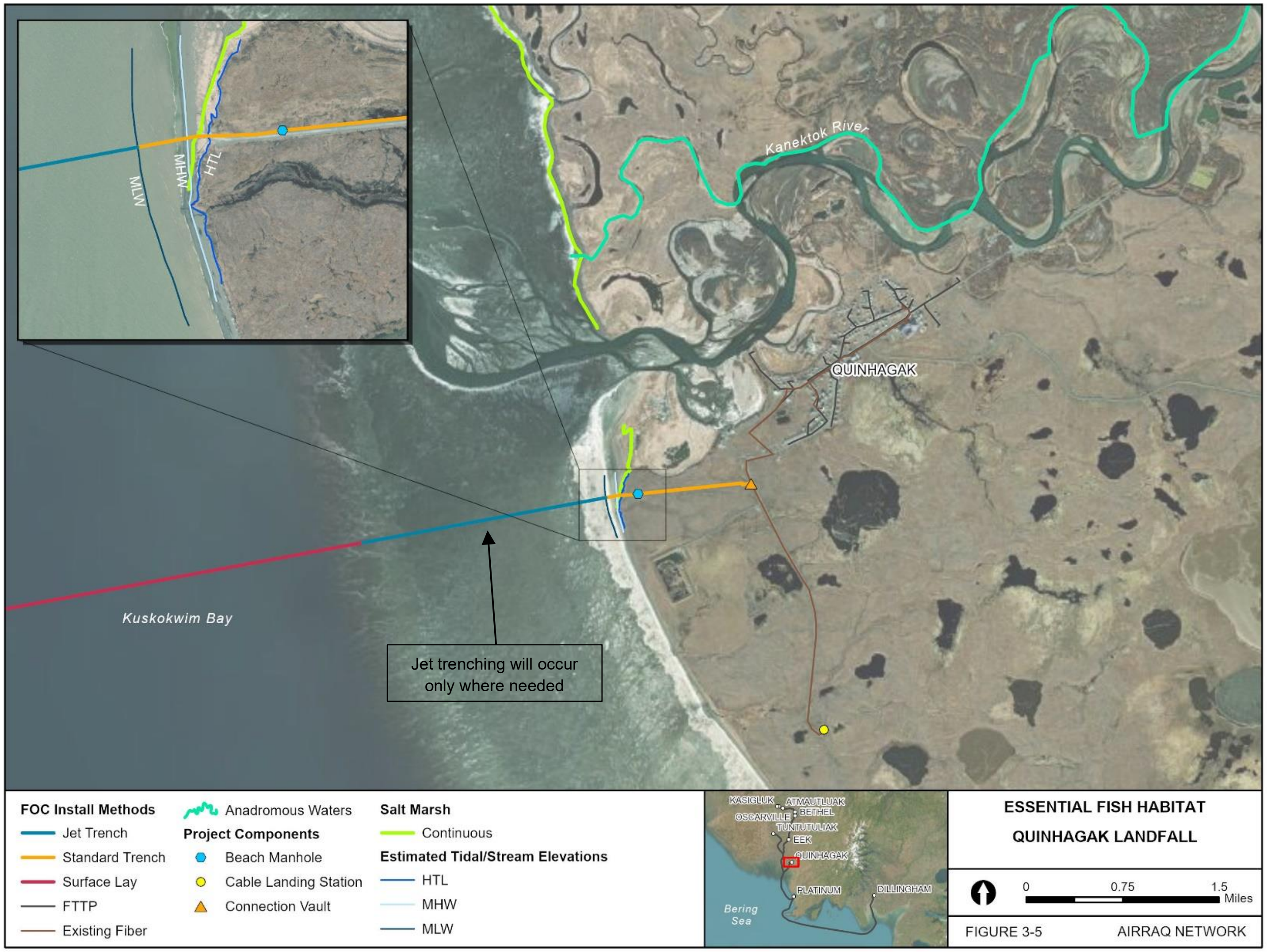


Figure 3-6. Kuskokwim Bay: to Tuntutuliak and Eek Landfall Locations

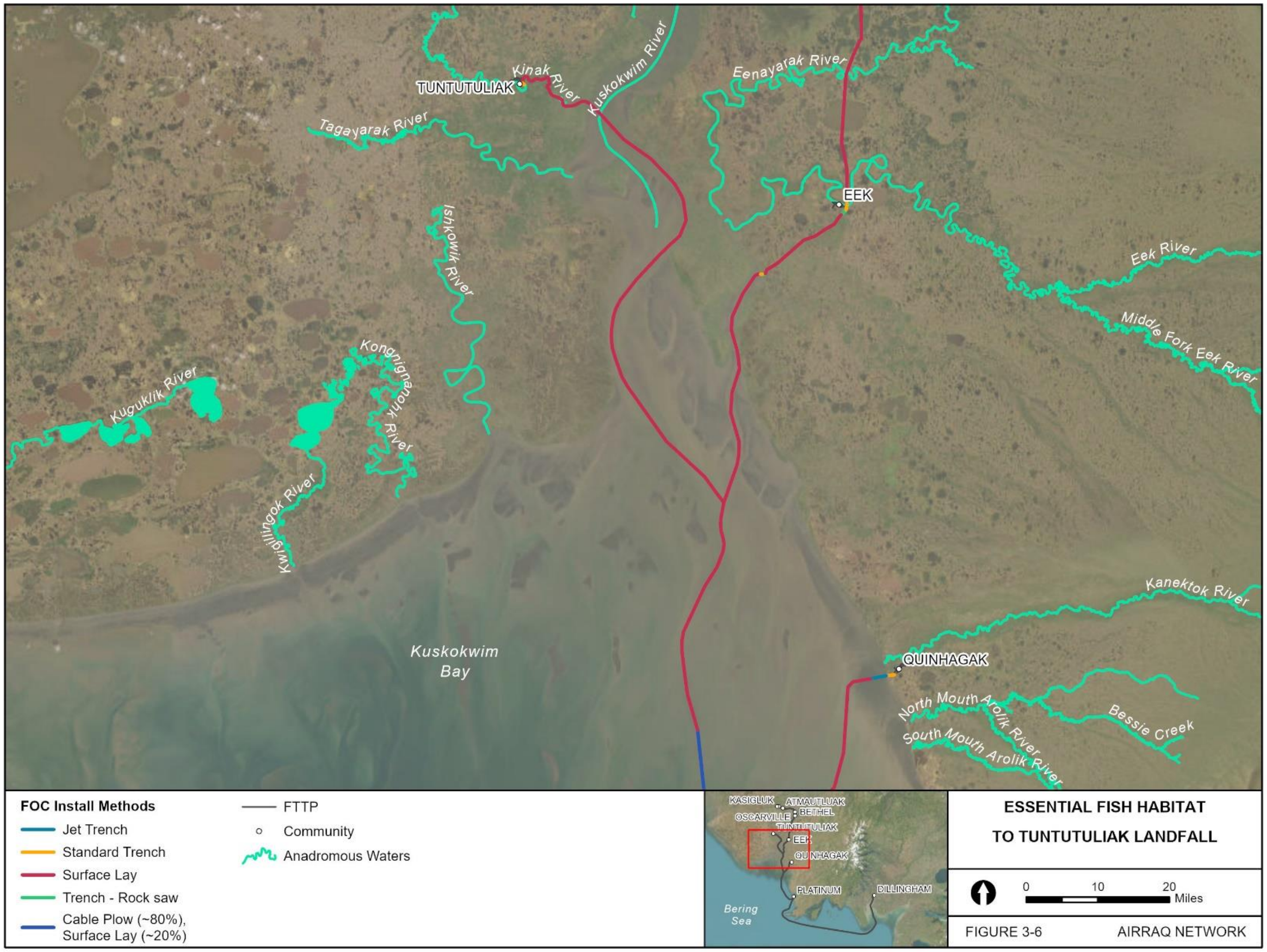


Figure 3-7. Tuntutuliak Landfall Location

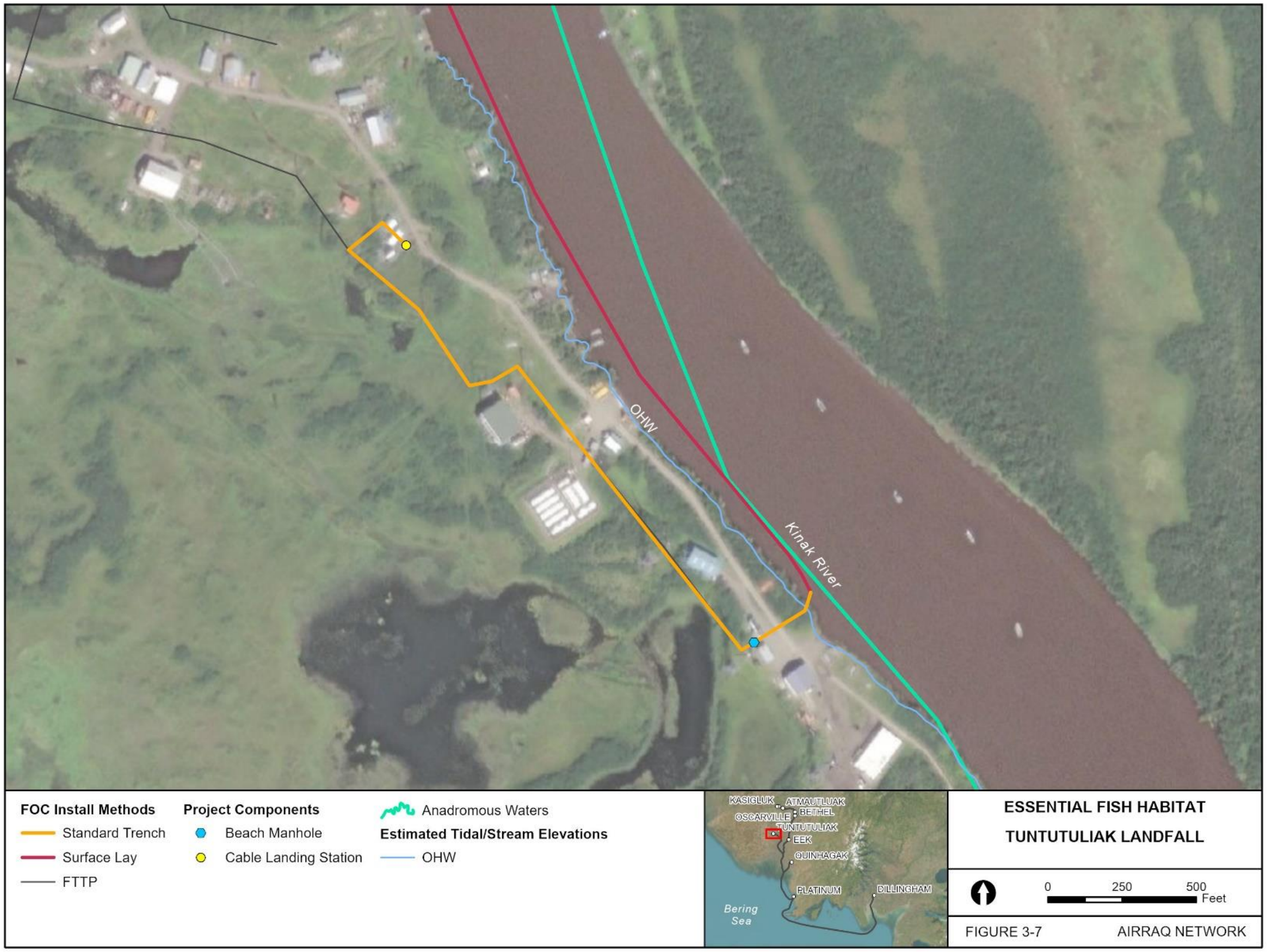


Figure 3-8. Apogak/Eek River Landfall Location

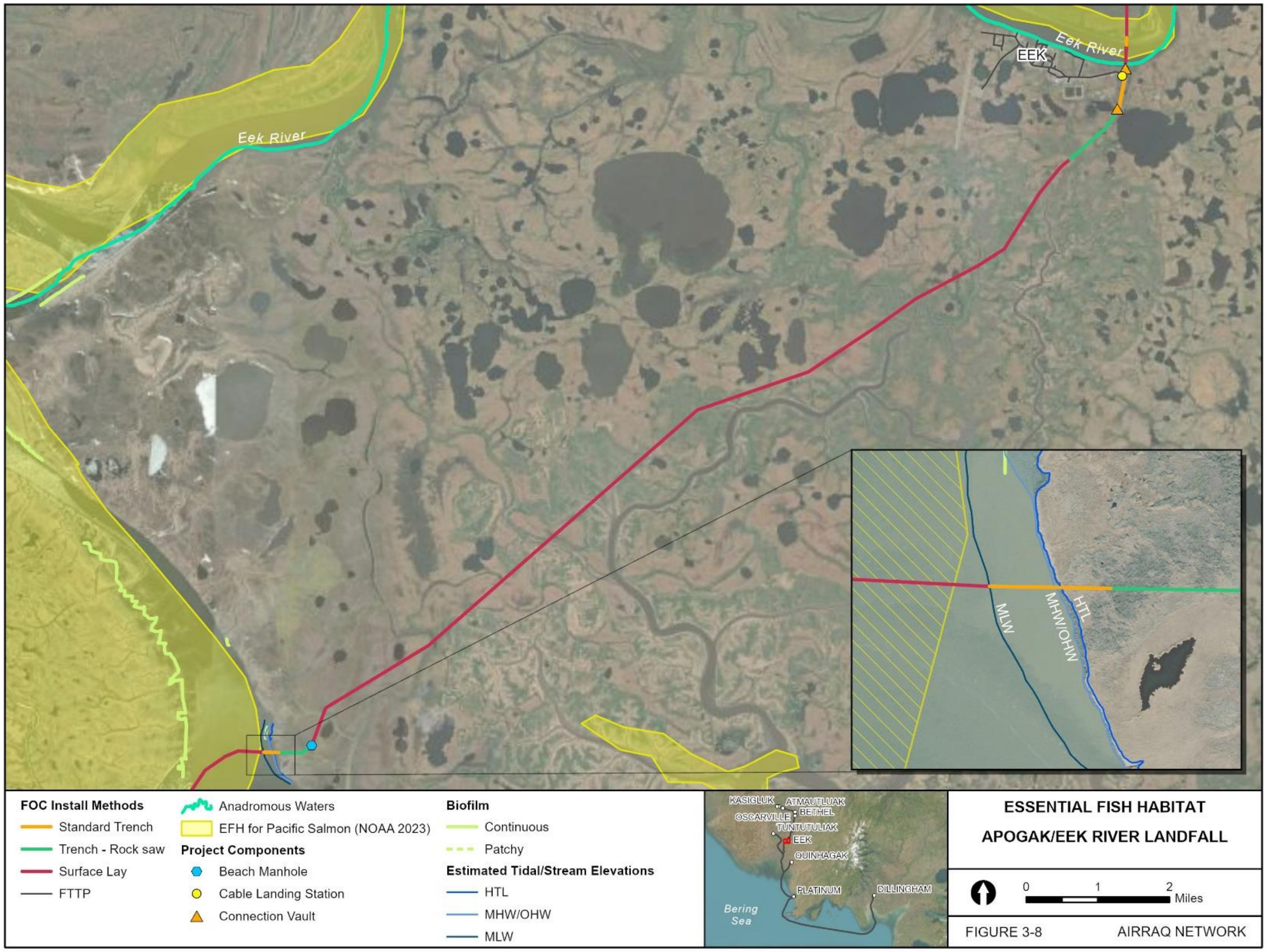


Figure 3-9. Overland Route: Eek to Kuskokwim River Crossing

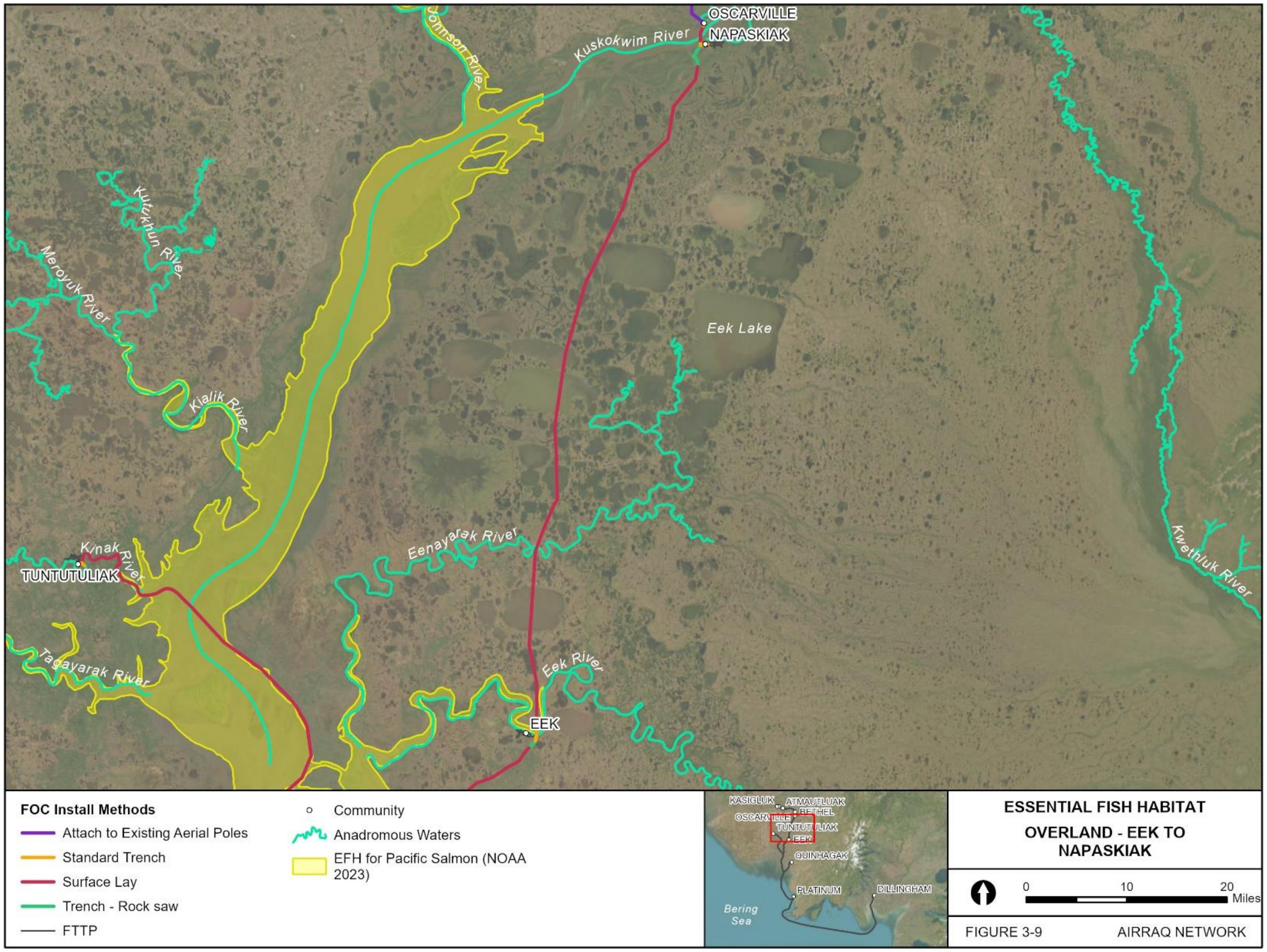


Figure 3-10. Overland Route: Napaskiak to Oscarville Kuskokwim River Crossing

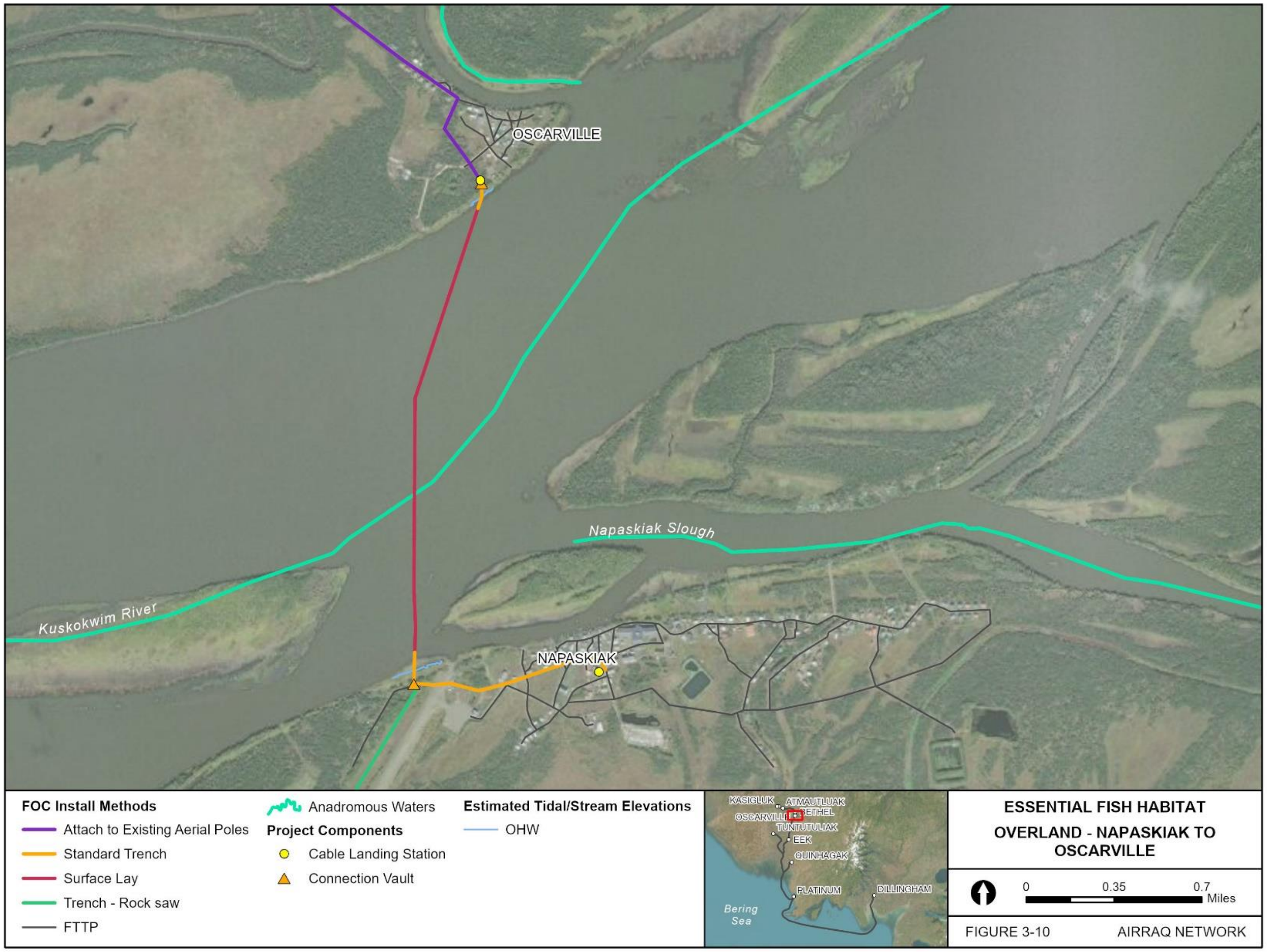
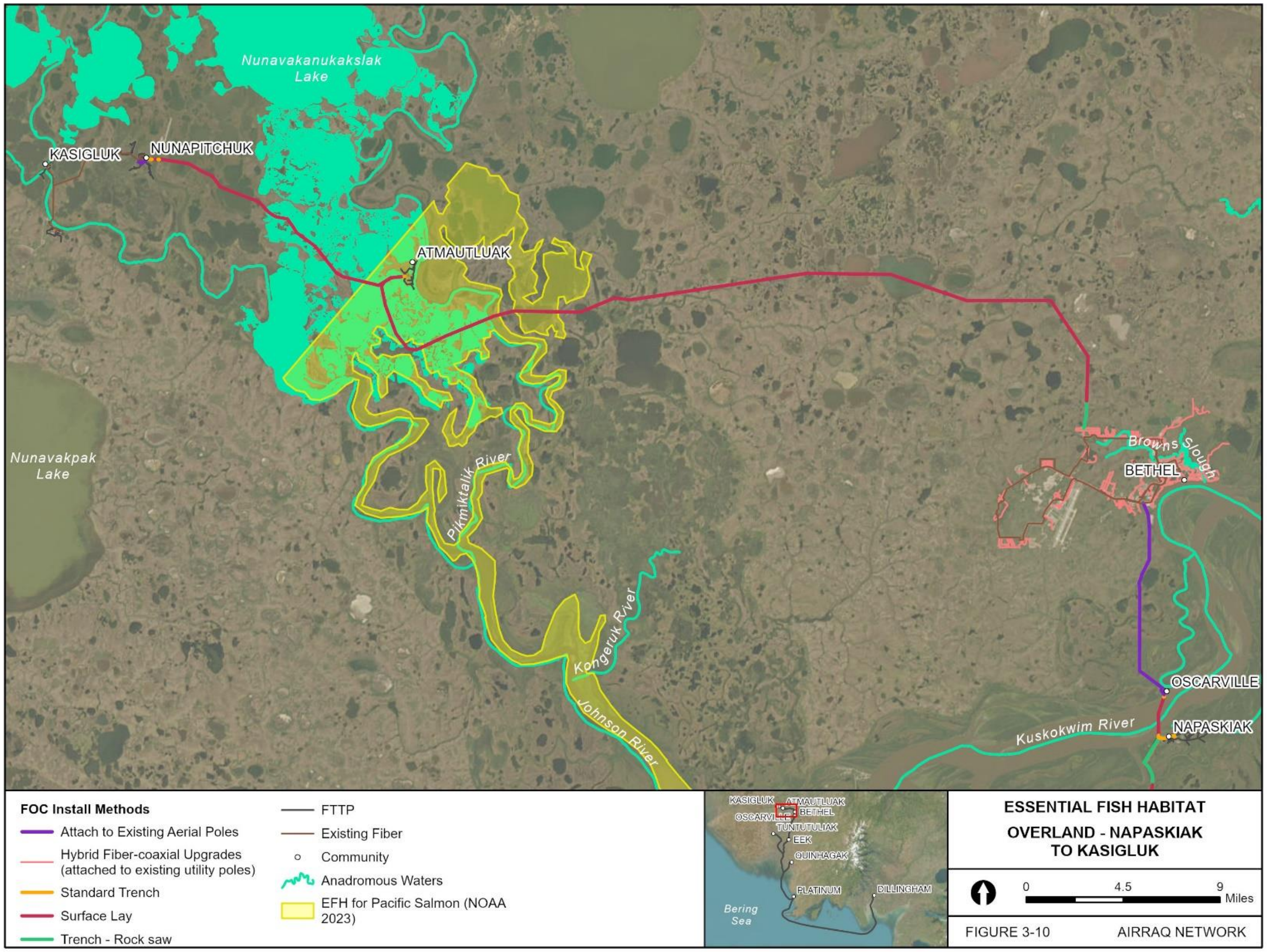


Figure 3-11. Overland Route: Bethel to Kasigluk



4 Analysis of Effects to EFH

This section presents an analysis of effects the proposed action may have on EFH and associated FMP-managed fish species. Section 4.1 presents an analysis of potential impacts on EFH and/or managed species and Section 4.2 assesses the potential for cumulative effects.

