APPENDIX E

NATIONAL MARINE FISHERIES SERVICE

ESSENTIAL FISH HABITAT ASSESSMENT

From: Charlene Felkley - NOAA Federal
To: Dawodu, Omololu - RD, Washington, DC
Cc: Allen, Christine - RD, Washington, DC; Emily Creely
Subject: [EXT] Re: FW: [External Email]AU Aleutian - Information for Charlene (NMFS)
Date: Wednesday, May 12, 2021 2:01:21 PM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image007.png
image013.png

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Hello Omololu,

Thank You for contacting the NMFS regarding AU Aleutian project - Updated EFHA, and for clarifying/responding to the questions regarding your EFH determination.

> *Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires federal agencies to consult with NMFS on federal actions that may adversely affect Essential Fish Habitat (EFH). NMFS is required to provide EFH Conservation Recommendations based on our authorities in Section 305(b)(4)(A) of the MSA.*

NMFS has no more comments at this time. **EFH consultation is complete**. Significant changes to the project may require reinitiation of consultation. Please contact Charlene Felkley at charlene.felkley@noaa.gov if you have any questions.

On Tue, May 11, 2021 at 2:45 PM Dawodu, Omololu - RD, Washington, DC <omololu.dawodu@usda.gov> wrote:

> Thank you very much Charlene. I am available to speak with you anytime that works on the 20th. If after your initial review of the updated EFHA, you find anything that needs to be addressed, please let me know. We can work on updating the document prior to our meeting on the 20th.
>
> Thank you again!
>
> **Omololu Dawodu**
> Environmental Protection Specialist
>
> Environmental and Engineering Staff
>
> Water and Environmental Programs

Rural Utilities Service, Rural Development Agency

United States Department of Agriculture

1400 Independence Avenue, SW

Washington, DC 20250

Phone: 202.720.5653

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From: Charlene Felkley - NOAA Federal <charlene.felkley@noaa.gov>
Sent: Tuesday, May 11, 2021 5:24 PM
To: Dawodu, Omololu - RD, Washington, DC <omololu.dawodu@usda.gov>
Cc: Allen, Christine - RD, Washington, DC <Christine.Allen@usda.gov>; Emily Creely <ecreely@dowl.com>
Subject: Re: FW: [External Email]AU Aleutian - Information for Charlene (NMFS)

Hi Omololu,

I am on Annual Leave beginning Thursday for a week. I return and can set us up for a call on the 20th. Would that work ok?

I'll do my best to read through the updated documents tomorrow before checking out for the week.

Thank You very much for relaying the questions we had. That and the responses were very much appreciated!

On Tue, May 11, 2021 at 2:12 PM Dawodu, Omololu - RD, Washington, DC <omololu.dawodu@usda.gov> wrote:

Hello Charlene,

Please see the updated EFHA documentation for the above referenced AU Aleutian project. Are you available sometime this week to discuss? I am available Friday, morning between 9AM-12PM and 1PM-5PM EDT.

Thank you!

Omololu Dawodu
Environmental Protection Specialist

Environmental and Engineering Staff

Water and Environmental Programs

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From: Emily Creely <ecreely@dowl.com>
Sent: Monday, May 3, 2021 7:58 PM
To: Dawodu, Omololu - RD, Washington, DC <omololu.dawodu@usda.gov>; Allen, Christine - RD, Washington, DC <Christine.Allen@usda.gov>
Subject: [External Email]AU Aleutian - Information for Charlene (NMFS)

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Omolulu & Christine,

So I think you have the final version and can send it to her. I'll answer her questions below.

1. *There is no definition of Major within the MSA (I think there may be in the ESA? which can lead to confusion and term-cross-over*

Should we strike that from the report? If so, see attached.

2. *How have areas been indicated to have human impacts or "areas with oil exploration, trawling (or other bottom contact fisheries), anchoring, etc."?*

NMFS has not provided this information. This information comes from two sources. First, GCI reaches out directly to fishing associations and other organizations (see attached). Second, this information is scoped during the initial project planning and comes from a variety of sources including the Transportation Research Board (general vessel traffic and anchoring), www.marinetraffic.com, and the Automatic Identification System (AIS)data from Global Fishing Watch. Individual interviews with locals are also conducted. Information gathered from all sources is synthesized.