4.1 Direct and Indirect Effects

The Project proposes to install submarine cable within marine habitats below MHW and select freshwater habitats using a combination of surface lay and trenching techniques.

Impacts to EFH and FMP-managed fish from such activities could potentially include limited:

- Fish injury or mortality (particularly benthic species or lifestages)
- Temporary disruption to fish behavior/movement
- Physical alteration or destruction of habitat
- Temporary reduction in habitat quality and/or modification of habitat function
- Temporary increased turbidity and decreased habitat quality
- Re-suspension and distribution of contaminants if present

The subsections below describe potential impacts on fish and EFH for each proposed activity.

4.1.1 Install Submarine Cable between the Five Landfall Locations (Summer)

Unicom plans to install cable between the five landfall locations in summer (likely July and August) 2024. Unicom anticipates that most of the submarine cable within the marine route will be buried. Unicom will conduct geophysical investigations in 2023 to assess bathymetric conditions along the route and identify areas necessary for trenching. Where trenching is required, a cable plow[13] will be used in waters deeper than 40 feet, a jet sled[14] will be used within waters 40 feet deep or shallower, and standard[15] trenching methods will be used within the intertidal zone (between MLW and HTL).

Excavation/trenching that occurs below the waterline will cause a temporary and localized increase in turbidity, which could affect fish occupying the temporarily affected habitat. Increased turbidity could temporarily decrease habitat quality and modify habitat function; under some circumstances, this may harm fish and/or temporarily alter behavior. Elevated turbidity from suspended solids could temporarily diminish habitat quality, and, if persistent, may decrease primary production and affect feeding behavior within the area affected (Limpinsel et al. 2017). Researchers have determined that large sediment plumes have the potential to damage gills and impair organ function (Limpinsel et al. 2017). However, activities proposed by the Project will not generate large sediment plumes. Marine waters within the Project area, particularly Kuskokwim and Nushagak bays, are naturally turbid environments. Increased turbidity resulting from the one-time burial of 1-inch-diameter submarine cable will be limited

[13] Cable plow trench dimensions are 1 foot wide (up to 5 feet deep) with no side cast.
[14] Jet sled disturbs an area 8 inches wide (and up to 1 foot deep) with no side cast.
[15] Standard trenching dimensions are 3 feet wide and 3 feet deep with 5 feet of temporary side cast.

both spatially and temporally. Such impacts will not affect fish populations or have long-term impacts on EFH. Jet sleds and cable plows are operated at relatively slow speeds, typically at 0.5 knot (0.84 feet/second) or less.[16] Most fish would likely move away from active trenching activities and highly sediment-laden waters. However, small or juvenile benthic species or lifestages (e.g., larval or egg) may be vulnerable to injury or potential burial if unable to move away from the active trenching activities. Trenching activities will not result in population-level affects.

Disturbing the seafloor may affect the benthic community, which could, in turn, affect food supply within a relatively small area. The disturbance effects on the benthos will be localized, primarily short-term, and likely similar to naturally occurring disturbances. Sand and mud dominate the substrate along the marine route. Sediment deposited by major rivers limit the amount of hard substrate available for coral attachment (Stone and Shotwell 2017). Based on current information, vertically complex, hard bottom habitats, such as hard corals and vegetated rocky reefs, will be avoided, as recommended by NMFS (Limpinsel et al. 2023). Based on review of the NOAA Deep-Sea Coral and Sponge Map Portal, which includes data records collected between 1890 and 2016, soft corals and sponges may occur in portions along the marine route that contain suitable habitats. Given the naturally turbid and relatively shallow (less than 100 meters [328 feet]) habitat along much of the marine route, however, distribution is likely to be patchy. Soft coral or sponge species, if present within the path of the cable plow, may be damaged. Habitat alteration from installing the submarine cable is not anticipated to affect fish at the population level. Trenching/excavation in intertidal areas (between MLW and HTL) will be done at low tide and therefore not impact fish.

Habitat disturbance from laying the 1-inch-diameter submarine cable onto the seafloor will be relatively minimal and largely temporary.[17] Once placed, this surface-lain submarine cable is not anticipated to adversely affect FMP-managed fish species or the habitats' ability to support managed species. While altering the physical habitat may affect some habitat function, the Project will not block juvenile nor adult fish migration during or after the completion of cable laying or trenching activities. Post-Project conditions are anticipated to remain suitable to support FMP-managed fish species that rely on these habitats.

4.1.2 Install Cable along Overland Route (Winter)

This work will include laying cable across the frozen ground surface, where it will self-bury over time, and burying the cable into streambanks below OHW at crossings (using a backhoe). Care will be taken to position crossings on stable banks for erosion protection. When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface so it can passively drop into the waterbody during spring break-up and self-bury within aquatic bed sediments. Installing cable during winter conditions will largely avoid impacts to fish and EFH. Unicom plans to inspect the route after breakup to ensure that the cable is not suspended but instead conforms to water body contours.

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[16] Jet sleds will be operated at speeds of less than 0.5 knot; although cable plows can operate at higher speeds, they will typically move at approximately 0.5 knot, if not more slowly.

[17] Given the small cable diameter and small area of seafloor contacted, deployment of communication cable on the seafloor is a minimal threat to deep coral systems in Alaska (Stone and Shotwell 2017).

4.2 Cumulative Effects

Cumulative effects are impacts on the environment that result from the incremental impacts of an action when added to other past, present, and reasonably foreseeable future actions (40 Code of Federal Regulations § 1508.7). A cumulative effects analysis is intended to examine actions occurring within a watershed or marine ecosystem that adversely affect the ecological structure or function of EFH.

Project effects will be limited to temporary and localized affects and not affect managed fish populations or substantially modify EFH. The ecological structure and function of EFH will be maintained; cumulative effects are not anticipated.

5 Proposed Conservation Measures

Unicom proposes the following measures that will avoid and/or minimize potential impacts:

- Use existing rights-of-way whenever possible to lessen overall encroachment and disturbance of wetlands.
- Store and contain excavated material on uplands. If storage in wetlands or waters cannot be avoided, use alternate stockpiles to allow the continuation of sheet flow. Store stockpiled materials on construction cloth rather than bare marsh surfaces, eelgrass, macroalgae, or other submerged aquatic vegetation.
- Handle and store on site all fuels and hazardous substances used by the Project in compliance with state and federal regulatory guidance. Store all fuels and chemicals in appropriate primary containment areas. Design secondary containment areas in compliance with all applicable permits and regulations.
- Transport fuels and other products to the action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.
- Backfill excavated wetlands with either the same or comparable material capable of supporting similar wetland vegetation. Restore original marsh elevations. Stockpile topsoil or organic surface material, such as root mats, separately and return it to the surface of the restored stie. Use adequate material to ensure the pre-Project elevation is attained following the settling and compaction of the material. After backfilling, implement erosion protection measures where needed.
- Native vegetation and topsoil removed for Project construction will be stockpiled separately and used for site rehabilitation. Species to be used for seeding and planting will follow this order of preference:
    - Species native to the site
    - Species native to the area
    - Species native to the state
- Trenches may not be constructed or backfilled in such a manner as to drain wetlands or other waters of the U.S. (e.g., backfilling with extensive gravel layers, creating a French drain effect). Ditch plugs or other methods will be used to prevent this situation.
- Any excess material will be removed to an upland (non-wetland) location.
- Except in areas of topsoil excavation, excavated soils will be sorted into mineral subsoils and topsoil (i.e., the upper, outermost layer of soil; usually the top 2 to 8 inches).
- Limit equipment access to the immediate Project area. Tracked vehicles are preferred over wheeled vehicles.
- Heavy equipment working within wetlands or mudflats will be placed on mats, or other measures will be taken to minimize soil disturbance.
- All exposed soil and other fills, as well as any work below OHW, will be permanently stabilized at the earliest practicable date. When possible, work within waters will be performed during periods of no or low flow, or during low tides.
- Caution equipment operators to avoid sensitive areas. Clearly mark sensitive areas to ensure that equipment operators do not traverse them.

- Identify nearshore segments of the marine route, avoiding developed shorelines and high energy landfalls that are subject to erosion. Conduct geophysical reviews for the route, and avoid areas prone to sediment slumping, turbid currents, and other hazards.
- Limit construction equipment to the minimum size necessary to complete the work. Use shallow-draft equipment to minimize ground effects and to eliminate the necessary for temporary access channels.
- Align crossings to avoid rock reefs and shoals to the extent possible.
- Avoid construction of permanent access channels to avoid disrupting natural drainage patterns and destroying wetlands through excavation, filling, and bank erosion.
- Conduct trench/excavation activities within intertidal areas (between MLW and HTL) at low tide to minimize impacts to fish and EFH.
- Bury cable in areas where scouring or wave activity would eventually expose them.
- Avoid damaging high-relief bottom habitat and across live bottom habitats such as corals and sponges to the extent possible.
- Conduct geophysical investigations in 2023 to assess bathymetric conditions along the route and identify areas necessary for trenching.
- Avoid high-impact fishing grounds where possible. Bury the cable when ground fishing areas cannot be avoided.
- Avoid intersecting or otherwise affecting mapped eelgrass beds.
- Locate route to minimize damage to marine and estuarine habitat to the extent feasible.
- Lay or trench the overland cable routes in winter to avoid or minimize impacts.
- Winter landfall and overland construction will limit ground disturbance and protect vegetation from heavy equipment and temporary side cast.
- Temporary fills will be removed in their entirety, and the affected areas will be returned to pre-construction elevations. The affected areas will be revegetated, as and when appropriate. Proper seeding of all areas under threat of erosion or unstable soil post-project will be seeded with appropriate grass seed to maintain solid soil stability. Any areas of vegetation will be revegetated to the greater standard among the permit—Storm Water Pollution Prevention Plan or Environmental Assessment standards.
- Follow permit stipulations (e.g., fish habitat permits; Section 404/10, etc.).
- When possible, conduct in-water work in fish-bearing waters during the time of year that will have the least impact on sensitive habitats and species, as determined through coordination with NMFS and/or the ADF&G).
- Position location of stream crossings on stable banks for erosion protection. When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface so it can passively drop into the waterbody during spring break-up and self-bury within aquatic bed sediments.
- Inspect the overland route after breakup to ensure that the cable is not suspended within water crossings but instead conforms to water body contours.
- Conduct post-lay inspection in marine waters using a remotely operated vehicle at select areas where difficulties were identified during the initial cable install, and. where needed, bury the cable using jet burial.

6 Conclusion

If constructed, the Project will result in a localized, temporary increase in turbidity during the one-time installation of 1-inch diameter cable below the waterline. Where burial is needed, Unicom anticipates that the direct disturbance path within marine waters will range from 8- to 12-inches wide. Disturbing the seafloor to bury the cable will temporarily increase suspended solids; individual fish occupying temporarily affected habitat during the in-water work may be affected. Most fish would be expected to move away from active in-water work and avoid direct burial and/or exposure to localized, temporary increases in turbidity given the typical operational speeds of 0.5 knot (0.84 feet/second) or less. It is possible that some benthic species or fish lifestages may not be able to move away from active trenching and could therefore be buried or suffer mortal injuries. Although it is possible that some fish could potentially be harmed, such activities will not impact fish populations.

The presence of the 1-inch diameter cable on the seafloor will not impede fish movement or alter habitat function. Trenching/excavation in intertidal areas (between MLW and HTL) will be done at low tide and therefore not impact fish. Pre-Project contours will be re-established within one week of disturbance. No adverse effects to EFH are anticipated.

Project construction and operation is not anticipated to affect managed fish populations. Post-Project conditions are anticipated to remain suitable to support the managed fish species and lifestages for which EFH is designated.

Based on the level of anticipated impacts and proposed mitigation measures, the proposed Project is not expected to have permanent adverse effects on EFH or FMP-managed species.

7 References

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Appendix A. Project Description

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Airraq Network

PHASES 1 AND 2

Project Description

Unicom, Inc

March 2023

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Contents

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Acronyms and Abbreviations

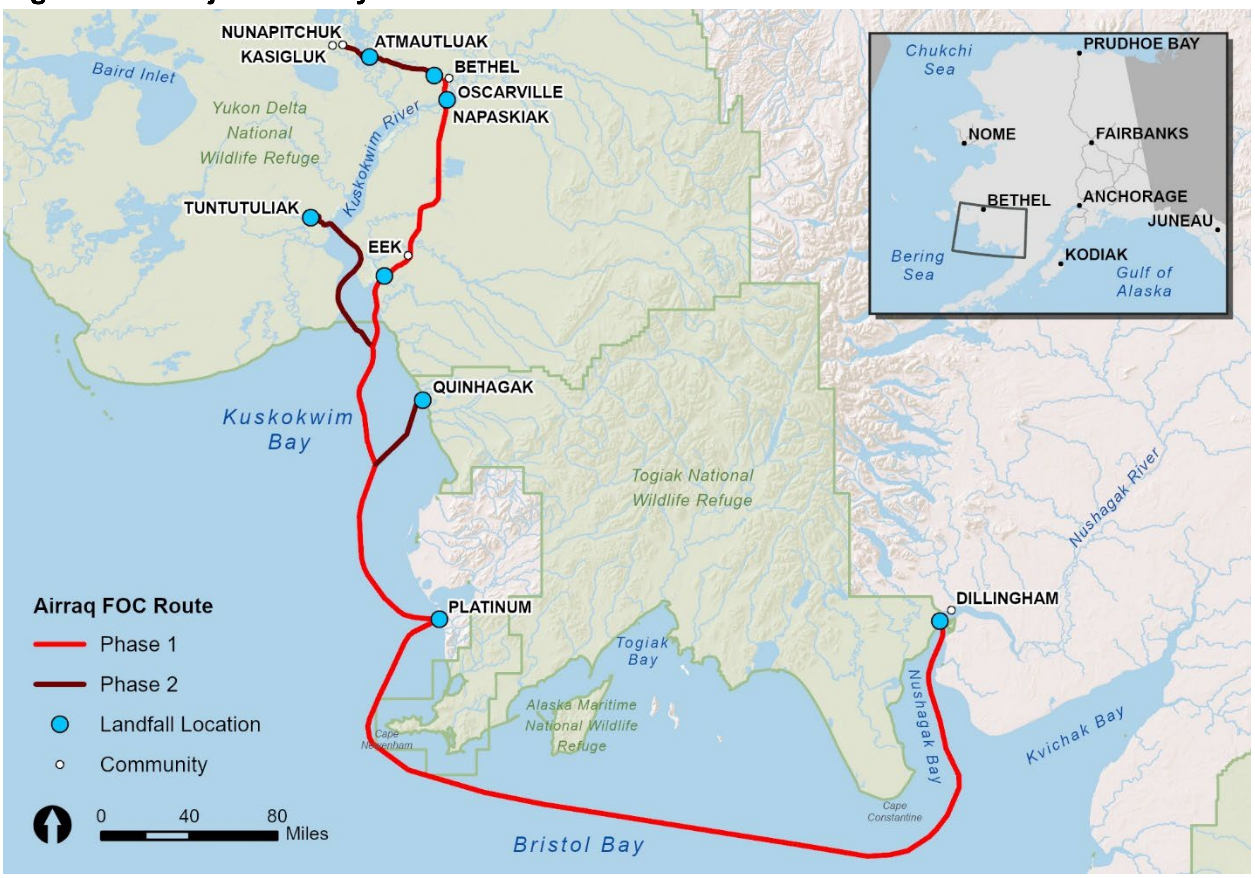
BMH	beach manhole
BU	branching unit
CLS	Cable Landing Station
CV	Connection Vault
FOC	fiber-optic cable
ft	foot/feet
ft^3	cubic foot/feet
FTTP	Fiber to the Premise
HTL	high tide line
mi	mile(s)
MLW	mean low water
NAD 83	North American Datum of 1983
NTIA	National Telecommunications and Information Administration
OHW	ordinary high water
PLGR	pre-lay grapnel run
Project	Airraq Network
ROV	remotely operated vehicle
Unicom	Unicom, Inc.
VOO	Vessel of Opportunity

1 Project Description

Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim Delta as part of the Airraq Network (Project). The Project will extend the existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

The Project will consist of two phases. Figure 1-1 provides an overview of the full Project.

Figure 1-1. Project Vicinity



Phase 1 will combine a 443-mile (mi) FOC build and Fiber to the Premise (FTTP) last mile network[1] upgrades within five communities: Platinum, Eek, Napaskiak, Oscarville, and Bethel. For the construction of Phase 1, Unicom has partnered with Bethel Native Corporation, which has been awarded a $42 million grant from the National Telecommunications and Information Administration (NTIA) Tribal Broadband Connectivity Program.

[1] Last mile network refers to any broadband infrastructure that connects directly to an end-user location.

Using a middle mile network [2], Unicom will interconnect with an FOC and microwave network within Dillingham to begin the Project. Phase 1 has an extensive marine component, extending FOC along the ocean floor from existing Unicom facilities within Dillingham to Platinum. This segment will be a 24-strand submarine FOC with a cable landing for signal regeneration in Platinum. From Platinum, the cable will continue along the marine route, paralleling the Kuskokwim Bay shoreline, until it reaches a landfall location within the Eek River, immediately upstream of its confluence with the Kuskokwim River. This will begin the overland route to Eek. From Eek, the FOC route will continue the overland route to Napaskiak, where it will cross the Kuskokwim River to Oscarville and end within Bethel. The Project will also establish a second FOC delivery technology, FTTP, within connected communities. FTTP local network access will provide high-speed broadband access to residences and businesses within the communities of Platinum, Eek, Napaskiak, and Oscarville. The existing hybrid fiber-coaxial access networks within Bethel will be upgraded to help facilitate broadband distribution within the community.

Phase 2 will include installation of 105 mi of FOC, which will be interconnected with Phase 1 by combining middle mile network transport segments and FTTP installation in five additional communities: Quinhagak, Tuntutuliak, Atmautluak, Kasigluk, and Nunapitchuk. This portion of the Project has been awarded federal grant funding from the U.S. Department of Agriculture through the Rural Utilities Service ReConnect Grant.

Phase 2 will build off the Phase 1 FOC route with both terrestrial and submarine components. Cable branching units (BU) originating from the Phase 1 FOC will connect the marine route within Kuskokwim Bay to the communities of Quinhagak and Tuntutuliak. A separate overland route will connect FOC from Bethel to Atmautluak to Nunapitchuk, where it will terminate within Kasigluk. Each community in Phase 2 will construct a FTTP network to bring high-speed broadband to the community.

Project activities include the following components:

- **Landfall Route:** This route involves installation of broadband submarine FOC at landfall locations between mean low water (MLW) and beach manhole (BMH) locations. BMHs are excavated manholes that provide connection points between submarine cable and either lightweight submarine or terrestrial cable. Landfall components between MLW and BMH locations are trenched.
- **Marine Route:** This route involves installation of broadband submarine FOC within marine environments below MLW, including segments extending from Kuskokwim Bay to Apogak and Tuntutuliak landfall locations. These segments are either trenched or laid on the seafloor.
- **Overland Route:** This route involves installation of broadband FOC along terrestrial landscapes, including wetlands, inland lakes, and stream crossings. Lightweight submarine cables will be used where crossing wetlands, and armored submarine cable will be used where crossing rivers. Each overland route segment will terminate at Connection Vaults (CV). CVs facilitate the splice between overland and terrestrial cable

[2] Middle mile network refers to any broadband infrastructure that does not connect directly to an end-user location.

prior to connection with prefabricated Cable Landing Stations (CLSs) or existing utility poles.

- **Community Shore Route:** This route is the terrestrial FOC segment that connects BMHs or CVs with CLSs. CLSs house the infrastructure needed to convert incoming terrestrial cable to FTTP cable.
- **FTTP Route:** This route will bring cable from the CLSs, either trenched or attached to existing utility poles, to residential and commercial users. This segment will terminate the FOC route within each community.

Table 1-1 provides a Project summary.

Table 1-1. Project Summary

Project Component	Phase 1 Total Length (mi)	Phase 2 Total Length (mi)	Project Total Length (mi)	Phase 1 Associated Facilities	Phase 2 Associated Facilities
Marine (below MLW)	328.4	62.1	390.5	None	None
Landfall (MLW to BMH)	0.7	0.1	0.8	BMH: 3	BMH: 2
Overland	49.2	27.7	76.9	CV: 7	CV: 4
Community Shore Routes	1.2	0.4	2.0	CLS: 6	CLS: 5
FTTP	63.1	15.1	78.2	None	None
Total	**442.6**	**105.4**	**548.0**	**—**	**—**

1.1 Construction

The following sections describe the construction methods and equipment used for the Landfall Route, Marine Route, Overland Route, Community Shore Route, and FTTP. Unicom anticipates initiating terrestrial construction activities in fall 2023, conducting marine construction activities in summer 2024, and completing the Project in 2026.

1.1.1 Landfall Locations

This section describes operations that occur between MLW and each landfall BMH. Landfall construction will occur concurrently with marine construction. Table 1-2 provides each Project landfall location.

Table 1-2. Project Landfall Locations

Landfall Location	Latitude (NAD 83)	Longitude (NAD 83)
Dillingham	59.003510	-158.535688
Platinum	59.010177	-161.821189
Apogak (Eek)	60.148601	-162.183601
Quinhagak	59.742126	-161.929299
Tuntutuliak	60.338149	-162.662662

Note: NAD 83 = North American Datum of 1983

At each landfall, the cable will be trenched within the shoreline between MLW and the BMH. A BMH is an enclosed structure that houses the splice between the incoming submarine cable and outgoing lightweight submarine or terrestrial cable that will connect to existing Unicom facilities. Each BMH will measure 3 ft by 4 ft by 4 ft, or 48 cubic ft (ft^3). Excavation dimensions may vary by shoreline, bank contour, and substrate but will not exceed 5 ft by 5 ft by 5 ft, or 125 ft^3. BMHs are positioned above the high tide line (HTL). Landfall trenching will be conducted with either a rock saw or backhoe. Rock saw trenches are typically 6 inches wide and 8 inches deep, while backhoe trenches are 3 feet (ft) wide and 3 ft deep. Excavated material from trench construction and excavation will be side cast temporarily (i.e., for less than 1 week) into wetlands and underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable.

While conducting landfall construction, care will be taken to protect the shoreline from future erosion. Additionally, best practices will be employed to address stormwater runoff concerns. For all intertidal work (MLW to HTL), construction operations will occur only during low tide. When not constructing on shorelines with firm sediments such as large boulders, heavy equipment will be placed on mats to protect the substrate from slumping and erosion. Alterations to shorelines will be temporary.

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
- Landing craft similar to the marine vessel *Unalaq*

1.1.2 Marine Route Operations

Marine portions of the Project route include cable-laying operations in waters below MLW. Both phases of the Project have marine components. Phase 1 will construct the primary marine cable route, while Phase 2 will build off Phase 1 with two BUs.

The path chosen for the marine routes were identified through desktop studies and a marine route benthic survey. These engineering and field practices assist in selecting routes that provide considerations for environmental and anthropogenic forms of disturbance on the cable system that may lead to cable fault. The International Cable Protection Committee has identified fishing activities as the primary cause for submarine cable faults and repairs. As such, the proposed route avoids high-impact fishing grounds where possible. When ground fishing areas cannot be avoided, the cable will be buried. Nearshore 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/turbid currents, and other geological hazards.

The marine route will rely on four or more vessels for construction operations. The vessel used for cable-laying operations will be dependent on local water depth, location, and cable-laying method. A cable ship (Figure 1-2) will be used for cable-laying operations within areas of the marine route with water depths exceeding 40 ft and will rely on dynamic positioning. Project elements in waters shallower than 40 ft will be conducted using either a tug and barge, a small landing craft stored on the cable ship, or as a separate operation using an Alaska Vessel of Opportunity (VOO). Additionally, landfall locations will be assisted by a landing craft similar to the marine vessel *Unalaq*. These vessels will have a shallow draft, making shallow waters and landings more accessible. Segments of the cable routed into the Kuskokwim River will be laid with a cable-laying barge and tug when they reach a depth of 40 ft within Kuskokwim Bay. Tug and barge operations will continue for these segments until they reach a landfall location within tributaries of the Kuskokwim River. The tug and barge will lay lightweight submarine cable while all other marine portions of the route will use either a single armor or double armor submarine cable. The submarine cable, measuring 1 inch in diameter, is constructed from benign materials and will not carry an electrical current.

Figure 1-2. *C.S. IT Intrepid*, Typical Cable Laying Ship

For marine components, the cable will either be laid on top of the ocean floor or buried within a trench (i.e., trenching). Cable will be laid on the seafloor within areas identified as low risk to cable disturbance or when traversing seafloor substrates that do not allow for trenching. When placing cable on the seafloor, bathymetric conditions will 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, trenching will be used where there is significant risk of outside disturbance to the cable. Local reroutes or cable armoring will be implemented in high risk areas where the substrate does not allow for trenching.

Prior to trenching operations on the seabed, a pre-lay grapnel run (PLGR) will be conducted along segments of the cable-laying route selected during the desktop studies. The objective of the PLGR operation will 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 along the route over the seabed. Any debris recovered by the grapnel will be discharged ashore upon completion of the operations and disposed in accordance with local regulations. If debris cannot be recovered, then a local re-route will be planned to avoid the debris. The PLGR operation will be conducted to industry standards, employing towed grapnels, and the type of grapnel to be determined by the nature of the seabed.

Trench burial within waters deeper than 40 ft will be conducted using a cable plow. Trenching within deep sea segments will protect the FOC against activities known to cause cable faults, such as ground fishing operations, shallow anchor dragging, and earthquakes. The cable plow will be pulled along the seafloor by a tow wire connected to the cable ship. The cable will 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 will exit the lower aft end of the share blade, and the sediments will immediately collapse on top of the cable, behind the plow. This form of burial will eliminate side cast because the excavated substrate will be returned to the trench immediately after the cable is laid. As a result of the immediate burial, absence of side cast, and narrow excavation footprint, cable plow trenching incurs only minimal and temporary impacts.

In waters shallower than 40 ft, trenching will occur within areas where cable protection from other environmental conditions, such as surf action and ice scour, are needed. At these depths, 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 water used for jetting will be supplied from the surface by high pressure hoses. This system will allow for jetting pressure and flow rates to be manipulated based on local conditions. The pressurized water will be focused on the seafloor, liquifying the substrate. The cable will then sink within the trench without side cast. The elimination of side cast and narrow excavation footprint results in limited and temporary impacts. The jet sled will be accompanied by divers, who will monitor trenching performance and assist in operations. Figure 1-3 shows a typical jet sled.

Figure 1-3. Typical Jet Sled

Phase 1 marine portions of the Project include sections of the route between the Dillingham MLW and Platinum MLW, followed by an additional segment between the Platinum MLW and

MLW at the Apogak Landfall site. To reach that landing site, the cable will be routed up the Kuskokwim River and into the Eek River. The cable will be surface laid across the riverine areas so sediment transport can passively bury the cable. Table 1-3 summarizes the length of cable laid for the marine portions of the Project.

Marine elements of Phase 2 consist of two BUs extending from the Phase 1 marine route. One of the BUs will supply submarine cable to Quinhagak, while the other will connect to Tuntutuliak. To reach Tuntutuliak, the cable will enter the Kuskokwim River and travel up the Kinak River. The cable will be surface laid within the thalweg of these two rivers. Sediment transport is anticipated to self-bury the cable within the substrate. The marine portion of the BU will terminate when it reaches Tuntutuliak, above tidal influence at ordinary high water (OHW). The nearshore construction methods used at MLW at the other locations will be used at OHW adjacent to Tuntutuliak. Phase 2 marine impacts are summarized in Table 1-3.

Table 1-3. Marine Route Summary

FOC Route Segment	Cable Installed by Cable Ship[a] (mi)	Cable Installed by VOO, Tug and Barge, or Landing Craft[b] (mi)	Total Length (mi)
Phase 1	—	—	—
Dillingham MLW to Platinum MLW	178.7	52.5	231.2
Platinum MLW to Eek River Landing MLW	50.2	47.3	97.3
Phase 1 Total	**228.7**	**99.8**	**328.5**
Phase 2	—	—	—
Quinhagak BU – Phase 1 Route to Quinhagak MLW	0.0	20.0	20.0
Tuntutuliak BU – Phase 1 Route to Kinak River OHW at Tuntutuliak	0.0	42.1	42.1
Phase 2 Total	**0.0**	**62.1**	**62.1**
Project Total	**228.7**	**161.9**	**390.6**

[a] In waters deeper than 40 ft, cable may be surface laid or trenched with a cable plow.
[b] In waters shallower than 40 ft, cable may be surface laid or trenched with a jet sled.

Upon completion of cable-laying operations, a post-lay inspection and burial will be conducted using a ROVJET 207, or similar remotely operated vehicle (ROV). The purpose of the post-lay inspection and burial is to inspect portions of the cable ship route where laying operations may have encountered difficulties. These difficulties include plow failure, unplanned cable repair, uncontrolled cable payout, or other unplanned events. Where burial corrections need to be made, the ROV will use jet burial, similar to that of the jet sled, and trench the cable. The ROV will be operated remotely from the cable-laying ship; pulsed sounds will be generated from the ROV and cameras will be used for positioning and orientation.

1.1.3 Overland Route Operations

The overland route is defined as segments of the FOC route that both begin and terminate within a BMH or CV. The overland route between Bethel and Oscarville will use pre-existing riser poles and other infrastructure; therefore, it will incur no additional surface impacts. The overland route between Nunapitchuk and Kasigluk will be conducted on existing infrastructure and will not result in surface impacts.

Inland communities not collocated with a marine landfall location will use a CV in lieu of a BMH. CVs house the splice between incoming lightweight submarine cable and outgoing terrestrial cable. Excavation dimensions and considerations for BMHs will be the same for CVs.

Overland route segments will be installed in winter months, when the substrate is frozen, to minimize ground disturbance. The frozen ground helps protect vegetation while also being stable enough to support heavy equipment. Wetland segments will use a lightweight submarine cable provided in 20,000-foot segment spools that are towed by light tracked vehicles.

When crossing overland sections, the cable will either be laid across the ground surface or trenched. Placing the cable directly on the ground significantly reduces wetland impacts and is, therefore, the preferred installation method. The cable will be 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 routed on riser 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 trenching activities will be conducted using a rock saw. Overland routes will be made between the locations shown in Table 1-4.

Table 1-4. Overland Route Surface Impacts

FOC Route Segment	Cable Surface Laid on Uplands (mi)	Cable Trenched in Uplands (mi)	Cable Surface Laid on Wetlands and Waterbodies (mi)	Cable Trenched in Wetlands (mi)	Cable Attached to Existing Aerials (mi)
Apogak BMH to Eek Village South CV	—	—	6.8	0.5	—
Eek Village North CV to Napaskiak CV	—	<0.1	34.9	1.3	—
Napaskiak CV to Oscarville CV	—	<0.1	0.9	0.1	—
Oscarville CV to Bethel South CV	—	—	—	—	4.7
Bethel CV to Atmautluak East CV	—	<0.1	19.7	0.6	—
Atmautluak West CV to Nunapitchuk CV	—	—	6.7	0.2	—
Nunapitchuk CV to Kasigluk CV	—	—	—	—	—
Quinhagak BMH to Quinhagak CV	—	—	—	0.5	—
Project Total	**—**	**<0.1**	**69.0**	**3.2**	**4.7**

The process of laying cable within wetlands will begin by removing deep snow from the cable route. Buried cable segments through wetlands will then be excavated and the cable laid directly within the trench. Side cast from trenching into wetlands will be underlain with geotextile, ice pads, or similar material to allow for removal of the temporary material to the maximum extent practicable, and will be replaced when feasible (i.e., within less than 1 week). Trench depth will be targeted at 8 inches but will vary with the terrain. However, trench depth will always be contained within the organic vegetation mat, which balances allowing the trench to heal while providing sufficient protections for the cable.

When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface that will allow it to passively drop into the waterbody during spring break-up. When the cable sinks into the water body, the weight of the cable will allow it to self-bury within aquatic bed sediments. Submarine cable will be used to cross streams and rivers. The cable will be spliced with the overland route cable and buried into each stream bank below OHW. Best management practices will be used to avoid bank erosion and create drainage paths. Side cast will be replaced after the cable is laid (i.e., within less than 1 week).

Segments crossing major rivers (i.e., Pikmiktalik and Johnson Rivers) will use a landing craft to lay double armored submarine cable across the river. Sediment transport will passively bury the cable. Additionally, the cable will be equipped with an outer plastic covering to avoid frazil ice buildup. Care will be taken to position the crossings on stable banks to provide erosion protection.

During construction, heavy equipment will be placed on geotextile mats. The position of the laid cable will be recorded with a survey-quality Global Positioning System. Post-lay inspection for terrestrial components will be conducted following snow and ice melt. Any cable left suspended after melt will be repositioned so as not to be hazardous for humans or animals. Cable repositioning will be done manually by moving the installed slack cable accordingly. If needed, the cable can be pinned to the ground using small duckbill anchors that will be installed using a hammer and drive pin. Cable left on the vegetation will both sink into the vegetated mat and become overgrown, effectively burying itself out of sight. Helicopter and walking inspections will be conducted on an annual basis to monitor erosion and bank failure.

In general, equipment used across overland routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Rock saw
- Chain trencher or cable plow (optional)
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Winch or turning sheave
- Small utility boat for larger rivers
- Splicing equipment, small genset, and splicing tent

1.1.4 Community Shore Routes

Community shore routes include segments of FOC between each community's BMH or CV and the CLS. The BMHs and CVs located adjacent to communities will house the splice between overland or marine route cable and terrestrial cable. The terrestrial cable will extend beyond these splicing houses to a CLS.

All cable segments within community shore routes will be trenched or attached to existing electrical distribution poles. Trenching will be excavated using backhoes and conventional trenching methods. When possible, the cable will be routed adjacent to existing roads. Excavated material will be temporarily side cast (i.e., for less than 1 week) next to the trench and used to bury the cable. Backhoes and standard trenching techniques will be used to re-grade the BMH or CV footprint as well as all trenched areas to original, pre-existing contours. The trenching will employ best management practices to prevent erosion and water discharge.

Where possible, each CLS facility will be constructed adjacent to existing Unicom facilities. CLSs will be built on gravel pads that are 25 ft wide, 25 ft long, and 5 ft deep. Figure 1-4 shows a typical CLS facility.

Figure 1-4. Typical CLS Facility

In general, equipment used for community shore routes includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

1.1.5 FTTP

The way fiber is routed to the end user is dependent on what existing infrastructure is in place, if any. FTTP begins at the CLS, which houses the FTTP local access distribution equipment. FTTP is then routed throughout the community, connecting to local nodes, where splitters enable branching into feeder lines that deliver connectivity to the premise locations.

FTTP will be distributed throughout communities by trenching or attaching cable to existing utility poles. Unicom will not construct any new utility poles for the Project but will instead use existing utility poles where they are present. When utility poles are not present, the FTTP route will be trenched. When possible, this will occur along existing roads and rights-of-way. FTTP trenching will be conducted by a backhoe and standard trenching practices.

Upon construction completion, all trenched areas will be re-graded to original pre-existing contours. No excess material is anticipated to be produced that will require disposal.

In general, equipment used for the FTTP includes:

- Rubber wheel backhoe
- Tracked excavator or backhoe
- Utility truck and trailer to deliver materials
- Light tracked vehicle
- Chain trencher
- Hand tools (e.g., shovels, rakes, pry bars, wrenches)
- Survey equipment
- Splicing equipment, small genset, and splicing tent

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ADF&G Fish Habitat Permit Application

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THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Fish and Game

HABITAT SECTION
Southcentral Regional Office

333 Raspberry Road
Anchorage, Alaska
Main: 907.267.2342
Fax: 907.267.2499

FISH HABITAT PERMIT FH23-II-0071

ISSUED: July 13, 2023
EXPIRES: December 31, 2027

Unicom, Inc./GCI Communications Group
Attn: Chris Mace
2550 Denali St
Anchorage, AK 99503

RE: Fiberoptic Cable Installation and Stream Crossing
Unnamed Stream (Water Body No. 325-30-10100-2013)
Section 36, T 13 S, R 56 W, SM
Location: 59.003962 N, 158.535105 W

Kuskokwim River (Water Body No. 335-10-16000)
Section 8, T 07 N, R 71 W, SM
Location: 60.707405 N, 161.775311 W
Section 5, T 07 N, R 71 W, SM
Location: 60.720377 N, 161.771564 W

Kinak River (Water Body No. 335-10-16600-2151)
Section 21, T 03 N, R 77 W, SM
Location: 60.338106 N, 162.662579 W

Eek River (Water Body No. 335-10-16700)
Section 29, T 01 N, R74 W, SM
Location: 60.147738 N, 162.187033 W
Section 32, T 02 N, R 073 W, SM
Location: 60.217256 N, 162.011515 W

Eenayarak River (Water Body No. 335-10-16695)
Section 17, T 03 N, R 73 W, SM
Location: 60.350884 N, 162.010869 W

Pikmiktalik River (Water Body No. 335-10-16600-2197-3115)
Section 28, T 09 N, R 73 W, SM
Location: 60.844198 N, 162.225541 W

Nunacakanukakslak Lake (Water Body No. 335-10-16600-2197-0040)
Section 4, T 09 N, R 74 W, SM
Location: 60.893889 N, 162.423022 W
Section 5, T 09 N, R 74 W, SM
Location: 60.895934 N, 162.440360 W

Johnson River (Water Body No. 335-10-16600-2197)
Section 5, T 09 N, R 74 W, SM
Location: 60.896063 N, 162.446900 W

Dear Chris Mace:

Pursuant to the Anadromous Fish Act at AS 16.05.871 (b), the Alaska Department of Fish and Game (ADF&G) Habitat Section has reviewed your proposal to install a fiberoptic cable in western Alaska.

Project Description

Unicom, Inc. proposes to connect high-speed broadband internet service in the Yukon-Kuskokwim Delta as part of the Airraq Network Project. The existing fiberoptic cable (FOC) in Dillingham will be extended to ten Alaska communities crossing marine, freshwater, and upland habitat (see FOC Route Map). Most sections will be completed during the winter when waterbodies and soil are frozen except when working in marine waters or when crossing the Kuskokwim River between Napaskiak and Bethel which will be completed in the summer. FOC will be laid in Nushagak Bay after the area is ice free and prior to the 4th week of June when commercial fishing begins.

Overland winter installation of the 1-inch diameter FOC will begin from Eek to Bethel by laying the cable across frozen surfaces where it is expected to self-bury over time. In flowing waters, the FOC will be trenched through the streambanks on both sides and surface laid on the streambed. Once the trench through the streambank is created, a slot in the ice will be cut across the river so the cable can be laid on the streambed. When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface so that it can passively drop to the bottom and cover with sediment over time. The entire FOC route will be inspected after first breakup to ensure that the cable is conforming to all water body contours and will be repositioned as needed to remove suspensions. No bank trenching is expected at the Eenayarak River, Pikmiktalik River, and Nunacakanukakslak Lake crossings.

A tracked excavator will be used for installation and any exposed soils will be graded and stabilized at the earliest practicable date. Ice bridges are not included in project plans. If ice thickness is not sufficient for equipment crossings when the trench is excavated, conduit will be installed through the banks and then crews will return in the summer to lay cable from small watercraft. Native vegetation that has been removed will be stockpiled for site rehabilitation and ditch plugs will be used in trenched sections to prevent wetlands or ponded areas from draining.

Anadromous Fish Act
The Water Bodies have been specified as being important for the spawning, rearing, or migration of anadromous fishes pursuant to AS 16.05.871(a). The water bodies provide habitat for chum, coho, Chinook, pink, and sockeye salmon, as well as lamprey, whitefish, rainbow smelt, and Dolly Varden.

In accordance with AS 16.05.871(d), your project is approved subject to the project description, the following stipulations, and the permit terms.

1. 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 below ordinary high water line of the waterbodies referenced above. Vehicles leaking fuel, hydraulic fluids or other pollutants shall not be operated below the ordinary high water line of the waterbodies referenced above.

3. Structures or material 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.

Permit Terms
This letter constitutes a permit issued under the authority of AS 16.05.871 and must be retained on site during project activities. Please be advised that this determination applies only to activities regulated by the Habitat Section; other agencies also may have jurisdiction under their respective authorities. This determination does not relieve you of your responsibility to secure other permits; state, federal, or local. You are still required to comply with all other applicable laws.

You are responsible for the actions of contractors, agents, or other persons who perform work to accomplish the approved project. For any activity that significantly deviates from the approved plan, you shall notify the Habitat Section and obtain written approval in the form of a permit amendment before beginning the activity. Any action that increases the project's overall scope or that negates, alters, or minimizes the intent or effectiveness of any provision contained in this permit will be deemed a significant deviation from the approved plan. The final determination as to the significance of any deviation and the need for a permit amendment is the responsibility of the Habitat Section. Therefore, we recommend you consult the Habitat Section immediately before considering any deviation from the approved plan.

You shall give an authorized representative of the state free and unobstructed access to the permit site, at safe and reasonable times, for the purpose of inspecting or monitoring compliance with any provision of this permit. You shall furnish whatever assistance and information the authorized representative reasonably requires for monitoring and inspection purposes.

In addition to the penalties provided by law, this permit may be terminated or revoked for failure to comply with its provisions or failure to comply with applicable statutes and regulations. You shall mitigate any adverse effect upon fish or wildlife, their habitats, or any restriction or interference with public use that the commissioner determines was a direct result of your failure to comply with this permit or any applicable law.

You shall indemnify, save harmless, and defend the department, its agents, and its employees from any and all claims, actions, or liabilities for injuries or damages sustained by any person or property arising directly or indirectly from permitted activities or your performance under this permit. However, this provision has no effect if, and only if, the sole proximate cause of the injury is the department's negligence.

You may appeal this permit decision relating to AS 16.05.871 in accordance with the provisions of AS 44.62.330-630.

Please direct questions about this permit to Habitat Biologist Andrew Kastning at 907-267-2813 or andrew.kastning@alaska.gov.