Emily Creely, PWS
Environmental Specialist

DOWL

(907) 562-2000 | office
(907) 865-1216 | direct

dowl.com

From: Charlene Felkley - NOAA Federal <charlene.felkley@noaa.gov>
Sent: Monday, May 03, 2021 10:50 AM
To: Emily Creely <ecreely@dowl.com>
Subject: Re: [EXT] Test

HI Emily,

As we are dictated to work with federal agencies, I did send something similar to below to USDA already. Also, I did not receive the updated document. Is that something you could send me?

There were two points of note from the answers to the questions: See highlight below. 1. There is no definition of Major within the MSA (I think there may be in the ESA? which can lead to confusion and term-cross-over). and 2. How have areas been indicated to have human impacts or "areas with oil exploration, trawling (or other bottom contact fisheries), anchoring, etc."? Where are the applicants finding this information? I do not think we have provided that.

Please work with USDA to forward any info to us.

Thank you!!

---

1. Clarification on the Federal agency's conclusion regarding effects of the action on EFH (see AKR Fact Sheet attached)

    A. **Section 6.0 of USDA's EFHA, *Conclusions and Effects Determination*, details the federal agency's conclusion regarding EFH:**

    Although EFH in the action area will be temporarily adversely impacted, the Project will not impact EFH to the point of causing major adverse impacts to fish populations.

2. Updated timelines

    A. **Document has been updated**

3. Any additional conservation measures

    A. **We don't have any additional measures**

4. Clarification on how areas were determined to avoid where human activities could affect the line

A. **As stated in the EFHA, the Project would bury the cable in areas where human activities could affect the line. These are defined in the EFHA as:**

1. **areas with oil exploration, trawling (or other bottom contact fisheries), anchoring, etc.**

2. **nearshore or shallow areas.**

3. **areas with commercial bottom contact fishing, or signs of anchoring**

On Fri, Apr 30, 2021 at 2:56 PM Emily Creely <ecreely@dowl.com> wrote:

Hi Charlene,

I'm following up to make sure you had all that you needed?

Thanks!

Em

Emily Creely, PWS
Environmental Specialist

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(907) 865-1216 | direct

From: E. Leyla Arsan <larsan@dowl.com>
Sent: Friday, April 23, 2021 8:58 AM
To: Charlene Felkley - NOAA Federal <charlene.felkley@noaa.gov>
Cc: Emily Creely <ecreely@dowl.com>
Subject: RE: [EXT] Test

Take 2!

E. Leyla Arsan
Senior Biologist

DOWL

(503) 539-6398 | cell
(907) 865-1219 | office direct

4041 B Street
Anchorage, AK 99503

www.dowl.com

From: Charlene Felkley - NOAA Federal <charlene.felkley@noaa.gov>
Sent: Friday, April 23, 2021 8:57 AM
To: E. Leyla Arsan <larsan@dowl.com>
Subject: [EXT] Test

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Hello there.

--

Charlene Felkley

Alaska Region Habitat Division

NOAA Fisheries | U.S. Department of Commerce

Office: (907)271-5006

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--

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Charlene Felkley (pronouns: she/her)

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From: Dawodu, Omololu - RD, Washington, DC
To: Kristen Hansen; Emily Creely
Cc: Allen, Christine - RD, Washington, DC
Subject: [EXT] FW: Unicom AU-Aleutian Consultation Request
Date: Thursday, March 04, 2021 1:01:23 PM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image007.png

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Hello Kristen and Emily,

Thank you very much for the call this afternoon. Please see the entire email chain below.

Omololu Dawodu
Environmental Protection Specialist
Environmental and Engineering Staff
Water and Environmental Programs
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From: Charlene Felkley - NOAA Federal <charlene.felkley@noaa.gov>
Sent: Monday, February 22, 2021 3:04 PM
To: Dawodu, Omololu - RD, Washington, DC <omololu.dawodu@usda.gov>; Allen, Christine - RD, Washington, DC <Christine.Allen@usda.gov>
Cc: Matthew Eagleton - NOAA Federal <matthew.eagleton@noaa.gov>; Stefanie Coxe - NOAA Federal <stefanie.coxe@noaa.gov>
Subject: Re: Unicom AU-Aleutian Consultation Request

Hello Omololu and Christine,

Thank you very much for taking the time to speak with me today. As discussed:

- Find the most recent Impacts to Essential Fish Habitat from Non-Fishing Activities in Alaska. This will be helpful in updating conservation recommendations within the EFH assessment.
- I will send an email soon (cc'ing you both) to the North Pacific Fishery Management Council. This is to help coordinate with the NPFMC and avoid conflicts with fishing gear by sharing information on issues such as project location and timing.