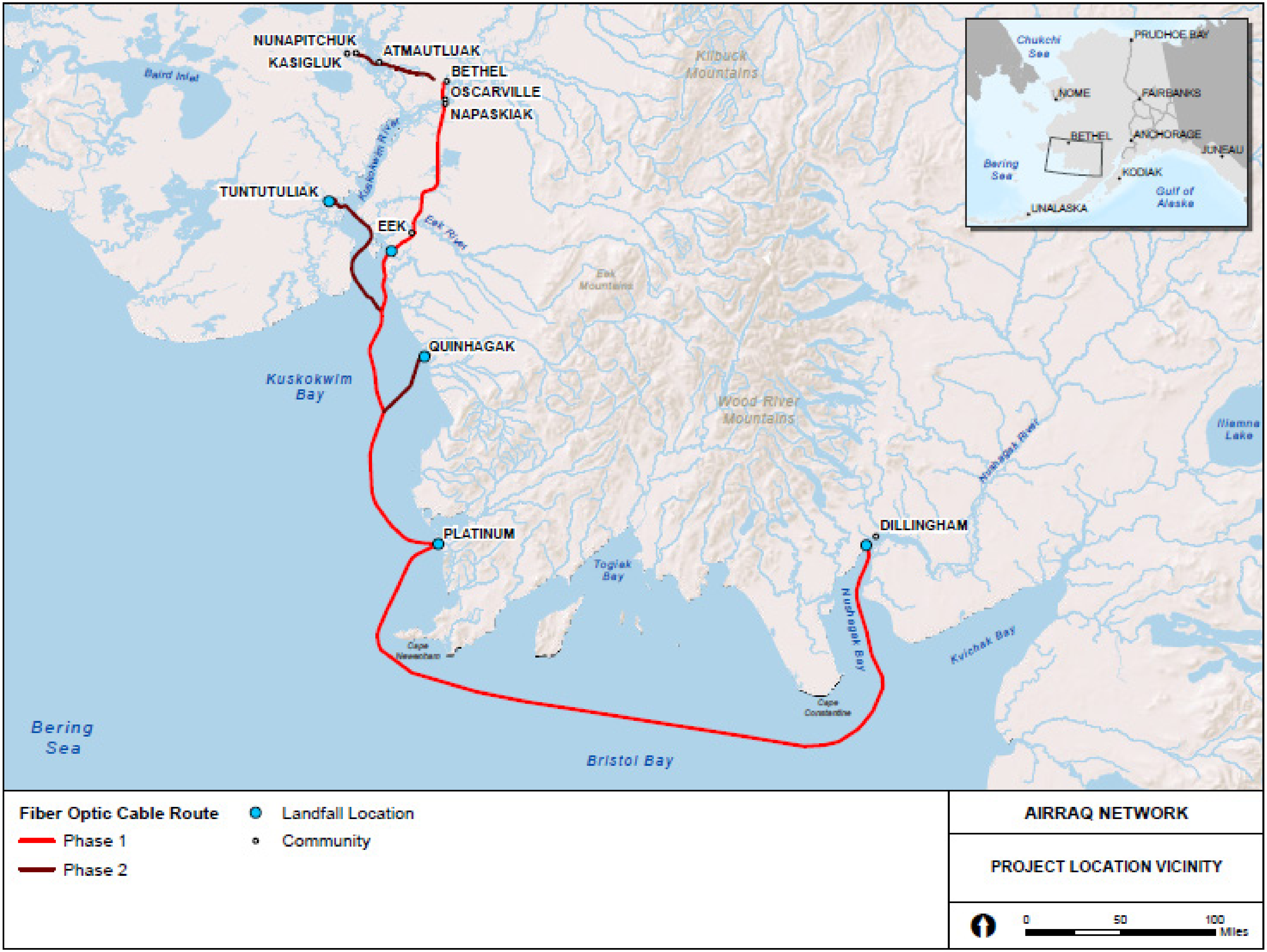
Sincerely,
Doug Vincent-Lang
Commissioner

Ron Benkert

By Ron Benkert
Southcentral Regional Supervisor

Enclosures: FOC Route Map

Email cc:
- A. Ott, ADF&G-HAB
- L. Borden, ADF&G-SF
- J. Chythlook, ADF&G-SF
- T. Sands, ADF&G-CF
- N. Smith, ADF&G-CF
- C. Larson, ADNR DMLW
- ADNR - TWUA
- J. Rypkema, ADEC
- USACE, Regulatory
- DPS/AWT, Dillingham
- DPS/AWT, Bethel
- Togiak National Wildlife Refuge
- Yukon Delta National Wildlife Refuge


NUNAPITCHUK
ATMAUTLUAK
KASIGLUK
BETHEL
OSCARVILLE
NAPASKIAK
Baird Inlet
Kilbuck Mountains
Kuskokwim River
TUNTUTULIAK
EEK
Eek River
Eek Mountains
QUINHAGAK
Kuskokwim Bay
Wood River Mountains
Iliamna Lake
Nushagak River
PLATINUM
DILLINGHAM
Togiak Bay
Cape Newenham
Nushagak Bay
Kvichak Bay
Cape Constantine
Bering Sea
Bristol Bay
Chukchi Sea
PRUDHOE BAY
NOME
FAIRBANKS
BETHEL
ANCHORAGE
JUNEAU
Bering Sea
KODIAK
Gulf of Alaska
UNALASKA
Fiber Optic Cable Route
Phase 1
Phase 2
Landfall Location
Community
AIRRAQ NETWORK
PROJECT LOCATION VICINITY
0
50
100
Miles

FH#__________
(Office Use Only)

FISH HABITAT PERMIT APPLICATION

Alaska Department of Fish and Game - Habitat Section

Office Locations

A. APPLICANT

Name: Chris Mace, VP (Unicom, Inc./GCI Communications Group)

Mailing Address: 2550 Denali Street, Anchorage, AK 99503

Email Address: cmace@gci.com

Phone: 907-868-6837 Alt Phone:

AGENT / POINT OF CONTACT:

Name: Malcolm Salway, HDR

Mailing Address: 592 E. 36th Avenue, Suite 500

Email Address: malcolm.salway@hdrinc.com

Phone: 907-644-2051 Alt Phone:

B. PROJECT DESCRIPTION:

Unicom, Inc. (Unicom), a wholly-owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim Delta as part of Airraq Network (Project). Additionally details are provided in Attachment 1: Project Information to Support Fish Habitat Permit Application.

C. PROJECT TIME FRAME: January 2024 to December 2027

D. PROJECT LOCATION:

Water body name: Nushagak & Kusksokwim River drainages

Anadromous stream number: 325-30-10100; 335-10-16000 & tributaries (see Attachment 1)

Latitude & longitude in decimal degrees: see Attachment 1 for location information

Section several Township several Range several Meridian Seward USGS Quad see Attachment

E. WATERBODY CHARACTERISTICS:

Water body width: varies, see Attachment 1. Water body depth: varies, see Attachment 1.

Substrate type (Boulder, cobble, gravel, sand, mud): primarily sand and mud; some gravels.

Stream gradient: low

PLEASE COMPLETE THE APPLICABLE SECTIONS BELOW:
A list of best practices for many commonly authorized activities can be found at our Habitat Permits Website.

F. IN-WATER WORK:

Will you place a structure or any fill below ordinary high water? ☒ Yes ☐ No

Will you remove material from below ordinary high water? ☒ Yes ☐ No

Type and amount: Existing streambank material will be temporarily removed to create a trench, then backfilled.

Will you alter the bed or banks of the water body? ☒ Yes ☐ No

How? surface lay of cable on bed; trenching at banks (see Attachment)

Will you use tracked or wheeled equipment below ordinary high water? ☒ Yes ☐ No

What type? excavator, backhoe, utility truck, snowmachine, boats, survey gear (primarily winter travel).

Will you drive piles below ordinary high water? ☐ Yes ☒ No

How many and what type? Not applicable

Pile installation method: ☐ vibratory hammer ☐ impact hammer ☐ drilled

☐ other: Not applicable

Will you divert the stream around the work area? ☐ Yes ☒ No

How long will the stream be diverted? Not applicable

How will you divert the stream? Not applicable

Will you be placing a coffer dam or silt fencing to isolate the work area? ☒ Yes ☐ No

Will you dewater the work area with a pump? ☐ Yes ☒ No

Who will trap fish and remove them from the work area? Not applicable
Capture and relocation of fish will require an Aquatic Resource Permit from the ADF&G Division of Sport Fish.

G. **STREAM CROSSINGS:**

What type of vehicles or equipment will cross the stream or lake?

boats in summer; excavator, backhoe, utility truck, snowmachine, survey gear (primarily winter travel)

How many crossings (one-way) will be required? minimum necessary to install cable and conduct post-install inspections

Will you build ice bridges for winter crossing? ■ Yes ☐ No

H. **WATER WITHDRAWAL**:

Pump intake size (inches): Not Applicable Maximum pumping rate (gpm): Not Applicable

Total daily amount (gal): Not Applicable Total seasonal amount (gal): Not Applicable

Water withdrawal from fish-bearing waterbodies will require appropriate intake screening to avoid impacts to fish. Screening criteria can vary by location depending on the species of fish and life stages present at the time of withdrawal. Contact the Habitat Section for more information on intake screens.

Intake screening specifications (attach photos if available):

Not Applicable

Please attach plans, specifications, aerial photographs, site rehabilitation plans, or other information in support of your application. Submit your completed application by postal mail, email, or in person at the appropriate Habitat Section office.

I certify all information provided in my application and supporting documents is true and complete to the best of my knowledge.

DocuSigned by: Chris Mace 86137DB744804AB... 6/9/2023

Applicant Signature Date

Airraq Network

PHASES 1 AND 2

Attachment 1: Project Information to Support Fish Habitat Permit Application

Unicom, Inc

June 2023

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Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

ADF&G	Alaska Department of Fish and Game
AWC	Anadromous Waters Catalog
EFH	essential fish habitat
FOC	fiber optic cable
HTL	high tide line
MHW	mean high water
MLW	mean low water
NOAA	National Oceanic and Atmospheric Administration
NTIA	National Telecommunications and Information Administration
OHW	ordinary high water
PLGR	pre-lay grapnel run
Project	Airraq Network
Unicom	Unicom, Inc.

1 Introduction

Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, proposes to bring high-speed broadband internet service to the Yukon-Kuskokwim Delta as part of Airraq Network (Project). In doing so, Unicom will extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 Western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk. These communities that the Project proposes to service are home to the Yup'ik, with at least 74 percent of their population being Alaska Native.

Installing FOC between Dillingham and the other communities will require in-water work below the mean high water (MHW) and/or ordinary high water (OHW) elevations of habitat known to support Pacific salmon (*neqaraq*)[1] and other species, and some of these activities require Title 16 authorization from the Alaska Department of Fish and Game (ADF&G) prior to construction.[2] Based on initial coordination with the ADF&G, Unicom is requesting authorization to construct the Project under a single fish habitat permit.

The purpose of this document is to describe Project components that require Title 16 permit authorization prior to construction. **Section 2** provides an overview of the Project, focusing on proposed Project components that require work in and near fish habitat. **Section 3** identifies where the Project will intersect fish habitat and describes proposed work planned to occur below OHW and/or MHW in fish habitat and timing of proposed work. **Section 4** identifies the applicant's proposed conservation measures to minimize potential Project effects.

2 Project Overview

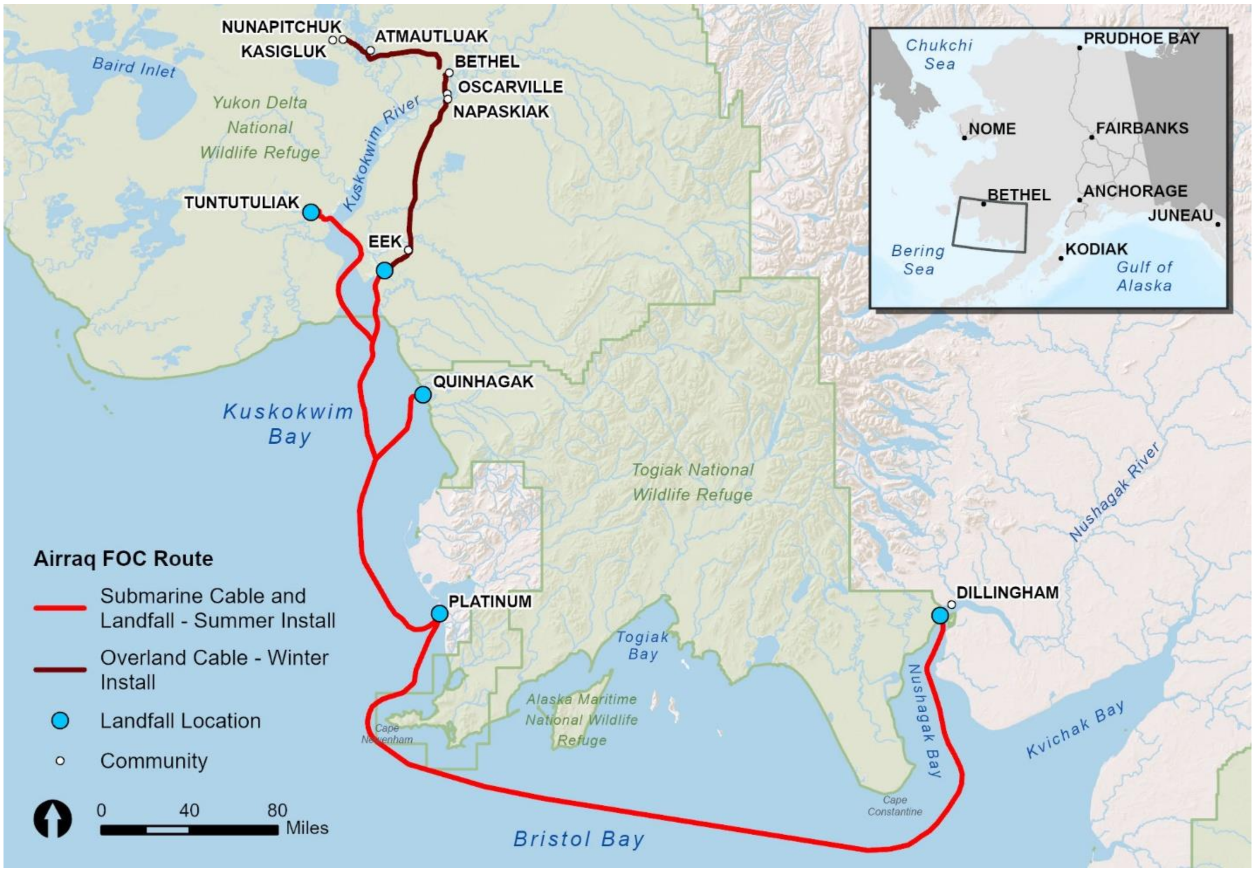
Unicom anticipates construction will start in early 2024 and be complete in 2027. Inset 1 provides an overview of the Project, identifying the 5 landfall locations, the overland and marine routes for the FOC, and the 10 communities to be serviced.

Installing FOC within marine habitats below MHW and select freshwater habitats below OHW are the primary Project activities that will intersect fish habitat. Unicom plans to install FOC within the marine route during the open water season and within the overland route primarily during winter conditions. The subsections below summarize activities that will intersect fish

[1] The Yup'ik name for salmon is *neqaraq* (SASAP 2023).

[2] In April 2023, the National Telecommunications and Information Administration (NTIA), the lead federal agency for this Project, submitted an essential fish habitat (EFH) assessment to the National Oceanic and Atmospheric Administration (NOAA) Fisheries in accordance with the Magnuson-Stevens Fishery Conservation and Management Act. In May 2023, NOAA concluded that implementation of the Project's proposed conservation measures and best management practices will mitigate potential effects, and no further consultation is necessary. NTIA also submitted a Department of Army permit application to the U.S. Army Corps of Engineers requesting Section 404/10 authorization under Nationwide Permit 57 (Electric Utility Line and Telecommunications Activities) for this Project.

habitat. A detailed Project Description, which describes all proposed Project components, is available upon request.



Inset 1. Project Vicinity and Overview

2.1 Overland Route (Winter)

Unicom plans to install FOC within the overland route primarily during winter conditions, starting with the segment from Eek to Bethel in winter (February through April) 2024. This work will include laying cable across the frozen ground surface, including waterbody banks bordered by inundated wetlands, where it will self-bury over time. At larger stream crossings (e.g., Eek and Johnson Rivers), the cable will be trenched into the stream banks (using a backhoe). Care will be taken to position crossings on stable banks for erosion protection. When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface so it can passively drop into the waterbody during spring break-up and self-bury within aquatic bed sediments. Installing cable during winter conditions will largely avoid impacts on fish. Unicom plans to inspect the route after breakup to ensure that the cable is not suspended but instead conforms to water body contours. Cable will be manually repositioned as needed to remove all suspensions.

The Kuskokwim River crossing between Oscarville and Napaskiak is the only portion of the overland route that will be completed during summer.

2.2 Marine Route/Landfall Locations (Summer)

Unicom plans to install submarine cable between the five landfall locations (Dillingham, Platinum, Apogak [Eek], Quinhagak, and Tuntutuliak) in summer (June through August) 2024. The cable will either be placed on the seafloor's surface or buried beneath it to protect the cable from ice scour, wave action, and/or human activity. As the route approaches each of the five landfall locations, Unicom will bury the cable for protection. Unicom will conduct geophysical investigations in 2023 to assess bathymetric conditions along the marine route and identify areas necessary for trenching.[3] The Project will use one of three trenching methods to bury the cable, depending on seafloor substrate, water depth, and distance from shore.

Where trenching is needed in deep waters (more than 40 feet), cable will be fed through a cable plow's share blade (1-foot wide and 5 ft deep) and inserted into sediments. Sediments will immediately collapse on top of, and bury, the cable (no side cast).[4], as the plow is pulled by the cable ship. In deep waters (more than 40 feet), Unicom anticipates that approximately 20 percent of the cable will be surface laid, and the other 80 percent will be buried for protection.[5]

Where cable burial is needed in waters less than 40 feet deep, a jet sled will focus highly pressurized water onto the seafloor to liquify substrate, and the cable will sink into its 8-inch-wide (up to 3-foot-deep) trench (no side cast). Divers will accompany the jet sled to monitor trenching performance and assist in operations.

Standard trenching in intertidal areas will be conducted with a backhoe or excavator during low tidal conditions to connect cable from marine waters to a beach manhole (above the high tide line [HTL]) at each landfall location. Standard trenching dimensions are 3 feet wide and 3 feet deep with a temporary (less than 1 week) side cast area of 5 feet. Trenching/excavation in intertidal areas (between MLW and HTL) will be done at low tide and therefore not impact fish. At the Kuskokwim River crossing, Unicom proposes to bury the cable into streambanks below OHW (using a backhoe) during summer. To transition the cable to the terrestrial environment, Unicom will excavate a temporary trench within one bank of the Kinak River during summer, as described in **Section 3**.

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

[4] Trenching within deep sea segments will protect the cable against activities known to cause cable faults such as ground fishing operations, shallow anchor dragging, and earthquakes, where necessary.

[5] After install, post-lay inspections will occur in areas where initial cable installation encountered difficulty (e.g., plow failure, uncontrolled cable payout, etc.), using a remotely operated vehicle to facilitate issue resolution. Where needed, the remotely operated vehicle will use jet burial to bury the cable.

3 Activities that Intersect Fish Habitat

Unicom plans to install the cable between the five landfall locations during the open water season in summer and install cable along the overland route primarily during winter. The FOC route will cross several rivers and other waterbodies known to support fish. Proposed activities that will require in-water work below OHW/MHW in fish-bearing waters include:

1) Surface laying the 1-inch-diameter cable below OHW within a stream channel's thalweg or perpendicular to the channel at crossing locations (summer).
2) Excavating a shallow trench into a streambank to transition the 1-inch-diameter cable back to the terrestrial environment at select crossing locations (summer and/or winter).
3) Surface laying the 1-inch-diameter cable across small streams, ponds, and lakes along the overland route (winter).

Table 3-1 provides a summary of proposed work below OHW/MHW in fish-bearing habitat, timing of activity, and documented fish species occurrence. The subsections that follow describe the construction methods and timing proposed for fish-bearing waters under ADF&G's jurisdiction and for which authorization is requested. The figures referenced herein and identified in **Table 3-1** are presented at the end of this document (see **Appendix A**).

Table 3-1. Summary of Proposed Work below OHW/MHW in Fish Habitat

Figure ID	Project Element	River Name AWC Number	Stream Width	Activities below OHW		Documented Fish Species
				Trench Cable at Streambank	Surface Lay Cable	
A-1	Entire Project	Several (see below)	—	—	—	Several (see below)
			Marine Route			
A-2	Dillingham Landfall	Unnamed Stream 325-30-10100-2013	6 feet	Summer	Summer	Coho, Chinook, pink, and sockeye salmon
A-3	To Nushagak Bay	Nushagak River 325-30-10100	1.8 miles	Summer	Summer	Chum, coho, Chinook, pink, and sockeye salmon; Arctic char; rainbow smelt; whitefish
A-4	Platinum Landfall	*Not applicable*[a]	—	—	—	Pacific salmon and others
A-5	Quinhagak Landfall	*Not applicable*[b]	—	—	—	Pacific salmon and others
A-6	To Tuntutuliak Landfall	Kuskokwim River 335-10-16000	2.9 miles	—	Summer	Chum, coho, Chinook, pink, and sockeye salmon
	Tuntutuliak Landfall	Kinak River 335-10-16600-2151	363 feet	Summer	Summer	Sheefish, whitefish
A-7	Apogak/Eek River Landfall	Kuskokwim Delta/Bay	0.5 mile	Summer (at low tide, dry)	Summer (below MHW)	Chum, coho, Chinook, pink, and sockeye salmon
			Overland Route			
A-7	Eek to Napaskiak	Eek River 335-10-16700	871 feet	Winter	Winter or Summer	Chum, coho, Chinook, pink, and sockeye salmon
	Eek to Napaskiak	Eenayarak River 335-10-16695	163 feet	—	Winter	Arctic char, Sheefish, whitefish
A-8	Napaskiak to Oscarville	Kuskokwim River 335-10-16000	0.75 mile	Summer	Summer	Pacific salmon, Sheefish, broad and humpback whitefish, least cisco, lampreys, rainbow smelt
A-9	Bethel to Atmautluak	Pikmiktalik River 335-10-16600-2197-3115	328 feet	—	Winter	Sheefish, whitefish species
	Atmautluak to Nunapitchuk	Nunavakanukakslak Lake 335-10-16600-2197-0040	—	—	Winter	Sheefish, whitefish species
	Nunapitchuk to Kasigluk	Johnson River 335-10-16600-2197	413 feet	Winter	Winter or Summer	Sheefish, whitefish species

Source: Giefer and Graziano 2022a, 2022b; NOAA 2023
Notes: ID = Identification Number
[a] The Project will not intersect nearby Smalls River (335-00-10870), which supports coho and sockeye salmon.
[b] The Project will not intersect nearby Kanektok River (335-00-10600), which supports five salmon species.

3.1 Nushagak River and Tributary Stream

At the **Dillingham Landfall** site, Unicom will use standard trenching methods to bury the cable between the beach manhole and the tidally influenced Nushagak River (325-30-10100) during low tide conditions. Prior to reaching the Nushagak River, Unicom plans to route the 1-inch-diameter cable within the lower portion of an unnamed anadromous tributary stream (325-30-10100-2013) for protection of the cable through winter ice and breakup conditions (**Insets 2 and 3; Figure A-2**). This would require excavating a small trench into the streambank, then placing the cable within the tributary channel to its convergence with the Nushagak River.

Inset 2. Red Line Shows Anticipated Cable Route into Tributary Stream (325-30-10100-2013)

Inset 2. Looking East into Tributary Stream (325-30-10100-2013)

The Nushagak River supports five Pacific salmon species. The Anadromous Waters Catalog (AWC) identifies the lower 850 feet of the tributary stream as supporting Chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), sockeye (*O. nerka*), and pink (*O. gorbuscha*) salmon (Giefer and Graziano 2022a). Poorly sorted muddy aggregates with erratic boulders dominate the substrate along the shoreline of the Nushagak River (Benthic GeoScience Inc. 2023).

Unicom plans to install the cable within the tributary stream and along the shoreline during the open water season but at low tide conditions, which will help to minimize potential impacts on fish and habitat (**Figure A-2**). Below tidal influence (i.e., below MLW), the cable will be placed on the existing substrate and routed along the thalweg of the lower Nushagak River as it enters Nushagak Bay. The cable will be surface laid throughout Nushagak Bay (**Figure A-3**).

3.2 Kuskokwim and Kinak Rivers

Unicom plans to place the cable directly onto the seafloor within Kuskokwim Bay, except at landfall locations (**Figure A-1**). As the cable route approaches the lower Kuskokwim River (335-10-16000) and upstream into the Kinak River (335-10-16600-2151), the cable will be placed within the rivers' thalweg during the open-water season (**Figure A-6**). The Kinak River supports Sheefish (*Stenodus leucichthys*), which are also known as Inconnu, and whitefish species. The Kuskokwim River supports five Pacific salmon species, Sheefish, Arctic lamprey (*Lampetra camtschatica*), Pacific lamprey (*Entosphenus tridentatus*), least cisco (*Coregonus sardinella*), broad whitefish (*C. nasus*), humpback whitefish (*C. pidschian*), rainbow smelt (*Osmerus mordax*), and various resident fish species (Giefer and Graziano 2022b).

To transition the cable between the streambed and the landfall location at the **Tuntutuliak Landfall** site, Unicom plans to excavate a relatively shallow trench in the streambank within which to bury the cable. Similarly, at the Kuskokwim River crossing between Napaskiak and Oscarville, the cable will be surface laid on the streambed and placed in a trench on either bank as it transitions overland (**Figure A-8**). This work will occur in summer during the open water season.

The Kinak and Kuskokwim Rivers are naturally turbid environments at these locations. Habitat disturbance from laying the 1-inch-diameter submarine cable will be relatively minimal and largely temporary. Once placed, this surface-laid submarine cable is not anticipated to adversely affect fish or the habitats' ability to support fish. Excavating the shallow trenches within the banks may temporarily increase sediment input but on a relatively minor scale given the rivers' naturally high sediment loads and large volume of water at these locations. Unicom anticipates the trench, up to 3 feet wide, will be opened and closed with an excavator within the same day at each location.

3.3 Eek, Eenayarak, Pikmiktalik, and Johnson Rivers and Lakes

The **Apogak Landfall** site, which will serve as a point of transition between the marine and overland routes, is located near the convergence of the tidally influenced Eek River (335-10-16700) and Apogak Slough (**Figure A-7**). Habitat within this area supports Pacific salmon and other anadromous and marine species. As the surface-laid cable approaches landfall, Unicom will excavate a trench into the bank of the channel/shoreline and bury the cable within it during summer conditions. This work will be done during low tide conditions, which will help to avoid and/or minimize disturbance to fish and habitat. Aside from the upstream crossing at the Kuskokwim River (**Figure A-8**), most of the cable along the overland route will be surface laid or otherwise installed during winter.