Let us know if you have any questions. Feel free to call as well 423-277-6811

On Thu, Feb 18, 2021 at 9:03 AM Dawodu, Omololu - RD, Washington, DC <omololu.dawodu@usda.gov> wrote:

> Hello Mr. Eagleton,
>
> Thank you very much for your speedy reply.
>
> I will look forward to working with Mrs. Felkley.
>
> **(Ms.) Omololu Dawodu**
> Environmental Protection Specialist
> Environmental and Engineering Staff
> Water and Environmental Programs
> Rural Utilities Service, Rural Development Agency
> United States Department of Agriculture
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>
>
>
> ---
>
> **From:** Matthew Eagleton - NOAA Federal <matthew.eagleton@noaa.gov>
> **Sent:** Thursday, February 18, 2021 12:07 PM
> **To:** Dawodu, Omololu - RD, Washington, DC <omololu.dawodu@usda.gov>
> **Cc:** Allen, Christine - RD, Washington, DC <Christine.Allen@usda.gov>; Charlene Felkley <charlene.felkley@noaa.gov>
> **Subject:** Re: Unicom AU-Aleutian Consultation Request
>
> Dear Mr. Dawodu,

Thanks for the information regarding EFH. Mrs. Charlene Felkley may reach out to you. Hope all is well there.

Matthew

On Thu, Feb 18, 2021 at 7:23 AM Dawodu, Omololu - RD, Washington, DC <omololu.dawodu@usda.gov> wrote:

Hello Mr. Eagleton,

My name is Omololu Dawodu, I am the USDA, Rural Utilities Service NEPA reviewer for the **Unicom, Inc.'s (Unicom) proposed AU-Aleutian Fiber project**.

The proposed project will deliver fast terrestrial internet service to six rural Alaska Native Aleut villages for the first time: Akutan, Chignik (aka Chignik Bay), King Cove, Larsen Bay, Sand Point, and Unalaska (aka Dutch Harbor).

Please find the attached request for consultation with the National Marine Fisheries Service.

Please let me know if you would like to schedule a time to further discuss this project.

Thank you,

Omololu Dawodu
Environmental Protection Specialist
Environmental and Engineering Staff
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--
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AU ALEUTIAN PROJECT

Draft Essential Fish Habitat Assessment

Prepared for:

Unicom, Inc.
5450 A Street
Anchorage, Alaska 99518

Prepared on behalf of:

U.S. Department of Agriculture
Rural Development

Committed to the future of rural communities.

Prepared by:

4041 B Streer
Anchroage, Alaska 99503

April 2021

TABLE OF CONTENTS

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

ADF&G	Alaska Department of Fish and Game
ADEC	Alaska Department of Environmental Conservation
AWC	Anadromous Waters Catalog
BMH	Beach Man Hole
EFH	Essential Fish Habitat
ft	feet
GCI	GCI Communication Corp.
km	kilometer
m	meter
mi	mile
MHW	Mean High Water
MSA	Magnuson Stevens Fishery and Conservation and Management Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
OHW	Ordinary High Water
PDES	Pollutant Discharge Elimination System
ROV	Remotely Operated Vehicle
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION AND BACKGROUND

GCI Communication Corp. (GCI) proposes to extend their existing fiber optic line in Kodiak to Unalaska via a subsea fiber optic cable. The action could affect essential fish habitat (EFH) for a variety of species and this document serves to fulfill the requirements of the Magnuson Stevens Fishery and Conservation and Management Act (MSA) for GCI to consult with the National Marine Fisheries Service (NMFS). This EFH Assessment presents information about the AU-Aleutian project and its potential effects to EFH.

The MSA directs federal agencies to consult with NMFS when their activities may have an adverse effect on EFH, where adverse effects are defined as *any impact which reduces quality and/or quantity of EFH…adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, or reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences*.

The MSA defines EFH as the *waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity*. Where *'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*.