To cross the Eek and Johnson Rivers (335-10-16600-2197), Unicom plans to excavate a trench within the banks during winter conditions. The plan is to trench down the bank to the ice level until water is reached, then cut a slot across the river through the ice so the cable can be laid within the channel. If ice conditions do not allow the team to safely cut a slot through the ice across the river, the team will return to lay the cable across the bottom of the channel during summer. Either way, Unicom plans to complete the cable trenching on both sides of the river in winter. Streambank trenches will be backfilled as best as possible in winter, likely the same day of excavation. Immediately after breakup, a qualified crew will revisit both crossing sites to assess the condition of the trench and make sure the cable is laying on the riverbed at each site. At that time, waddles and possibly geotech fabric will be placed over the disturbed bank to promote stability and vegetation growth, and to ensure no drainage or erosion path is created.

No trenching is planned to facilitate crossings of the Eenayarak River (335-10-16695), Pikmiktalik River (335-10-16600-2197-3115), or Nunavakanukakslak Lake (335-10-16600-2197-0040) (**Figures A-7** and **A-9**). Inundated wetlands comprise the banks of these waterbodies, which will allow the cable to self-bury. Unicom plans to lay the 1-inch-diameter submarine cable across the surface of these waterbodies in winter.

4 Proposed Conservation Measures

Unicom proposes the following measures that will avoid and/or minimize potential impacts:

- Use existing rights-of-way whenever possible to lessen overall encroachment and disturbance of wetlands.
- Store and contain excavated material on uplands. If storage in wetlands or waters cannot be avoided, use alternate stockpiles to allow the continuation of sheet flow. Store stockpiled materials on construction cloth rather than bare marsh surfaces, eelgrass, macroalgae, or other submerged aquatic vegetation.
- Handle and store on site all fuels and hazardous substances used by the Project in compliance with state and federal regulatory guidance. Store all fuels and chemicals in appropriate primary containment areas. Design secondary containment areas in compliance with all applicable permits and regulations.
- Transport fuels and other products to the action area using a licensed, commercial transporter following U.S. Department of Transportation regulations for safe transport of materials to minimize spill risk.
- Backfill excavated wetlands with either the same or comparable material capable of supporting similar wetland vegetation. Restore original marsh elevations. Stockpile topsoil or organic surface material, such as root mats, separately and return it to the surface of the restored site. Use adequate material to ensure the pre-Project elevation is attained following the settling and compaction of the material. After backfilling, implement erosion protection measures where needed.
- Native vegetation and topsoil removed for Project construction will be stockpiled separately and used for site rehabilitation. Species to be used for seeding and planting will follow this order of preference:
    - Species native to the site
    - Species native to the area
    - Species native to the state
- Trenches may not be constructed or backfilled in such a manner as to drain wetlands or other waters of the U.S. (e.g., backfilling with extensive gravel layers, creating a French drain effect). Ditch plugs or other methods will be used to prevent this situation.
- Any excess material will be removed to an upland (non-wetland) location.
- Except in areas of topsoil excavation, excavated soils will be sorted into mineral subsoils and topsoil (i.e., the upper, outermost layer of soil; usually the top 2 to 8 inches).
- Limit equipment access to the immediate Project area. Tracked vehicles are preferred over wheeled vehicles.
- Heavy equipment working within wetlands or mudflats will be placed on mats, or other measures will be taken to minimize soil disturbance.
- All exposed soil and other fills, as well as any work below OHW, will be permanently stabilized at the earliest practicable date. When possible, work within waters will be performed during periods of no or low flow, or during low tides.

- Caution equipment operators to avoid sensitive areas. Clearly mark sensitive areas to ensure that equipment operators do not traverse them.
- Identify nearshore segments of the marine route, avoiding developed shorelines and high energy landfalls that are subject to erosion. Conduct geophysical reviews for the route, and avoid areas prone to sediment slumping, turbid currents, and other hazards.
- Limit construction equipment to the minimum size necessary to complete the work. Use shallow-draft equipment to minimize ground effects and temporary access channels.
- Align crossings to avoid rock reefs and shoals to the extent possible.
- Avoid construction of permanent access channels to avoid disrupting natural drainage patterns and destroying wetlands through excavation, filling, and bank erosion.
- Conduct trench/excavation activities within intertidal areas (between MLW and HTL) at low tide to minimize impacts on fish and EFH.
- Bury cable in areas where scouring or wave activity would eventually expose them.
- Avoid damaging high-relief bottom habitat and across live bottom habitats such as corals and sponges to the extent possible.
- Conduct geophysical investigations in 2023 to assess bathymetric conditions along the route and identify areas necessary for trenching.
- Avoid high-impact fishing grounds where possible. Bury the cable when ground fishing areas cannot be avoided.
- Avoid intersecting or otherwise affecting mapped eelgrass beds.
- Locate the route to minimize damage to marine and estuarine habitat to the extent feasible.
- Lay or trench the overland cable routes in winter to avoid or minimize impacts.
- Winter landfall and overland construction will limit ground disturbance and protect vegetation from heavy equipment and temporary side cast.
- Temporary fills will be removed in their entirety, and the affected areas will be returned to pre-construction elevations. The affected areas will be revegetated, as and when appropriate. Proper seeding of all areas under threat of erosion or unstable soil post-project will be seeded with appropriate grass seed to maintain solid soil stability. Any areas of vegetation will be revegetated to the greater standard among the permit—Storm Water Pollution Prevention Plan or Environmental Assessment standards.
- Follow permit stipulations (e.g., fish habitat permits; Section 404/10, etc.).
- When possible, conduct in-water work in fish-bearing waters during the time of year that will have the least impact on sensitive habitats and species, as determined through coordination with NOAA and/or ADF&G).
- Position the location of stream crossings on stable banks for erosion protection. When crossing lakes and ponds, the cable will be laid with adequate slack on the ice surface so it can passively drop into the waterbody during spring break-up and self-bury within aquatic bed sediments.
- Inspect the overland route after breakup to ensure the cable is not suspended within water crossings but instead conforms to water body contours.
- Conduct post-lay inspection in marine waters using a remotely operated vehicle at select areas where difficulties were identified during the initial cable install and, where needed, bury the cable using jet burial.

5 References

Benthic GeoScience Inc.

2023 Airraq Fiber Network Desktop Study, Version 1.0. April 16, 2023.

Giefer, J., and S. Graziano

2022a *Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Southwestern Region, effective June 15, 2022*. Alaska Department of Fish and Game, Special Publication No. 22-05. Anchorage, Alaska.

2022b *Catalog of waters important for spawning, rearing, or migration of anadromous fishes – Western Region, effective June 15, 2022*. Alaska Department of Fish and Game, Special Publication No. 22-06. Anchorage, Alaska.

NOAA (National Oceanic and Atmospheric Administration)

2023 Essential Fish Habitat Mapper for Alaska. Accessed at https://www.fisheries.noaa.gov/resource/map/alaska-essential-fish-habitat-mapper.

SASAP (State of Alaska's Salmon and People)

2023 State of Alaska's Salmon and People website. Accessed at https://alaskasalmonandpeople.org/.

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Appendix A. Figures

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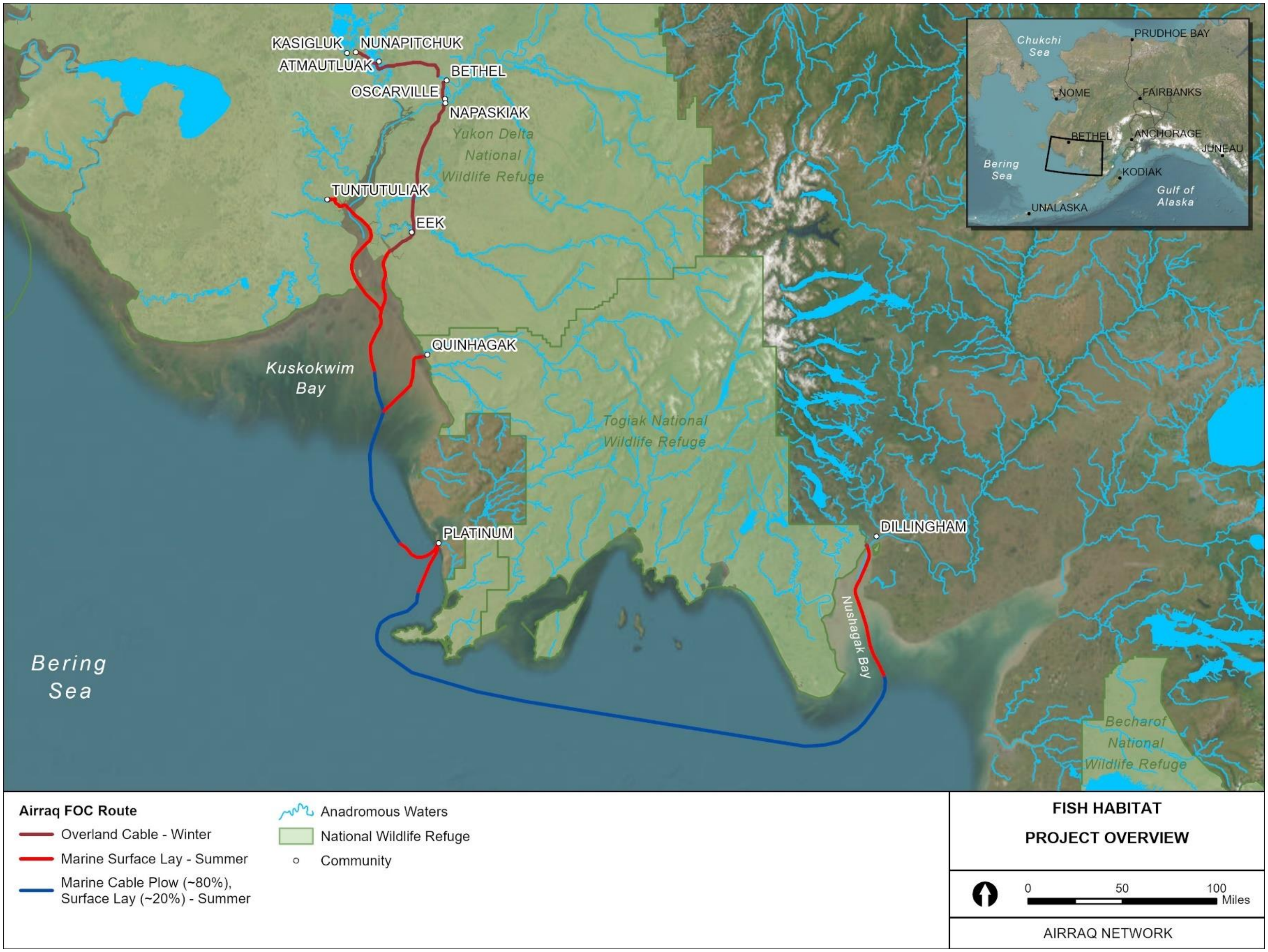

Figure A-1. Anticipated Marine Surface Lay, Marine Cable Plow/Surface Lay, and Overland Cable Routes

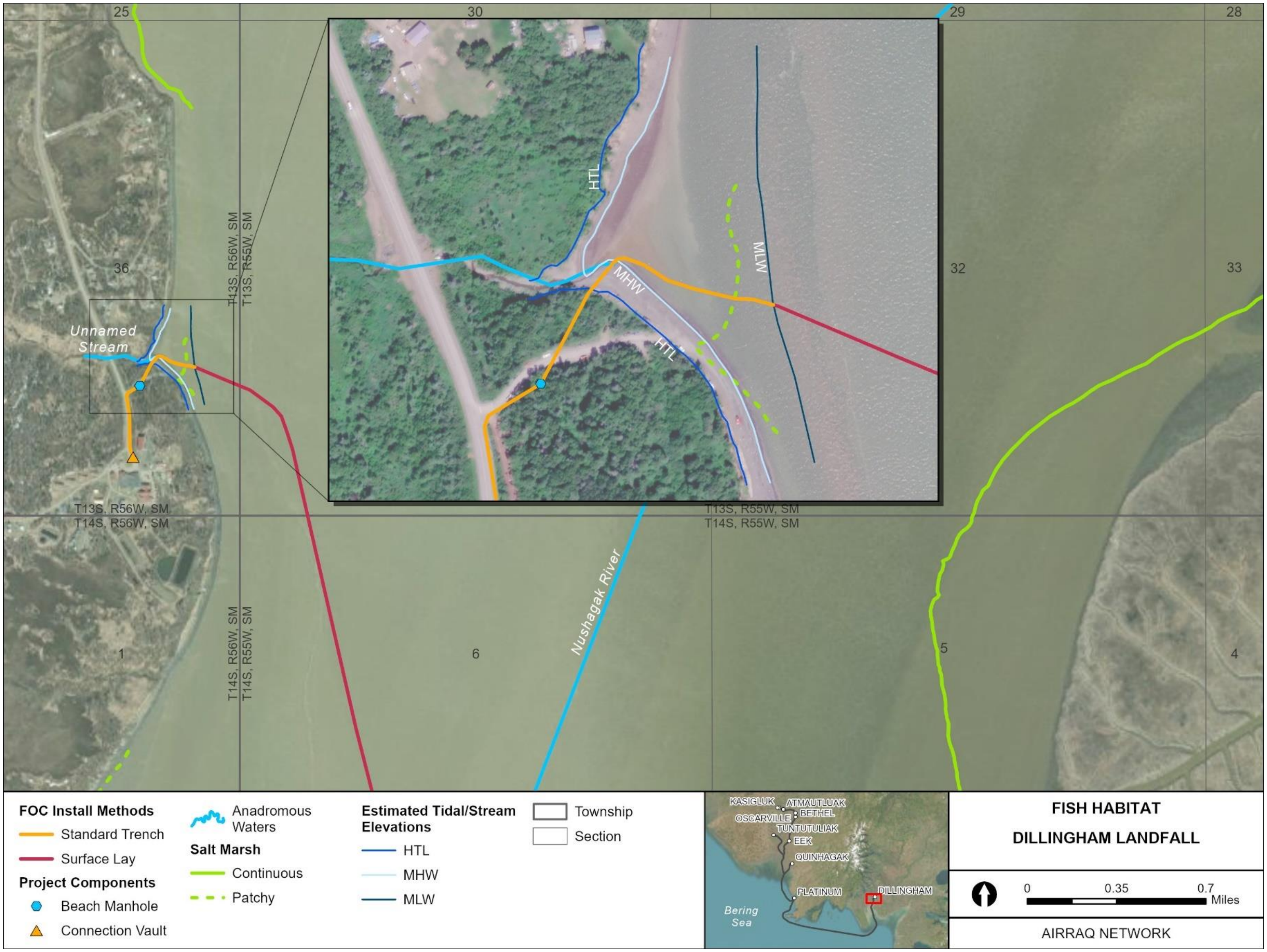

Figure A-2. Dillingham Landfall: Nushagak River (325-30-10100) and Tributary Stream (325-30-10100-2013)

Figure A-3. Cable Route within Lower Nushagak River (325-30-10100) and Nushagak Bay

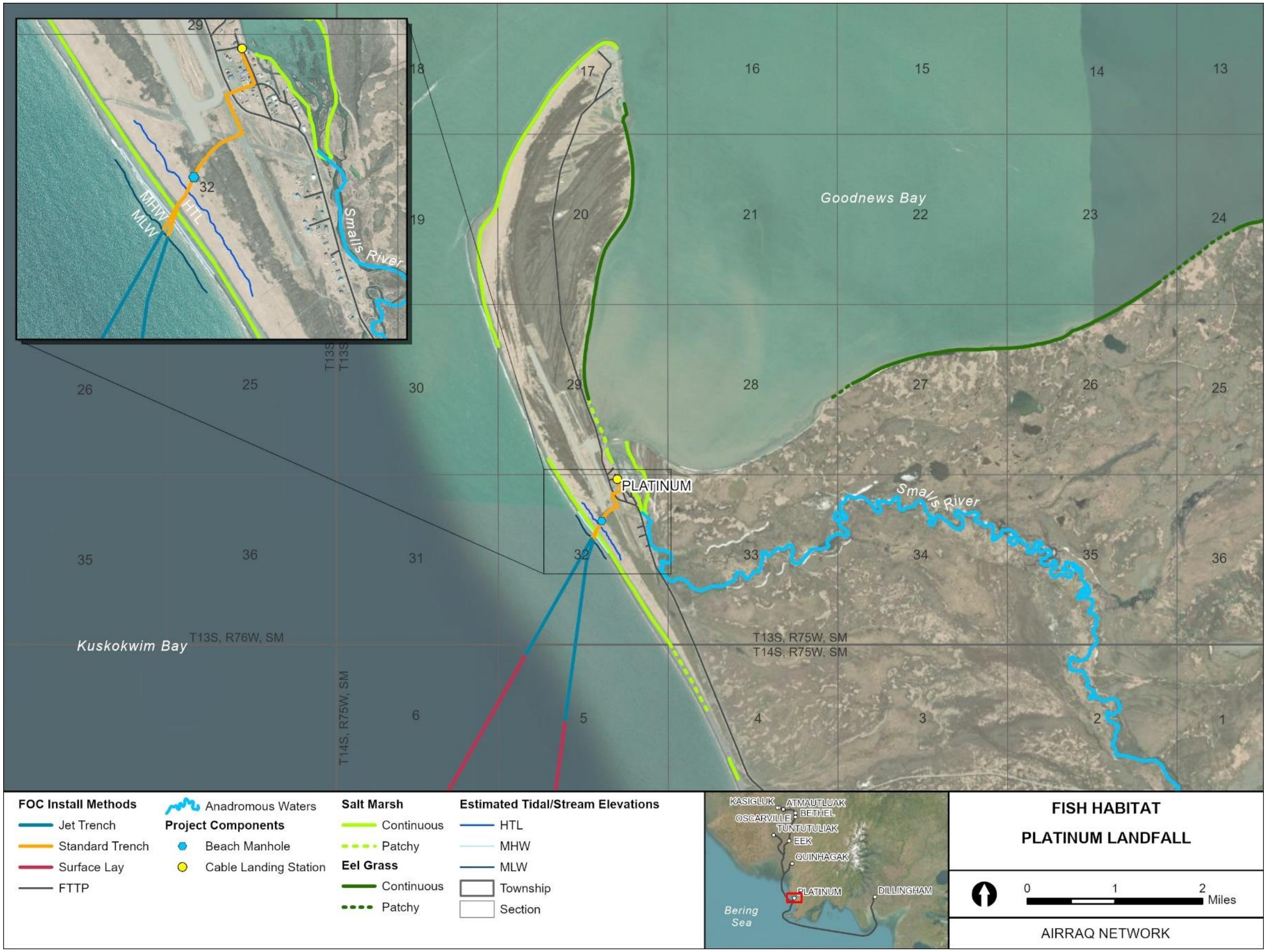

Figure A-4. Platinum Landfall: No In-water Work Proposed in Nearby Smalls River (335-00-10870)

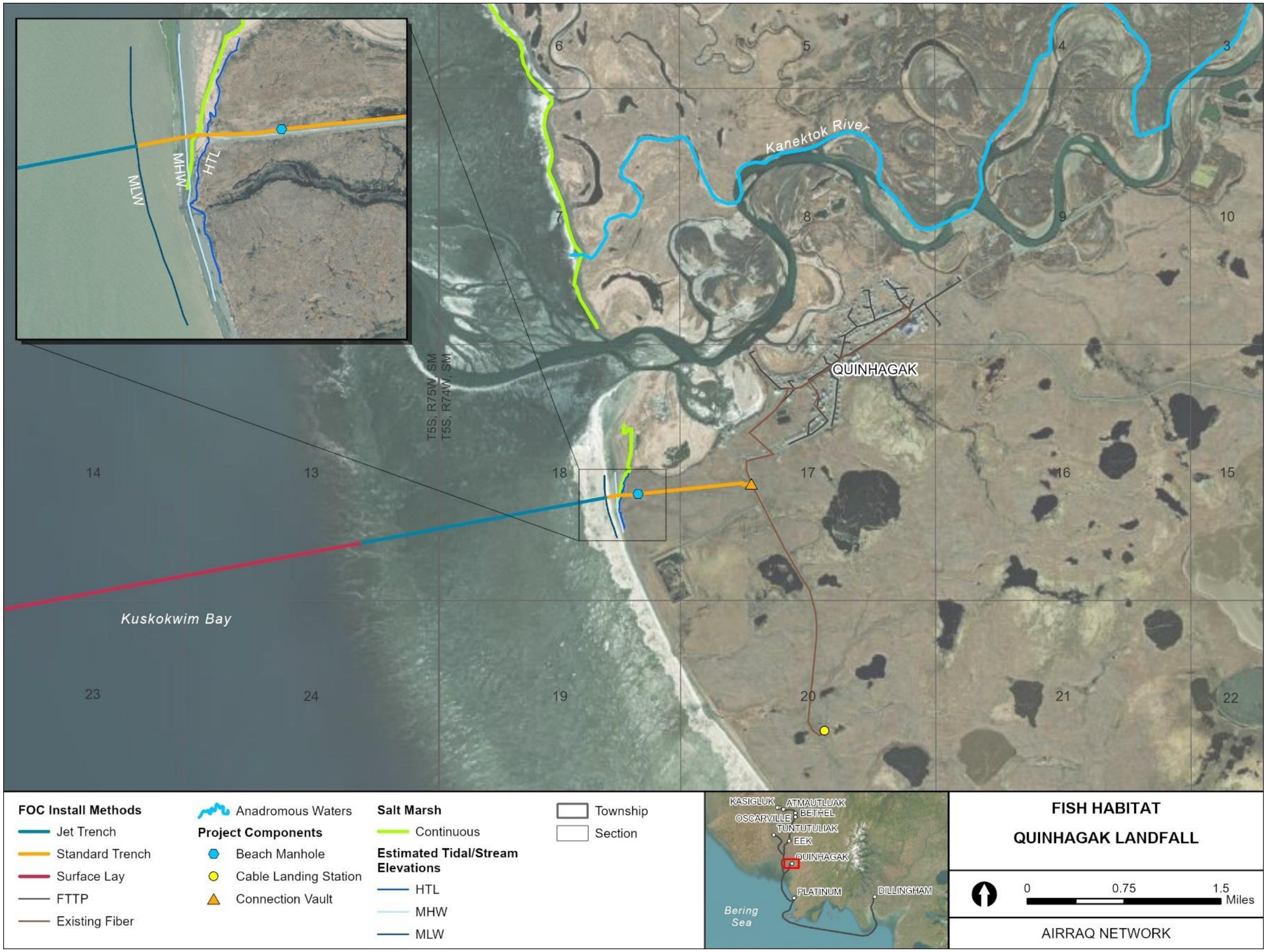

Figure A-5. Quinhagak Landfall: No In-water Work Proposed in Nearby Kanektok River (335-00-10600)

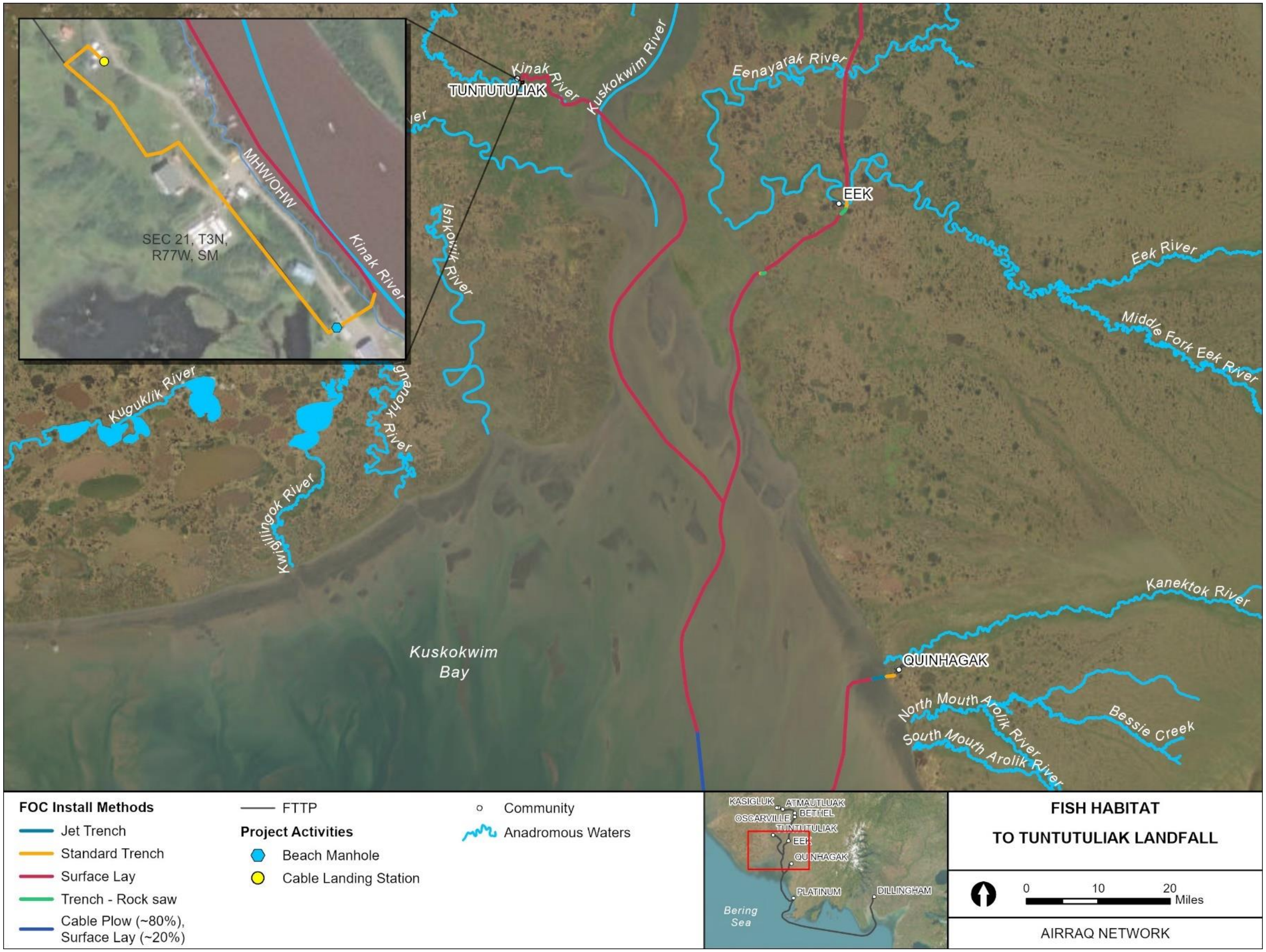

Figure A-6. Tuntutuliak Landfall: Kuskokwim River (335-10-16000) and Kinak River (335-10-16600-2151)

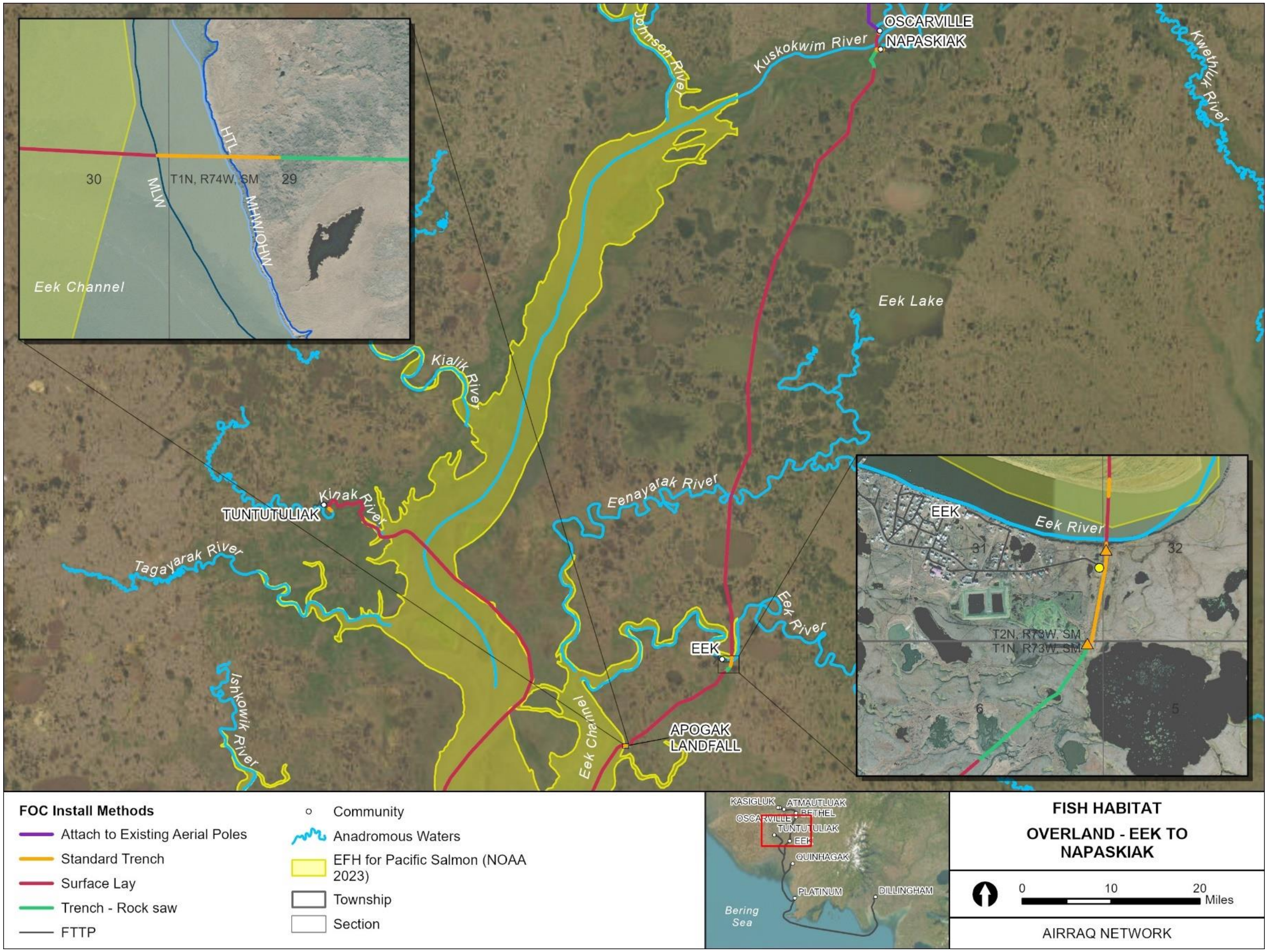

Figure A-7. Apogak Landfall and Overland Route: Eek River (335-10-16700) and Eenayarak River (335-10-16695) Crossings

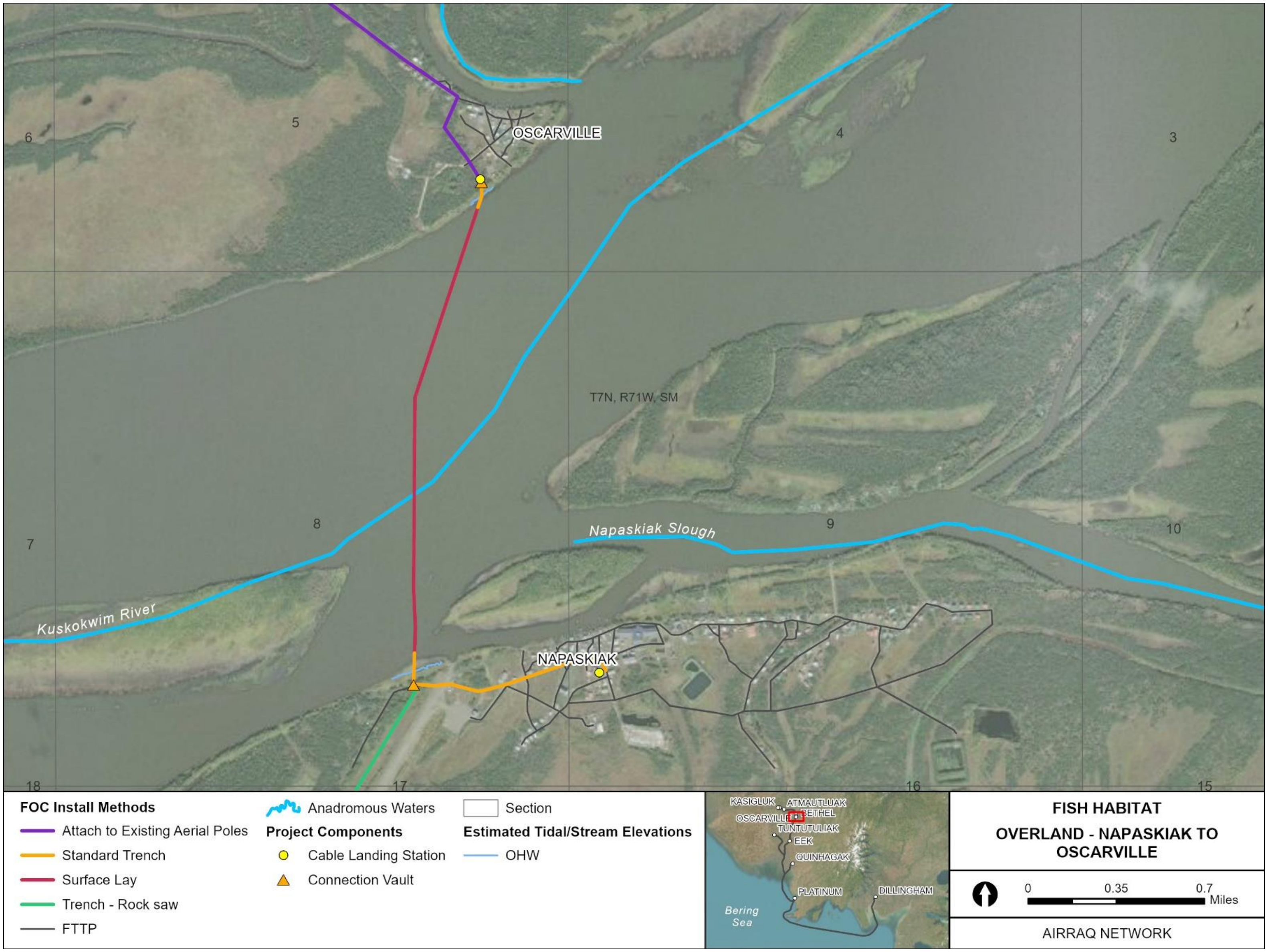

Figure A-8. Overland Route: Kuskokwim River (335-10-16000) Crossing Detail

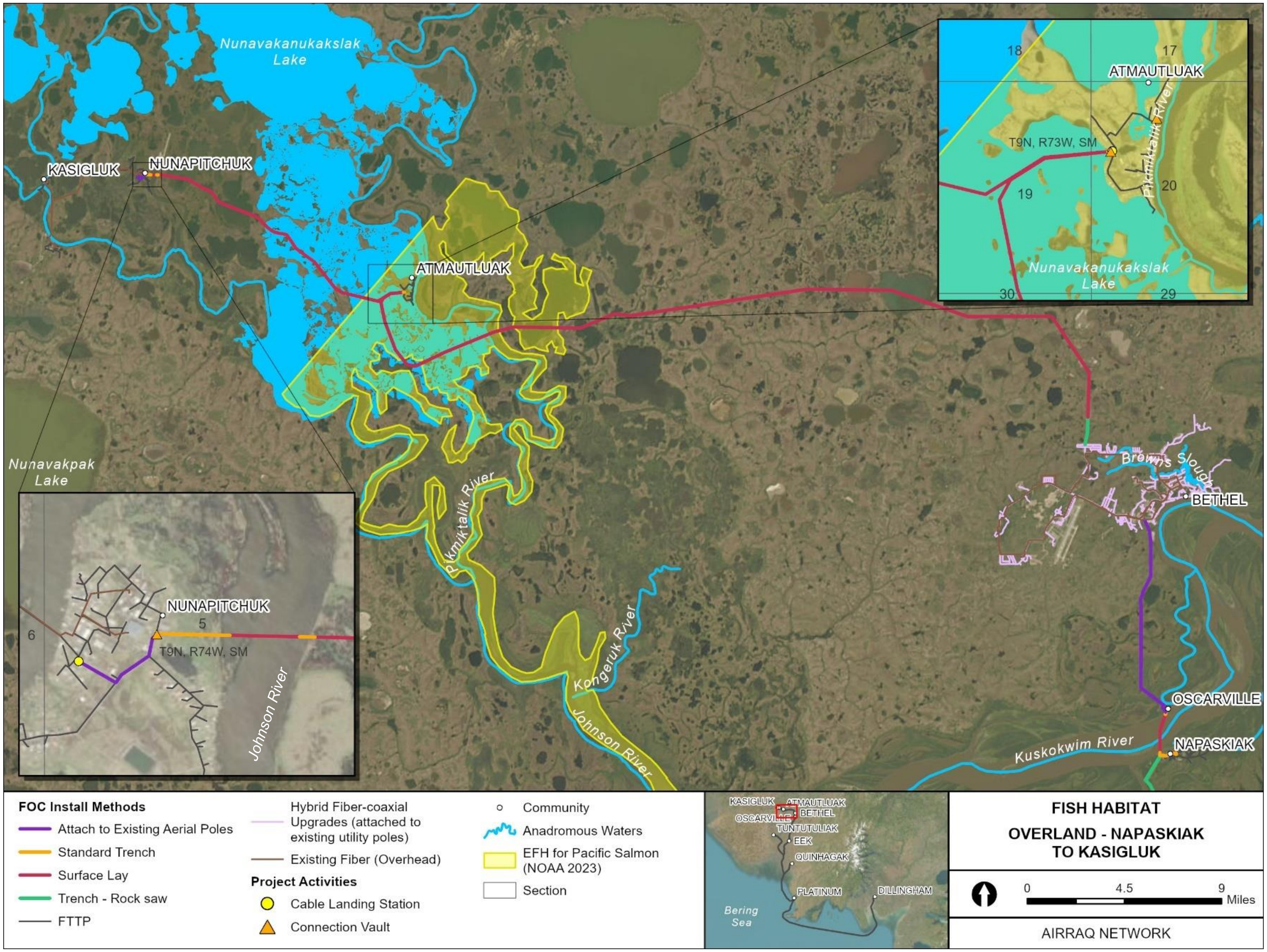

Figure A-9. Overland Route: Pikmiktalkik River (335-10-16600-2197-3115), Nunavakanukakslak Lake (335-10-16600-2197-0040), and Johnson River (335-10-16600-2197) Crossings

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Appendix G. NHPA Section 106 Consultation and Desktop Survey

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February 20, 2024

Andrew Bielakowski
Director of Environmental Compliance and Federal Preservation Officer
NTIA, First Responder Network Authority
12201 Sunrise Valley Dr.
Reston VA 20192 Via Email: Andrew.Bielakowski@firstnet.gov

RE: Section 106 of the National Historic Preservation Act consultation for the Airraq Network Project

Dear Mr. Bielakowski:

Calista Corporation ("Calista") expresses gratitude for the opportunity to participate in the Section 106 of the National Historic Preservation Act consultation for the Airraq Network Project ("Project"). The project would bring high-speed broadband service to the residents of ten isolated and hard to reach Alaska Native villages where reliable high-speed internet is desperately needed and no true broadband exists, by extending the fiber optic cable from Dillingham to Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak and Kasigluk.

The overwhelming majority of the population within the proposed project footprint are Alaska Natives, and a significant number of this population live below 150% of the poverty line. Affordable high-speed connectivity will help bridge the opportunity gap for residents by creating jobs, better remote learning tools, remote work opportunities and improved healthcare access via telemedicine. By bringing broadband to these remote communities, this Project will help remove their current socio-economic constraints and provide residents with the more equitable educational, medical and job opportunities.

Calista has reviewed the Section 106 analysis for the Airraq Broadband Project and has found no Historical and Cemetery sites within the anticipated Project plan areas. We do request that HDR and its associates, contractors and employees do not disturb any archaeological or anthropological sites. If any such site is discovered on Calista land during installation and trenching activities, the identity and location of such sites shall be provided to Calista.

The success of the project will be measured in implementation of a reliable high-speed network that will provide economic opportunities and improvement to the quality of life in these isolated and often impoverished communities and we are excited to support the advancement of this project.

CALISTA CORPORATION

Tisha Kuhns
Vice President, Land and Natural Resources

Cc: Daniel Leonard, HDR Senior Cultural Resource Specialist

THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Natural Resources

DIVISION OF PARKS AND OUTDOOR RECREATION
Office of History & Archaeology

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http://dnr.alaska.gov/parks/oha

February 13, 2024

File No.: 3130-1R NTIA/2023-01077

Andrew Bielakowski
Acting Federal Preservation Officer (FPO)
U.S. Department of Commerce
National Telecommunications & Information Administration
Washington, D.C. 20230

SUBJECT: Continuation of Section 106 of the National Historic Preservation Act Consultation and Notification of Finding of No Historic Properties Affected for the Airraq Network Project

Dear Mr. Bielakowski:

The Alaska State Historic Preservation Office (AK SHPO) received the subject correspondence and associated reports for review under Section 106 of the National Historic Preservation Act (36 CFR 800). Upon review, we concur with a finding of 'no historic properties affected' for the proposed undertaking. We offer the following comments:

1. We request that the Napaskiak *qasgiq*/burial mound location is assigned an Alaska Heritage Resources Survey (AHRS) number based on the information obtained while in the community. The site while being protected by the community, could be more effectively managed if recorded within the AHRS database.
2. Subsurface testing was not conducted for multiple different reasons presented in the report. We can generally agree that reasoning based on environmental considerations, prior disturbance, and construction methods are fair. However, we strongly recommend subsurface testing is conducted at not only areas deemed moderate to high probability, but as a verification method for low probability reasoning (where feasible). In addition, one of the reasons stated was that there was not subsurface owner permission, but it is our understanding that archaeological resources are not considered to be subsurface resources due to their nature (non-natural/human-made).

Should previously unidentified archaeological resources be discovered during the project, work must be interrupted until the resources have been evaluated using the National Register of Historic Places eligibility criteria (36 CFR 60.4) in consultation with our office. Consultation should also include assessment of whether effects to the identified resource(s) were sufficiently minimized, or further consultation on mitigation to resolve an adverse effect is necessary.

As stipulated in *36 CFR § 800.3*, other consulting parties such as the local government and Tribes are required to be notified of the undertaking. Additional information provided by the local government, Tribes or other consulting parties may cause our office to re-evaluate our comments and recommendations.

Thank you for the opportunity to comment and review. Please contact Mckenzie Herring at 269-8726 mckenzie.herring@alaska.gov if you have any questions or if we can be of further assistance.

Sincerely,

for Judith E. Bittner
State Historic Preservation Officer
JEB:msj

May 18, 2023

McKenzie Herring
Alaska Department of Natural Resources, Office of History and Archaeology
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550 West 7th Avenue, Suite 1310
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mckenzie.herring@alaska.gov

RE: Initiation of Section 106 of the National Historic Preservation Act consultation for the Airraq Network Project

Dear Ms. Herring,

The National Telecommunications and Information Administration (NTIA) has awarded Bethel Native Corporation a Tribal Broadband Connectivity Program grant to bring high-speed broadband internet service to the Yukon-Kuskokwim (YK) Delta as part of the Airraq Network Project (Project). Bethel Native Corporation has partnered with Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, to complete the Project. Unicom would extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk.

The Project is a federal undertaking as defined in 36 Code of Federal Regulations (CFR) 800.16(y) and is subject to compliance with Section 106 of the National Historic Preservation Act (36 CFR 800). For the purposes of Section 106 review, NTIA is the lead federal agency for the Project (36 CFR 800.2(a)(2)) and has authorized Unicom to assume its Section 106 responsibilities. Unicom has contracted with HDR Engineering, Inc. (HDR) for services that include conducting Section 106 activities. **This letter serves as notice that Unicom, as the non-federal representative for NTIA, is initiating consultation under Section 106.**

Project Description

Project construction would occur in two phases and place approximately 548 miles of FOC on the ocean floor, Kuskokwim River, and terrestrial landscapes throughout the YK Delta (Attachment 1). When completed, Phase 1 would bring high-speed internet to the communities of Platinum, Eek, Napaskiak, Oscarville, and Bethel; it is funded through an NTIA Tribal Broadband Connectivity Program grant. Phase 2 would provide additional connections to the communities of Quinhagak, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk; it is funded through a U.S. Department of Agriculture, Rural Utilities Service ReConnect Grant.

Proposed Area of Potential Effects

Section 106 directs federal agencies to establish an Area of Potential Effects (APE) for their undertakings. The APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historical properties, if any such properties exist" (36 CFR 800.16(d)).

The proposed APE for this Project is a 60- to 300-foot (ft)-wide corridor surrounding the proposed FOC alignment. Within marine segments, the proposed APE includes a 150-ft buffer on either side of the alignment for a 300-ft-wide corridor. Along landfall and terrestrial components, the proposed APE is 30 ft wide on each side of the alignment, or 60 ft wide in total. The proposed APE encompasses all areas of ground disturbance associated with the Project, including cable trenches or surface-laying cables and other associated facilities. It also encompasses other effects, such as visual, auditory, or vibratory, potentially associated with the Project; however, these effects are anticipated to be limited in magnitude and duration.

Unicom will finalize the APE after receiving comments from your agency and the consulting parties.

Identification Efforts

Unicom is in the process of identifying and evaluating historic properties within the APE and assessing potential impacts of Project activities on these properties. To gather information regarding previously documented cultural resources within the study area, HDR has prepared a data gap report that reviews information from available sources, including the Alaska Heritage Resources Survey, Revised Statute 2477 trail database, U.S. Geological Survey topographic maps, and lists of shipwrecks and traditional place names. This data gap report, which is enclosed for your review and comment, includes a detailed description of the undertaking and maps of the proposed APE as well as identified cultural resources (Attachment 2).

Additionally, a cultural resources field survey is planned for June 2023 to inspect portions of the APE that have not previously received sufficient survey coverage. When completed, Unicom will continue consultations. Unicom will participate in any consultations, if necessary, to resolve potential adverse effects and develop an agreement document memorializing the resolution of these effects.

In accordance with 36 CFR 800.2(c), Unicom has identified parties that may be interested in the proposed Project and Unicom's identification and evaluation of historic properties, assessment of effects, and findings (Attachment 3). Unicom is inviting these individuals, organizations, and Tribes by separate letter to participate in Section 106 consultation and is requesting their assistance in identification of sites of religious and cultural significance or historic properties that may be affected by the proposed undertaking.

Within 30 days of receipt of this letter, Unicom requests any comments you may have on the delineation of the APE and adequacy of efforts to identify historic properties. If you have any questions, please contact Daniel Leonard, HDR Senior Cultural Resources Specialist, at daniel.leonard@hdrinc.com or (215) 760-6721. An emailed response is preferred to ensure timely receipt of your communications.

Sincerely,

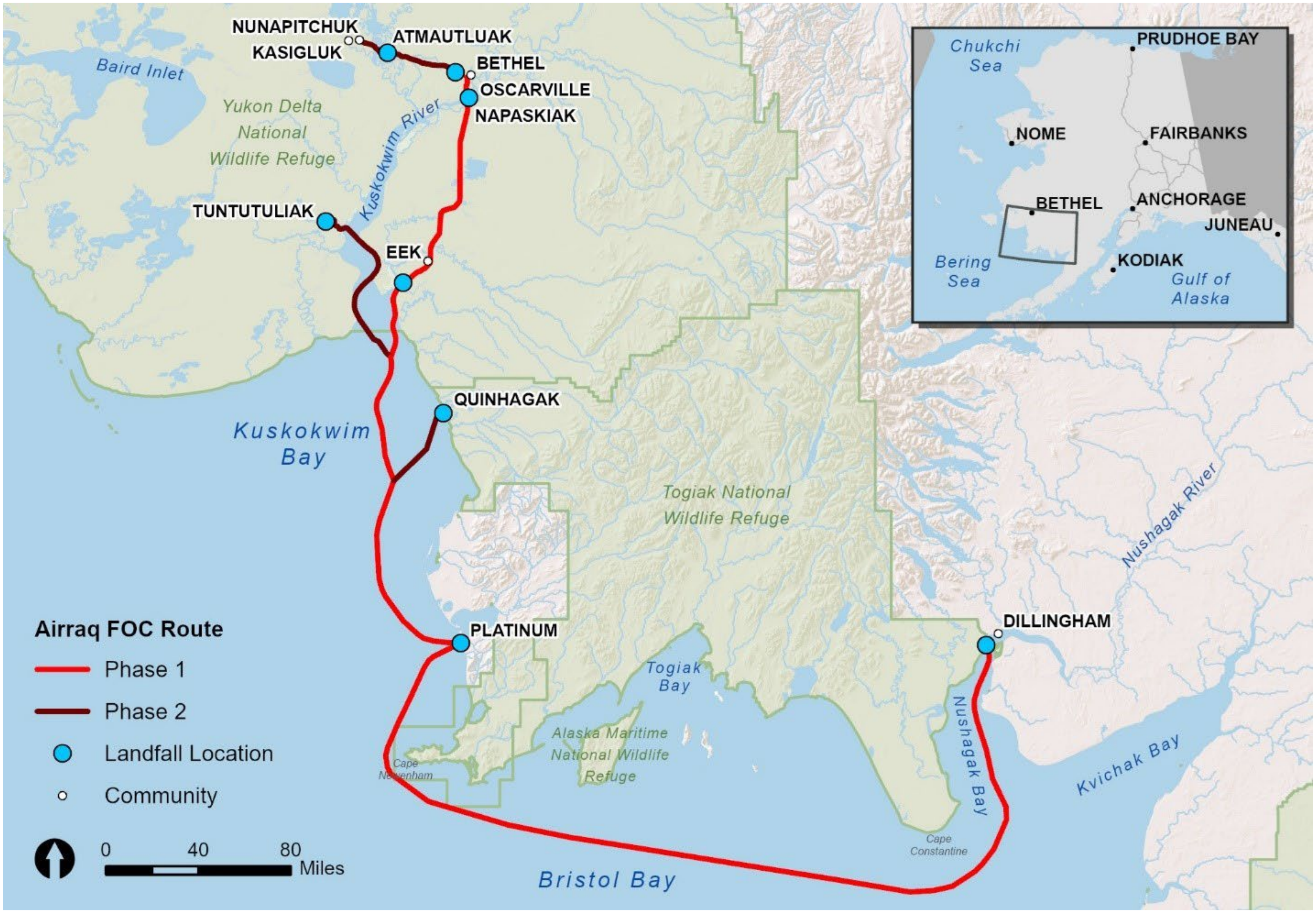
Daniel Leonard
Senior Cultural Resources Specialist
HDR Engineering, Inc

Enclosures: Attachment 1: Project Vicinity Map
Attachment 2: Data Gap Report
Attachment 3: List of Consulting Parties

cc w/enclosures: Andrew Bielakowski, Director of Environmental Compliance and Federal Preservation Officer, NTIA, First Responder Network Authority
Keja Whiteman, Program Manager, NTIA
Amanda Pereira, Program Officer, NTIA
James Wetherington, Environmental Lead, USDA RD
Ana Hoffman, President, Bethel Native Corporation
Valerie Haragan, Permitting Lead, GCI/Unicom

ATTACHMENT 1.

Figure 1. Project Vicinity



ATTACHMENT 2.

ATTACHMENT 3.

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UNITED STATES DEPARTMENT OF COMMERCE
National Telecommunications and
Information Administration
Washington, D.C. 20230

October 20, 2023

McKenzie Herring
Alaska Department of Natural Resources, Office of History and Archaeology
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mckenzie.herring@alaska.gov

RE: Continuation of Section 106 of the National Historic Preservation Act consultation and Notification of Finding of No Historic Properties Affected for the Airraq Network Project

Dear Ms. Herring,

The National Telecommunications and Information Administration (NTIA) has awarded Bethel Native Corporation (BNC) a Tribal Broadband Connectivity Program Grant to bring high-speed broadband internet service to the Yukon-Kuskokwim (YK) Delta as part of the Airraq Network Project (Project) Phases 1 and 2. BNC has partnered with Unicom, Inc. (Unicom), a wholly owned subsidiary of GCI Communication Corporation, to complete the Project. The Project is a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations [CFR] 800). NTIA, the lead federal agency for the Project, has authorized BNC/Unicom and their contractor (HDR) to participate on its behalf in Section 106 consultation.

On May 18, 2023, on behalf of NTIA, HDR sent your office a letter to initiate consultation with you on this undertaking. Since that time, NTIA has completed additional identification efforts. The purpose of this letter is to continue Section 106 consultation for the Project by providing documentation on recently completed identification efforts, notify you of our finding of no historic properties affected pursuant to 36 CFR 800.4(d)(1), and seek your concurrence with NTIA's findings.

Proposed Undertaking

Unicom would extend their existing fiber-optic cable (FOC) network from Dillingham to provide the following 10 western Alaska communities with high-speed broadband and affordable data plans: Platinum, Quinhagak, Eek, Napaskiak, Oscarville, Bethel, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk. Project construction would occur in two phases and place approximately 548 miles of FOC on the ocean floor, Kuskokwim River, and terrestrial landscapes throughout the YK Delta (**Attachment 1**). When completed, Phase 1 would bring high-speed internet to the communities of Platinum, Eek, Napaskiak, Oscarville, and Bethel; it is funded through an NTIA Tribal Broadband Connectivity Program Grant. Phase 2 would provide additional connections to the communities of Quinhagak, Tuntutuliak, Atmautluak, Nunapitchuk, and Kasigluk; it is funded through a U.S. Department of Agriculture, Rural Utilities Service ReConnect Grant.

Area of Potential Effects (APE)

As defined in 36 CFR 800.16(d), the APE consists of the area where the proposed Project has the potential to cause effects on historic properties, and has been delineated to reflect the nature, scale, and location of the entire Project. Within marine segments (approximately 398 miles total), the APE consists of a 300-foot-wide corridor centered on the Project alignment. Along landfall and terrestrial components (approximately 150 miles total), the APE consists of a 60-foot-wide corridor centered on the Project alignment. The APE encompasses all areas of ground disturbance associated with the Project. It also encompasses other effects, such as visual, auditory, or vibratory, potentially associated with the Project; however, these effects are anticipated to be limited in magnitude and duration.

Identification of Historic Properties

In accordance with 36 CFR 800.4(b), NTIA has made a reasonable and good faith effort to identify historic properties within the APE. No historic properties were identified within the APE as a result of this effort.

On behalf of NTIA, HDR staff carried out background research and performed a helicopter and pedestrian archaeological survey of terrestrial portions of the APE. Of the 150 miles of terrestrial Project alignment, 75 miles will be attached to existing aerial poles with no anticipated impact on cultural resources. The archaeological survey, therefore, concentrated on the remaining 75 miles of alignment that will be installed via surface-lay (69.2 miles), rock saw trench (2.3 miles), and standard trench (3.4 miles, 0.9 mile of which will be in existing utility trenches).

During the survey, HDR revisited and updated portions of one previously recorded site in Napaskiak (BTH-00007) and identified one new site in Dillingham consisting of four beached historic boats (Alaska Heritage Resources Survey [AHRS] site number pending). In the vicinity of BTH-00007, the FOC will be installed on existing aerial infrastructure, with no anticipated potential to impact this resource. The Dillingham boats site is located within the APE but is not directly aligned with the FOC route; it will be avoided by Project construction. Additionally, two sites in Dillingham that are plotted in the AHRS as intersecting the APE (DIL-00182 "House Pits North of Graves" and DIL-00225 "Bradford Cannery Cemetery") were confirmed not to be within the APE; no evidence of these sites was found within the APE, and archival research suggests they are currently misplotted. While a third Dillingham site (DIL-0054 "Bradford Cannery") was plotted in the AHRS as outside the APE, it would have intersected the APE; however, it is no longer extant.

Results of the terrestrial archaeological survey are included in the attached Cultural Resources Survey Report (**Attachment 2**).

In addition to the terrestrial archaeological survey, HDR's underwater archaeologist is currently reviewing sub-bottom profile and side scan sonar data to identify submerged cultural resources. The resulting Marine Archaeological Report will be forthcoming.

Consulting Party Outreach

In accordance with 36 CFR 800.2(c), NTIA identified 34 parties that may be interested in the proposed Project and NTIA's identification of historic properties, assessment of effects, and findings. On behalf of NTIA, HDR sent separate letters (dated May 18, 2023) to these individuals, organizations, and Tribes inviting them to participate in Section 106 consultation. The following responses have been received:

- On July 11, 2023, Patty Buholm, Director of Planning & Grants Management with the City of Dillingham, requested to review the archaeological survey report so that the City can be aware of any significant findings and any new cultural resources can be preserved or marked as a historical site.

- On July 13, 2023, Tisha Kuhns, Vice President of Land and Natural Resources with Calista Corporation, requested a meeting to discuss the Project and the results of the terrestrial archaeological field survey.

Regarding the remaining 32 parties:

- 15 parties have acknowledged receipt of the Section 106 initiation letter, several stating they have no concerns or are excited about the Project.
- 14 parties received follow-up calls several weeks after the Section 106 initiation letters were sent out. In all but one case, someone at the organization was reached via phone and requested that the initiation letter be resent to a new email or stated that someone would call back. In the one remaining case, a follow-up call was made but the number was out of service.
- 3 parties received follow-up calls several weeks after the Section 106 initiation letters were sent out. These calls were unsuccessful; however, these parties are aware of the Project via the Right-of-Entry request for fieldwork.

Concurrent with this letter continuing Section 106 consultation with your office, NTIA is sending separate letters with the cultural resources survey report to the City of Dillingham and Calista Corporation. If necessary, NTIA will be scheduling meetings with these two parties in the upcoming weeks to discuss the Project and the results of the terrestrial archaeological field survey.

Assessment of Effects

Based on the information above and enclosed, NTIA has determined that no historic properties are present within the APE for the undertaking. Therefore, NTIA has made a finding of **No Historic Properties Affected** pursuant to 36 CFR 800.4(d)(1).

Request for 30-Day Review and Comment

Within 30 days of receipt of this letter, NTIA requests any comments you may have on the adequacy of efforts to identify historic properties, and requests your concurrence with the finding of no historicp roperties affected. If you have any questions, please contact me via email at andrew.bielakowski@firstnet.gov or phone at 202-657-7982.

Thank you for your coordination on this Project.

Sincerely,

ANDREW BIELAKOWSKI

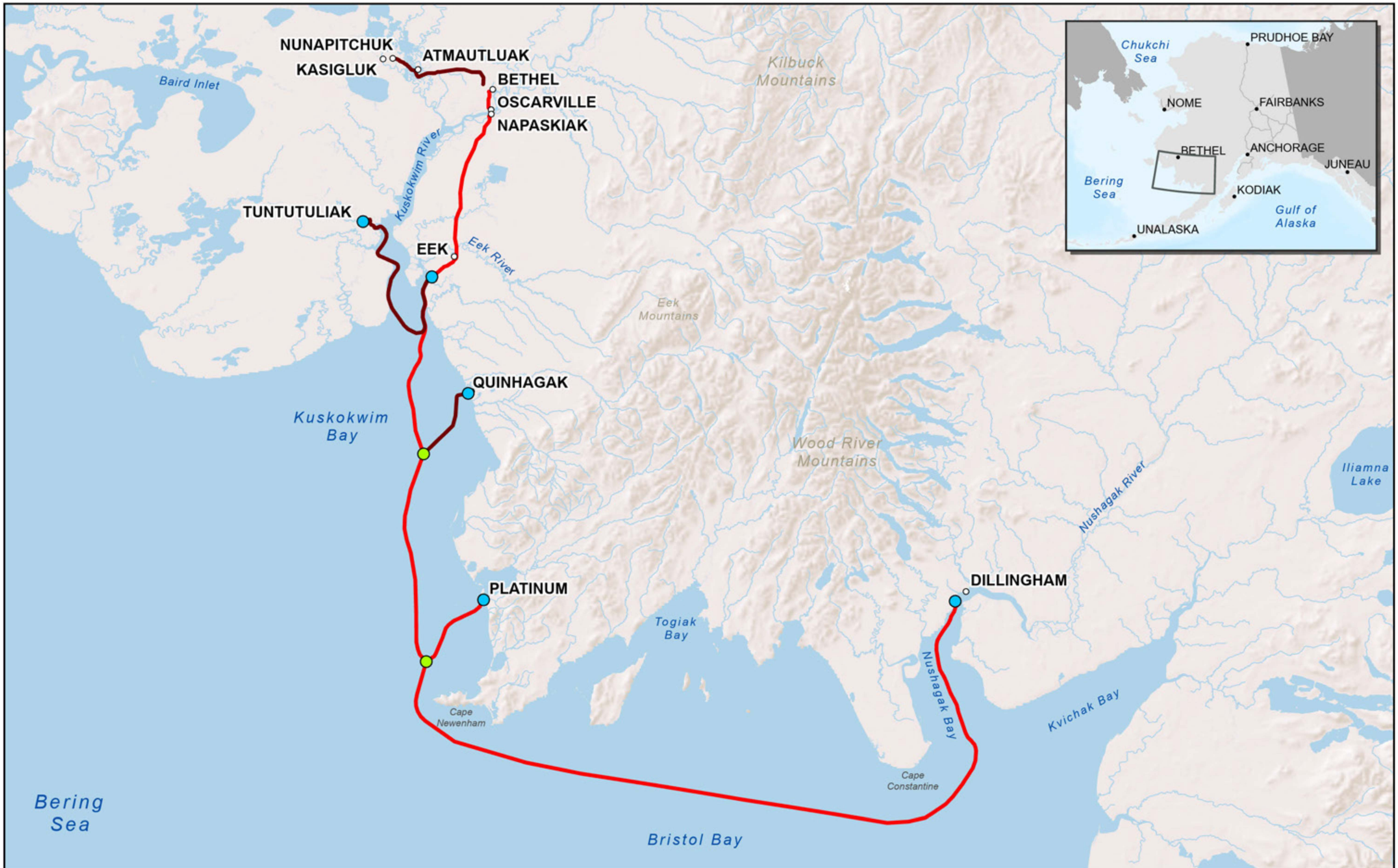
Digitally signed by ANDREW BIELAKOWSKI
Date: 2023.10.20 17:43:28 -05'00'

Andrew Bielakowski
Acting Federal Preservation Officer (FPO)
Office of Internet Connectivity and Growth (OICG)
National Telecommunications & Information Administration (NTIA)

Enclosures: Attachment 1: Project Location Vicinity Map

Attachment 2: Airraq Network Phases 1 and 2 Cultural Resource Survey Report, Rev. 1 Final, October 2023

cc w/enclosures: Amanda Pereira, Program Officer, NTIA
Vanesscia Cresci, Federal Program Officer, NTIA
Anthony High, Environmental Lead, USDA RUS
Glenn Stelter, Archaeologist, USDA RUS
Natalie Kovach, General Field Representative, USDA RUS
Ana Hoffman, President, Bethel Native Corporation
Valerie Haragan, Permitting Lead, GCI/Unicom
Daniel Leonard, Cultural Resources Specialist, HDR



Fiber Optic Cable Route

- Phase 1
- Phase 2

- Landfall Location
- Branching Unit
- Community

AIRRAQ NETWORK

PROJECT LOCATION VICINITY

1 Cultural Resources in the Project Area

This appendix provides information regarding cultural resources identified within 1 mile (mi) of the Project alignment as of August 2023. Data sources consulted include the Alaska Department of Natural Resources (ADNR) Revised Statute 2477 trail database (ADNR 2022); databases of shipwrecks and obstructions managed by the National Oceanic and Atmospheric Administration (NOAA; Office of Coast Survey 2022) and Bureau of Ocean Energy Management (BOEM; BOEM 2011); ethnographic place name data; Alaska Heritage Resources Survey (AHRS) data maintained by the ADNR Office of History and Archaeology (OHA; OHA 2023); and U.S. Geological Survey topographic maps.

1.1 Revised Statute 2477 Trails

Review of the ADNR (2022) database indicates seven Revised Statute 2477 trails are within 1 mi of the revised Project alignment (Table 1). Many of these routes are winter trails used historically for mail and freight during the early twentieth century. Table 1 provides brief descriptions of each trail's history and location.

Table 1. Revised Statute 2477 Trails within 1 mi of the Project

Trail Name	Trail No.	Description	Associated Project Phase(s)
Bethel-Quinhagak	30	Winter trail used as Mail Route 78187 from 1911, with improvements by the Alaska Road Commission (ARC) in 1923. The route is approximately 90 mi long and begins near Bethel, generally following the Kuskokwim River through Napaskiak, Eek, and Apogak to Quinhagak on Kuskokwim Bay.	1, 2
Bethel-Kasigluk	31	Winter trail constructed by the ARC in 1934–1938. The trail is 38 mi long and travels northwestward from Bethel to Nunapitchuk and Kasigluk.	2
Bethel-Tuluksak	32	Winter mail route between Bethel and Akiak in 1914; also noted as ARC Route 92B, Bethel Subdistrict. The trail was permanently staked in 1921–1922 by the ARC and extended to Tuluksak in 1928. The total length is 44 mi.	1
South Spit Goodnews Bay-Platinum Creek	87	Trail constructed by the ARC in 1935, with maintenance and improvements in the 1940s and 1950s; also used as Mail Route 78213 by 1936. The 33-mi trail travels from the city of Goodnews Bay southwestward to Platinum, where the route splits into two spurs extending northward to the South Spit and southward to the Goodnews Mining Camp.	1
Kinak-Kipnuk	116	Winter pack trail documented on a 1938 ARC map, also known as ARC Route 92U. The trail starts from the abandoned site of Kinak and passes through the villages of Tuntutuliak, Kongiganak, Kwigillingok, and Kipnuk.	2
Quinhagak-Goodnews Bay	173	Winter mail trail mentioned in postal correspondence as early as 1912; permanently staked by the ARC in 1924. The trail runs for 60 mi southward from Quinhagak, following the shoreline of Kuskokwim Bay to Goodnews Bay.	2
Johnson River-Kinak Trail	406	This 30-mi-long winter trail travels southwestward from the confluence of the Johnson and Kuskokwim Rivers to the historical site of Kinak. Also known as ARC Route 92T, the trail is mentioned in ARC correspondence as early as 1936.	2

Source: ADNR 2022

1.2 Shipwrecks and Obstructions

1.2.1 NOAA Wrecks and Obstructions

A search of NOAA's Wrecks and Obstructions database (Office of Coast Survey 2022) identified one wreck or obstruction within 1 mi of the Project (Table 2). NOAA's electronic navigational charts indicate this wreck is a submerged hazard within the Kuskokwim River outside the Bethel small boat harbor.

Table 2. NOAA Wrecks or Obstructions within 1 mi of the Project

Vessel Name	Description	Approximate Location
(Unknown)	Fully submerged wreck	Kuskokwim River, near the Bethel small boat harbor

Source: Office of Coast Survey 2022

1.2.2 BOEM Shipwrecks

Additional shipwreck data from BOEM (2011) identify more than four dozen ships lost in the general Project vicinity since the late nineteenth century. These vessels are listed in Table 3. The locational precision of each reported wreck varies considerably; some BOEM records include exact locations, while others state only the general area or body of water within which the vessel was lost. Therefore, some vessels listed in Table 3 may be located further than 1 mi from the Project alignment.

Table 3. Other Shipwrecks Potentially within 1 mi of the Project

Vessel Name	Year Lost	Approximate Location
Montana	1886	Nushagak River
Western Shore	1886	Nushagak River near Bristol Bay
Wildwood	1889	Nushagak River
Jessie	1898	Mouth of Kuskokwim River
Minerva	1898	Mouth of Kuskokwim River
Sterling	1898	Cape Constantine
Unnamed barge	1898	Mouth of Kuskokwim River
Allavina Johnson	1900	Goodnews Bay
Elvin A. Thompson	1900	Cape Newenham
Volant	1905	Kuskokwim Bay
Bender Brothers	1907	50 mi north of Goodnews Bay
Defender	1907	Kuskokwim Bay
Emily F. Whitman	1912	Nushagak
Standard	1917	Cape Constantine
Nuten	1927	Nushagak
Capt. Worden	1928	Dillingham
Libby	1932	Nushagak Bay near Ekuk
Unnamed barge	1938	Goodnews Bay
Mary Pat	1953	Bristol Bay
A P A-S-5	1958	Bristol Bay
R P No. 1	1960	Bristol Bay
B B P 14	1961	Dillingham
Pen 14	1963	Bristol Bay
P S & W H Ry No. 3	1964	Kuskokwim River near Bethel
Hercules	1966	Clark's Point
Louis B.	1969	Nushagak
Z B F100	1970	Bristol Bay
Husky II	1971	Kuskokwim River, 1,000 yards offshore from Bethel
Becky	1973	Bristol Bay
Jarl	1973	Bristol Bay
Unnamed fishing vessel	1976	Clark's Point

Vessel Name	Year Lost	Approximate Location
Ahaliq	1977	118 mi southwest of Dillingham
Bristol	1977	Long Sands Bar in Nushagak Bay
Michael Lee	1980	Clark's Point
Shaktoolik	1980	Between Dillingham and Kodiak
Cornell No. 10	1982	Kuskokwim Bay, 22 mi west of Carter Spit
Electra	1982	0.5 mi from Dillingham in Nushagak River
Unnamed small boat	1986	Mouth of Eek River
Rifta	1989	Bristol Bay
Tiny	1989	South of Cape Newenham
Polar Husky	1990	Bristol Bay
Shin Yang Ho	1990	Bristol Bay, 60 mi south of Dillingham
Mary Lou	1991	Dillingham
Sable	1991	Bristol Bay
Silver Eagle	1991	Bristol Bay
EPC 22	1992	Bristol Bay
Alice M.	1996	Nushagak Bay
Quin Delta	1997	Bristol Bay
Angela B.	1998	Bristol Bay
Yenducer	1998	Bristol Bay
Equalizer	1999	Bristol Bay
Hang On	1999	Bristol Bay
Jeanne Marie	2000	Nushagak Bay, 10–15 mi south of Ekuk

Source: BOEM 2011

1.3 Traditional Place Names

Data regarding sites of traditional, cultural, or religious importance were obtained primarily from the *Yup'ik Atlas* developed by Calista Education and Culture, Inc. (CECI; CECI 2023). Supplementary data sources include Yup'ik dictionaries (Jacobson 2012), subsistence reports (Andrews 1989), U.S. Geological Survey place names (Orth 1967), and community profiles from the Alaska Division of Community and Regional Affairs (DCRA; DCRA 2022). Review of these sources indicated at least 35 documented place names within 1 mi of the Project area (Table 4). Table 4 lists Yup'ik place names identified within 1 mi of the Project, along with English correlates and translations of the Yup'ik name, when known.

Table 4. Yup'ik Place Names within 1 mi of the Project, with English Correlates and Translations

Yup ik Place Name	English Translation	English Correlate
Akuluraq	Channel connecting lakes or other bodies of water; that in between	[Channel between the north and south Platinum Spits][a]
Anlleq	Edible tuber of the tall cottongrass; mousefood	[River or stream 1.6 mi northwest of West Point, on the Kuskokwim River][a]
Apruka'ar	—	Apogak/Apokak
Arviiq	Dark-colored whetstone (gathered at this location)	Platinum
Atalriarmiut	Former inhabitants of *Atalria* (one [the land] depends on)	[Village on the Johnson River, opposite Old Kasigluk][a]
Atmaulluaq	Related to the word for "backpack"	Atmautluak
Ciituli	—	[Camp located on a lake 4.5 mi northwest of Eek Lake][a]
Ekvicuaq	Little cliff	Eek
Iik	Two eyes	Eek
Iilgayaq	Possibly related to *ii*, "eye"	Nushagak River
Iquk	End, tip [of a thing or place]	[Site located 7 mi southwest of Napaskiak][a]
Kaganalleq	One that used to be *Kaganaq* (a man's name)	[House and grave site opposite New Kasigluk][a]

Yup ik Place Name	English Translation	English Correlate
Kassiglug	Confluence of rivers	Old Kasigluk
Kelliqucugmiut	—	[River or stream 1.6 mi southwest of West Point, on the Kuskokwim River][a]
Kuigaallermiut	Former inhabitants of *Kuigaaq* (little piece of river)	[Former village site on eastern side of the Johnson River, southeast of Nunapitchuk][a]
Kuiggayagaq	Small river	Oscarville
Kuinerraq	New river	Quinhagak
Kusquqvak	Big [river] with a small flow (?)	Kuskokwim River
Mamterilleq	Place of many caches	Bethel
Marayarpak	Large expanse of mud	[River or stream 0.5 mi west of West Point, on the Kuskokwim River][a]
Meqsarturyaraq	Place where we get fresh water	[Camp northeast of Quinhagak][a]
Napaskiaq	Possibly from *napa,* “spruce tree”	Napaskiak
Nunapicuaq	Little tundra (literally, “little real land”)	Nunapitchuk
Nunapigmiut	—	[Fish camp near the mouth of the Kuskokwim River][a]
Pengurpak	Large hill	[Hill located 5 mi northwest of Eek Lake][a]
Petmigtalek	Place with many pit traps	Pikmiktalik River
Petmilleq	—	[River in Quinhagak][a]
Piqertualleq	One who chopped; one who was chopped	[Slough west of Nunapitchuk][a]
Puyuraarcaraq	—	[Location across from tank farm in Quinhagak][a]
Qaleqcuugtuli	Place with a lot of grebes	[Settlement on slough east of the Johnson River, east of Nunapitchuk][a]
Qaluyaraq	—	[River or stream 1.2 mi northwest of West Point, on the Kuskokwim River][a]
Qillerkauyaar	—	[River or stream 3 mi southwest of West Point, on the Kuskokwim River][a]
Tengluk	Fist	[Fish camp near Quinhagak][a]
Tuntutuliaq	Place with many reindeer	Tuntutuliak
Urr’acuarmiut	Inhabitants of the little white or gray clay bluffs	New Kasigluk

Source: Andrews 1989; CECI 2023; DCRA 2022; Jacobson 2012; Lim et al. 2022; Orth 1967
[a] These place names do not have precise English correlates; instead, locational information is provided.

1.4 AHRS Sites

The AHRS database indicates 101 AHRS sites are within 1 mi of the Project (OHA 2023) Table 5 lists provides brief descriptions of each site and information regarding eligibility for the National Register of Historic Places (NRHP).

Most AHRS sites within 1 mi of the Project remain unevaluated for the NRHP. Only 27 sites have received a Determination of Eligibility, of which 10 have been found eligible for listing; an additional 2 sites are listed on the NRHP. Fifteen sites have been found not eligible for listing on the NRHP. One site (XBI-00028) was previously found not eligible in 1979, although AHRS records currently state that the site requires re-evaluation (OHA 2023).

Table 5. AHRS Sites within 1 mi of the Project

AHRS No.	Site Name	Description	NRHP Eligibility (Year, Criteria)	Associated Project Phase
BTH-00007	Napaskiak	Village site dating to at least the nineteenth century	Not evaluated	1
BTH-00009	St. Jacob's Church, Napaskiak	Russian Orthodox Church built in 1935	Listed on NRHP (1980; Criteria A, C)	1
BTH-00011	St. Sophia Church, Bethel	Russian Orthodox Church built in 1968	Not evaluated	1
BTH-00012	First Settler's Home	Log cabin associated with the first European settlers in Bethel	Not evaluated	1
BTH-00013	First Mission House	Wood-frame structure built in Bethel in 1885 by Moravian missionaries; restored in 1985	Listed on NRHP (1990, Criterion A)	1
BTH-00014	Bethel	Village site with 1870s trading post; first called Mumtrekhlagamiut but later renamed "Bethel" by Moravians in 1884	Not evaluated	1
BTH-00116	Bethel Staging Field and Civil Aeronautics Administration Air Station	Airfield complex constructed in 1940; structures were relocated to the newer Bethel airport in the early 1960s	Not eligible (1994)	1
BTH-00121	National Weather Service Bethel Upper Atmosphere Facility	Domed structure and observation deck constructed circa 1958	Not eligible (2003)	1
BTH-00122	National Weather Service Bethel Warehouse Building	Metal structure with gable roof and garage door, dating to circa 1966	Not eligible (2003)	1
BTH-00124	Building 601, Fire Hose Storage Building	Wood-framed building constructed in 1958; site is part of BTH-00127	Not eligible (2000)	1
BTH-00126	Building 603, Fire Hose Storage Building	Wood-framed building constructed in 1958; site is part of BTH-00127	Not eligible (2000)	1
BTH-00127	Bethel Civil Aeronautics Administration and Federal Aviation Administration Historic District	District consisting of 45 buildings and structures associated with the Civil Aeronautics Administration and Federal Aviation Administration circa 1940–1958; district includes BTH-00124 and BTH-00126	Not eligible (2000)	1
BTH-00129	Eekchuk	Village site predating AD 1800; local tradition holds this site as the original settlement of people who moved to Napaskiak	Not evaluated	1
BTH-00131	Kwigohok	Yup'ik site occupied circa 1900 and abandoned soon thereafter	Not evaluated	1
BTH-00132	Oscarville	Early twentieth-century settlement and trading post with a school opened by the Bureau of Indian Affairs in 1964	Not evaluated	1
BTH-00142	Bethel White Alice Communication System	Military station for tropospheric scatter communications; opened in 1958 and closed in 1979	Eligible (1989, Criterion A)	1
BTH-00143	Old Bureau of Indian Affairs School	Two-story wood frame structure built in 1931 and moved in 1941; used as a school and office until its closure in 1982	Eligible (1989; Criteria A, C)	1
BTH-00144	Reindeer Service Warehouse	Storage building constructed in 1939 for federal reindeer herding program; converted into housing after 1954	Not eligible (1989, Criterion A)	1

AHRS No.	Site Name	Description	NRHP Eligibility (Year, Criteria)	Associated Project Phase
BTH-00156	Hately Fox Farm	Former fur farm, consisting of numerous fox pens, a log cabin, and various outbuildings	Not eligible (1999)	1
BTH-00170	Napaskiak Federal Scout Readiness Center	Cold War-era military installation composed of 2 buildings with exterior fuel tanks, a hazardous materials locker, and a shipping container accessed via wooden boardwalks	Not evaluated[a]	1
BTH-00191	Bethel Armory Building	Two-story, metal-frame building built in 1962; used as a drill hall and a school gymnasium	Not evaluated	1
BTH-00192	Bethel Armory Organizational Maintenance Shop	Steel-frame structure built in 1988 for Alaska Army National Guard equipment and vehicles	Not evaluated	1
BTH-00193	Bethel Armory Cold Storage	Metal-frame cold storage building constructed in 1994	Not evaluated	1
BTH-00194	Bethel Armory Facilities Maintenance Shop	Two metal-frame buildings connected by a raised platform; constructed in 1962	Not evaluated	1
BTH-00195	Bethel Armory Hazardous Material Shop	Metal-frame storage building for hazardous material; construction date unknown	Not evaluated	1
BTH-00196	Bethel Armory Heated Storage	Single-story, wood-frame building used as regional headquarters for the U.S. Fish and Wildlife Service; also shared by the Alaska Army National Guard during 1989–2012	Not evaluated	1
BTH-00197	Bethel Air Force Station/Bureau of Indian Affairs Bethel Headquarters	Former U.S. Air Force Station consisting of 11 structures; abandoned circa 1992	Not evaluated	1
BTH-00199	Brown's Slough House	Residential structure built in Bethel circa 2006	Not evaluated	1
BTH-00200	Log House Ruin	Gable-roofed, 1.5- or 2-story ranch home constructed from D logs; heavily damaged by fire sometime before September 2021	Not evaluated	2
BTH-00201	White House	Modern residence with associated outbuildings, dating to circa 1995–2005	Not evaluated	1
BTH-00202	Tundra Ridge Road, Polk Road, Uamuralria Drive	Road connecting Ptarmigan Road to Bureau of Indian Affairs Road in Bethel; segments were constructed between 1957–1981	Not evaluated	1
DIL-00012	New Kanakanak	Early twentieth-century settlement, including a 1905 school remodeled as a hospital in 1918, and an orphanage built in 1918	Not evaluated	1
DIL-00054	Bradford Cannery	Salmon cannery in operation between 1886–1907 with associated village and cemetery (DIL-00225)	Not evaluated	1
DIL-00055	Nelsonville	Late nineteenth-century Euro-American settlement associated with Nushagak canneries; also known as Olsenville	Not evaluated	1
DIL-00180	Inland Cemetery	Historic cemetery containing at least 30 marked and unmarked graves	Not evaluated	1
DIL-00181	Bluff Edge Cemetery	Historic cemetery; some graves have been removed and reinterred elsewhere	Not evaluated	1
DIL-00182	House Pits North of Graves	Group of at least 11 house-pit depressions located north of DIL-00181	Not evaluated	1

AHRS No.	Site Name	Description	NRHP Eligibility (Year, Criteria)	Associated Project Phase
DIL-00187	Building 301, Kanakanak Hospital Complex	Multilevel healthcare facility and various additions, built in 1941–1942	Not eligible (2011)	1
DIL-00188	Building 303, Kanakanak Hospital Complex	One-story quarters built in 1953 and used as housing for resident and visiting medical personnel	Contributing property within an eligible district (2019)	1
DIL-00189	Building 304, Kanakanak Hospital Complex	Two-story frame building built in 1921 by the Bureau of Education as quarters for staff of the hospital and school	Contributing property within an eligible district (2019)	1
DIL-00190	Water Treatment Building, Kanakanak Hospital Complex	Metal-clad building built in 1952 as a water treatment facility for the Kanakanak Hospital	Not evaluated	1
DIL-00224	Kanakanak Reburial Site	Cemetery used since circa 2007 for reinterment of human remains recovered during work around the Kanakanak Hospital	Not evaluated	1
DIL-00225	Bradford Cannery Cemetery	Cemetery associated with the Bradford Cannery (DIL-00054)	Not evaluated	1
DIL-00234	Kanakanak Building	Aluminum-frame building constructed in the mid- to late 1950s, serving initially as office space but used for storage since the 1970s	Not evaluated	1
DIL-00256	Building 310 (Dental Annex/Human Resources)	Rectangular, prefabricated structure added to the Kanakanak Hospital complex in 1974	Not evaluated	1
DIL-00257	Building 311 (Unheated Storage)	Historic-era metal Quonset hut associated with the Kanakanak Hospital complex	Not evaluated	1
DIL-00258	Building 313 (Unheated Storage)	Rectangular, 1.5-story building associated with the Kanakanak Hospital complex	Not evaluated	1
DIL-00259	Building 315 (Staff Housing)	One of 4 residences built to house employees of the Kanakanak Hospital; built in 1960; site is a contributing property of DIL-00263	Contributing property within an eligible district (2019, Criterion A)	1
DIL-00260	Building 316 (Staff Housing)	One of 4 residences built to house employees of the Kanakanak Hospital; built in 1962; site is a contributing property of DIL-00263	Contributing property within an eligible district (2019, Criterion A)	1
DIL-00261	Building 317 (Staff Housing)	One of 4 residences built to house employees of the Kanakanak Hospital; built in 1962; site is a contributing property of DIL-00263	Contributing property within an eligible district (2019, Criterion A)	1
DIL-00262	Building 318 (Staff Housing)	One of 4 residences built to house employees of the Kanakanak Hospital; built in 1962; site is a contributing property of DIL-00263	Contributing property within an eligible district (2019, Criterion A)	1
DIL-00263	Kanakanak Hospital Staff Housing Historic District	Historic district used as quarters for staff of the Kanakanak Hospital, 1921–1962	Eligible (2019, Criterion A)	1

AHRS No.	Site Name	Description	NRHP Eligibility (Year, Criteria)	Associated Project Phase
GDN-00001	Platinum Village Site	House pits and midden materials, including human remains, pottery, slate and bone tools, and harpoon blade fragments	Not evaluated	1
GDN-00002	Platinum South Spit	Late prehistoric village consisting of numerous house pits and artifacts	Not evaluated	1
GDN-00217	Pengurraraarmiut	Group of 37 house pits, a modern fish-drying rack, and canvas wall tent	Not evaluated	1
GDN-00234	GDN-00234	Late prehistoric site extending over several hundred meters of the south Platinum Spit	Not evaluated	1
GDN-00239	Platinum Hearth on South Spit	Stone-lined hearth dating to 500 +/- 140 years before present	Eligible (2001, Criterion D)	1
GDN-00242	Old Village at Quinhagak House Pits	Unconfirmed village site noted on maps by the Alaska Department of Transportation and Public Facilities	Not evaluated	2
GDN-00245	Quinhagak Cemetery	Reported cemetery near Quinhagak	Not evaluated	2
GDN-00249	Bristol Bay Boat	Carvel planked, double-ended fishing boat, likely pre-dating 1951	Not evaluated	1
GDN-00251	Platinum Mine Operations Facility Building 1	Building within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00252	Platinum Mine Operations Facility Building 2	Building within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00253	Platinum Mine Operations Facility Building 3	Building within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00254	Platinum Mine Operations Facility Building 4	Building within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00255	Platinum Mine Operations Facility Building 5	Building within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00256	Platinum Mine Operations Facility Building 6	Building located in the village of Platinum. AHRS records provide no additional description.	Not evaluated	1
GDN-00257	Platinum Mine Operations Facility Building 7	Building within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00258	Platinum Buildings	Buildings within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00259	Platinum Buildings	Buildings within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00260	Platinum Buildings	Buildings within the village of Platinum; AHRS records provide no additional description	Not evaluated	1
GDN-00264	Friendly House	Single-story, vernacular residence dating to circa 1940; moved to current location in 2014 to protect from riverbank erosion	Not eligible (2014)	2
GDN-00265	Nicori House	Single-story, vernacular residence dating to circa 1940; moved to current location in 2014 to protect from riverbank erosion	Not eligible (2014)	2
GDN-00268	Kanektok Fish Camp	Cluster of approximately 16 cache pits associated with a former fish camp	Not evaluated	2
XBI-00002	Apokak	Yup'ik village first reported in 1878; 1949 report noted only 2 dilapidated cabins	Not evaluated	1

AHRS No.	Site Name	Description	NRHP Eligibility (Year, Criteria)	Associated Project Phase
XBI-00003	Kuskovak	Hunting camp occupied from the early 1900s–1950s; cultural remains include house depressions, a grave box, and a grave support frame	Not evaluated	2
XBI-00004	Kleguchek	Yup'ik camp or settlement reported in 1898	Not evaluated	2
XBI-00009	Chimekliak	Nineteenth-century Yup'ik village, variously reported as "Chenik" (1802), "Chim-e-kliag-a-mut" (1898), "Chimiagamute" (1880), and "Chimingyangamute" (1890)	Not evaluated	1
XBI-00024	Iliutak	Former Yup'ik camp or settlement reported as "Iliutagamute" in 1879	Not evaluated	1
XBI-00025	St. Agaphia Chapel, Tuntutuliak	Russian Orthodox Church built during 1967–1975 to replace an earlier structure	Found not eligible by Alaska Historical Commission (1979)	2
XBI-00026	Presentation of the Theotokos Chapel, Nunapitchuk	Russian Orthodox Church built circa 1946; structure demolished and replaced in 1985	Found not eligible by Alaska Historical Commission (1979)	2
XBI-00028	St. Michael's Chapel, Eek	Russian Orthodox Church built in 1958	Previously found not eligible (1979); needs re-evaluation	1
XBI-00029	Kasigluk Russian Orthodox Church, Holy Trinity Church, New Kasigluk	Russian Orthodox Church built in 1974	Not eligible (1992, Criterion C)	2
XBI-00068	XBI-00068	Single house pit reported approximately 1.5 mi west of Tuntutuliak	Not evaluated	2
XBI-00078	West Point	Fish camp reported in 1916	Not evaluated	2
XBI-00104	XBI-00104	Late nineteenth to early twentieth-century Yup'ik summer camp; 5 features at the site relate to a modern fish camp; 1 feature is a shallow depression possibly reflecting an older occupation	Not evaluated	2
XBI-00105	Tuqsunaarmiullret	Early twentieth-century summer and fall camp occupied by Yup'ik families; cultural remains include a 1930s chapel foundation, a possible house depression, a post, and 11 small pits	Not evaluated	2
XBI-00107	Qulvarvillermiullret	Yup'ik winter settlement occupied until the 1930s; cultural remains include house depressions, cache pits, and surface burials	Not evaluated	2
XBI-00188	Old Moravian Church, Old Kasigluk	Wood-frame church constructed in the 1930s or 1940s; moved from Nunachuk to Old Kasigluk circa 1940s	Not evaluated	2
XBI-00190	Eek Moravian Church	Moravian Church built between 1935–1939 and used until the 1970s	Not evaluated	1
XBI-00191	Eek Bureau of Indian Affairs School	Three buildings constructed in the 1940s for the Bureau of Indian Affairs School in Eek	Not evaluated	1

AHRS No.	Site Name	Description	NRHP Eligibility (Year, Criteria)	Associated Project Phase
XBI-00192	Old Village/ Archaeological Site	Former village reported on a map by the Association of Village Council Presidents and the Alaska Department of Commerce, Community, and Economic Development	Not evaluated	2
XBI-00193	Grave Sites	Graves reported on a map by the Association of Village Council Presidents and the Alaska Department of Commerce, Community, and Economic Development	Not evaluated	2
XBI-00195	Kasigluk Federal Scout Readiness Center	Military facility composed of 2 buildings with exterior fuel tanks, a hazardous materials locker, and a shipping container accessed via wooden boardwalks	Not evaluated[a]	2
XBI-00196	Tuntutuliak Federal Scout Readiness Center	Military facility composed of 2 buildings with exterior fuel tanks, a hazardous materials locker, and a shipping container accessed via wooden boardwalks	Not evaluated[a]	2
XBI-00205	XBI-00205	Frost mound with 2 pits on top; 1 pit contains a wooden box of dimensional lumber	Not evaluated	2
XHI-00090	House Pits	No description provided; listed in AHRS with XHI-00091 in 1998	Not evaluated	1
XHI-00091	XHI-00091	No description provided; listed in AHRS with XHI-00090 in 1998	Not evaluated	1
XNB-00006	Daly	Site of a former camp and saltery reported in about 1910	Not evaluated	1
XNB-00030	Old Kanakanak	Nineteenth-century settlement consisting of at least 24 house pits, cabin remains, and a former salmon cannery	Not evaluated	1
XNB-00042	Miogavik	Former village site dating to at least 1906–1915	Not evaluated	1
XNB-00093	Danny Johansen/ Hagel McFarland	No description or references provided; site was added to the AHRS in 2002	Not evaluated	1

Source: OHA 2023
[a] These sites were initially determined individually ineligible for the NRHP. Consultation between the State Historic Preservation Officer and Alaska Department of Military and Veterans Affairs later decided to treat each as eligible under the Alaska Federal Scout Readiness Centers Multiple Property.

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Appendix H. USFWS Compatibility Determination

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From:	Moos, Kenton KM
To:	Blihovde, Boyd; Kohl, Anna J.
Cc:	Dent, April M; Boeck, Laurie A; Marchowsky, Kori; Cooper, Douglass; Howell, Kaitlyn J; Bjornlie, Nichole L; Valerie Haragan; Marye, Tyler J CIV USARMY CEPOA (USA); Ostman, Amy; Hotch, Nora; Salway, Malcolm; 10359880_AIRRAQ Network Phase 1; 10359999_AIRRAQ Phase 2
Subject:	Re: [EXTERNAL] Airraq Network Coordination with National Wildlife Refuges
Date:	Monday, May 1, 2023 8:24:40 AM

Good morning Anna,

A Compatibility Determination (CD) is NOT required for this project as presented. If you make any changes to the project that would require you to cross or access refuge lands, please notify Boyd and/or I as this may require a CD. Thank you for your time and if you have any further questions, please do not hesitate to give me a call.

Kenton Moos

From: Blihovde, Boyd <boyd_blihovde@fws.gov>
Sent: Sunday, April 30, 2023 1:17 AM
To: Kohl, Anna J. <Anna.Kohl@hdrinc.com>; Moos, Kenton KM <kenton_moos@fws.gov>
Cc: Dent, April M <april_dent@fws.gov>; Boeck, Laurie A <laurie_boeck@fws.gov>; Marchowsky, Kori <kori_marchowsky@fws.gov>; Cooper, Douglass <douglass_cooper@fws.gov>; Howell, Kaitlyn J <kaitlyn_howell@fws.gov>; Bjornlie, Nichole L <nichole_bjornlie@fws.gov>; Valerie Haragan <vharagan@gci.com>; Marye, Tyler J CIV USARMY CEPOA (USA) <Tyler.J.Marye@usace.army.mil>; Ostman, Amy <amy.ostman@hdrinc.com>; Hotch, Nora <Nora.Hotch@hdrinc.com>; Salway, Malcolm <malcolm.salway@hdrinc.com>; 10359880_AIRRAQ Network Phase 1 <10359880_AIRRAQNetworkPhase1@hdrinc.com>; 10359999_AIRRAQ Phase 2 <10359999_AIRRAQPhase2@hdrinc.com>
Subject: Re: [EXTERNAL] Airraq Network Coordination with National Wildlife Refuges

If the project isn't proposing to enter or impact Refuge Managed or owned lands, I don't see how we cold require a compatability determination be completed. I imagine yo are already handing the NEPA side of things, but if you aren't technically on Refuge, then we wouldn't have authority to regulate what permits you get.

This is just my opinion based on my prior experiences, Kenton may have a different view.

Thanks

Boyd Blihovde
Refuge Manager
Yukon Delta NWR

PO Box 346
Bethel, AK 99559
I live and work on Yup'ik, Cup'ik, and Athabaskan land

From: Kohl, Anna J. <Anna.Kohl@hdrinc.com>
Sent: Friday, April 28, 2023 8:54 AM
To: Moos, Kenton KM <kenton_moos@fws.gov>; Blihovde, Boyd <boyd_blihovde@fws.gov>
Cc: Dent, April M <april_dent@fws.gov>; Boeck, Laurie A <laurie_boeck@fws.gov>; Marchowsky, Kori <kori_marchowsky@fws.gov>; Cooper, Douglass <douglass_cooper@fws.gov>; Howell, Kaitlyn J <kaitlyn_howell@fws.gov>; Bjornlie, Nichole L <nichole_bjornlie@fws.gov>; Valerie Haragan <vharagan@gci.com>; Marye, Tyler J CIV USARMY CEPOA (USA) <Tyler.J.Marye@usace.army.mil>; Ostman, Amy <amy.ostman@hdrinc.com>; Hotch, Nora <Nora.Hotch@hdrinc.com>; Salway, Malcolm <malcolm.salway@hdrinc.com>; 10359880_AIRRAQ Network Phase 1 <10359880_AIRRAQNetworkPhase1@hdrinc.com>; 10359999_AIRRAQ Phase 2 <10359999_AIRRAQPhase2@hdrinc.com>
Subject: [EXTERNAL] Airraq Network Coordination with National Wildlife Refuges

Dear Mr. Moos and Mr. Blihovde,

Thank you for your team's participation in our project overview conversation April 25, 2023. As described, Unicom is planning to construct the Airraq Network beginning in 2024, which will bring high-speed broadband internet service from Dillingham to 10 communities in the Yukon-Kuskokwim area. The project includes marine and overland components, with fiber optic cable installation on and within stream substrates within the Togiak and Yukon Delta National Wildlife Refuge boundaries. No staging areas, temporary camps, or project footprint are planned within either Refuge. Given the lack of project activities on Refuge lands, it is our understanding that a Compatibility Determination is not needed. No right-of-way or easement is required from the US Fish and Wildlife Service.

We are writing to request your concurrence with our determination that a Compatibility Determination is not needed for the project. The Airraq Network team commits to keeping Refuge managers informed as the project progresses, and we welcome questions and conversation about the project at any time.

Thank you for your time and attention to this important project.

Respectfully,
Anna

Anna J. Kohl, CEP

Environmental Project Manager
Vice President

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