2.0 PROJECT AREA

The proposed 1,735 kilometer (km) (1,078 mile [mi]) fiber optic cable extension route from Kodiak to Unalaska is shown in Figure 1. Eleven landings are proposed along the route: Larsen Bay, Chignik, Chignik Lagoon, Chignik Lake, Perryville, Sand Point, King Cove, Cold Bay, False Pass, Akutan, and Unalaska. From Kodiak, the fiber optic cable will be laid down the Shelikof Strait and then parallel the Alaska Peninsula to the south until IT REACHES Unalaska. Figures 1 through 13 provide details of the landing sites. There are two potential routes between Chignik and Perryville and between Perryville to Sand Point (see Figure 1). Branching units shown in Figure 1 are the junctions where the landfall cable joins the main cable. Site-specific information is described below.

Kodiak

The Kodiak landing is in Mill Bay and will be connected to the Kodiak Kenai Fiber Link (Figure 2).

Larsen Bay

The landing is in Larsen Bay and is at the end of a street leading to a beach (Figure 3).

Chignik

The Chignik landing is in Anchorage Bay and is located at the end of a side street (Figure 4).

DOWL

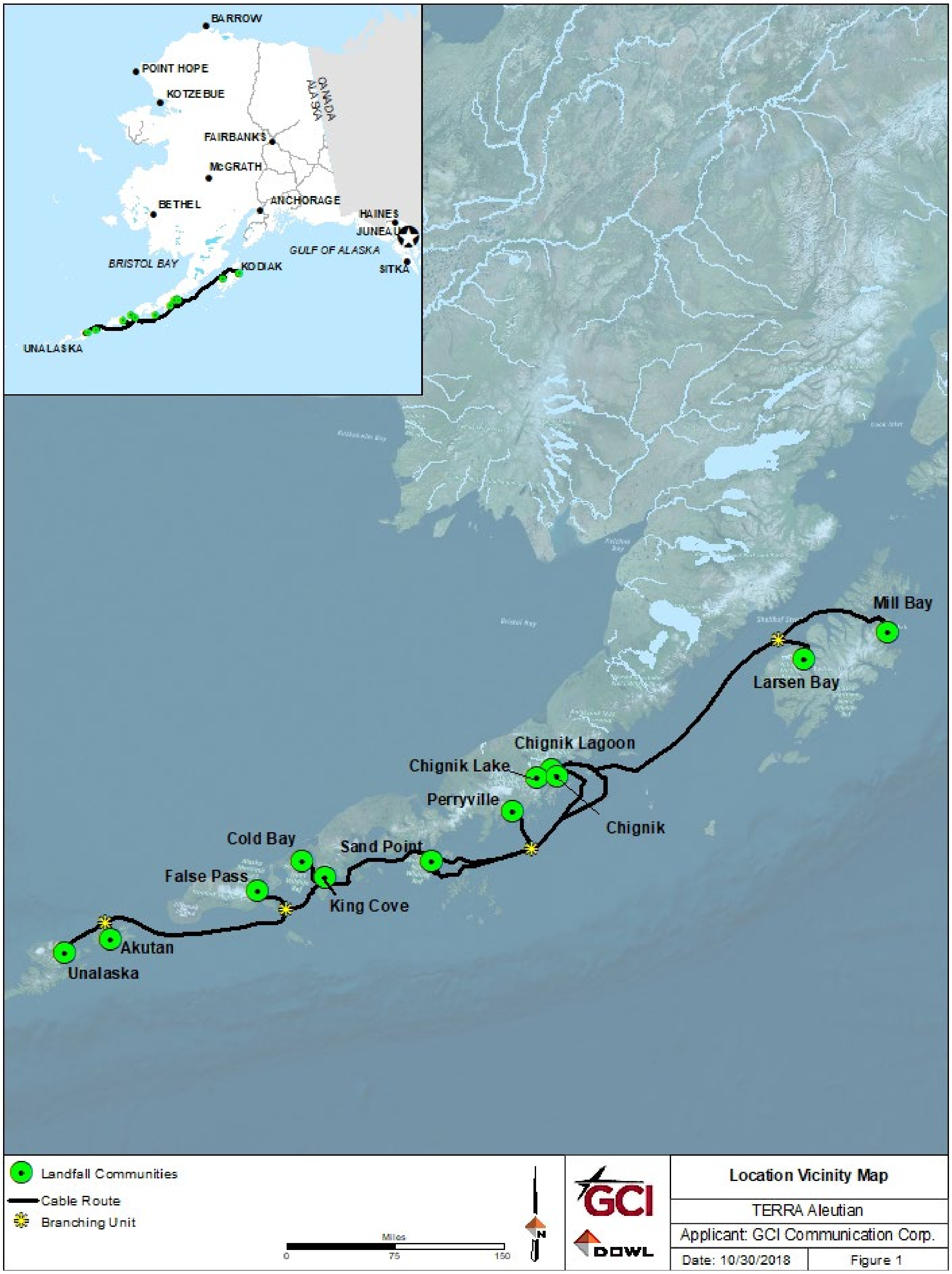

Figure 1. Proposed Route TERRA - Aleutian Subsea Fiber Optic Cable

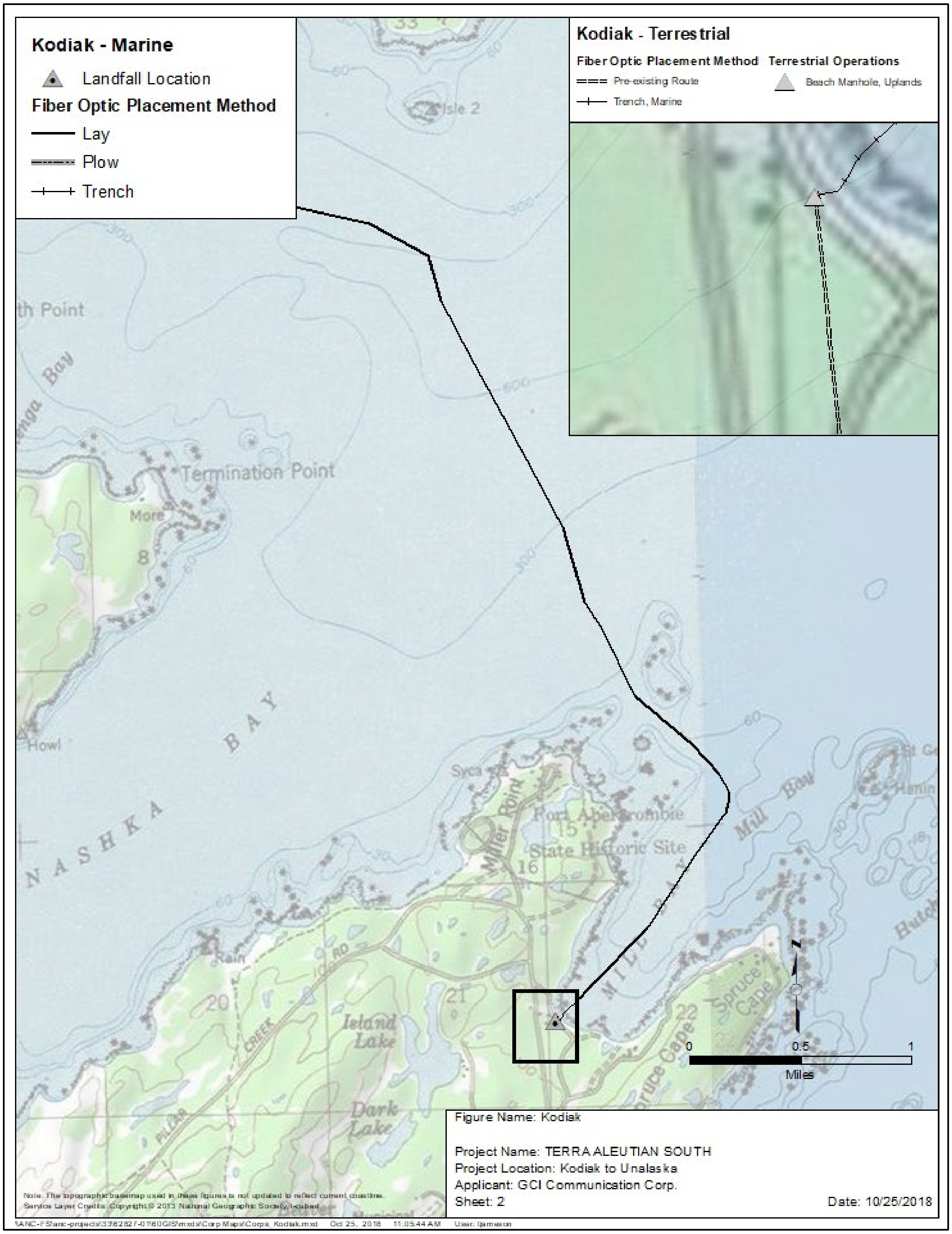

Figure 2. Kodiak Landing Location

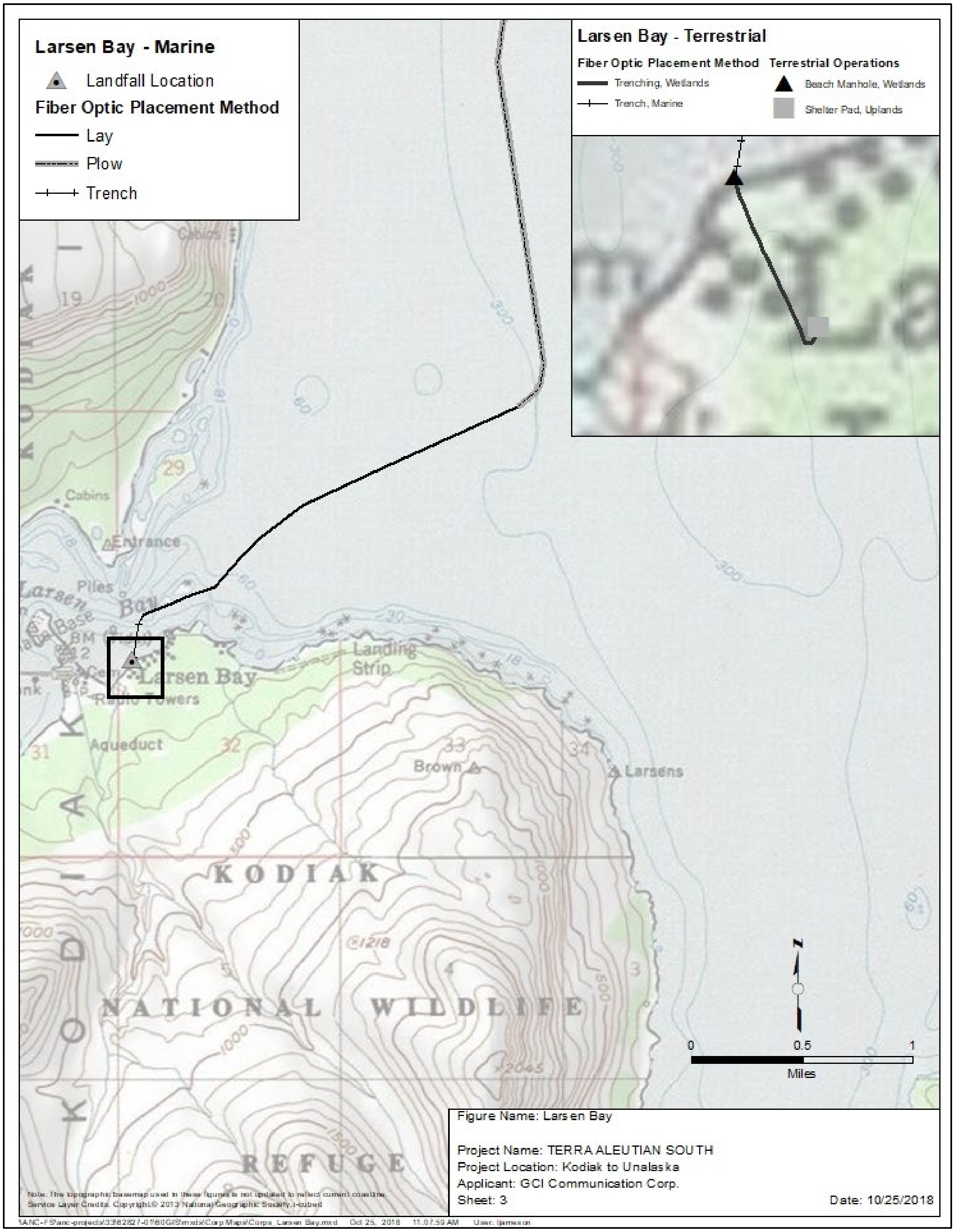

Figure 3. Larsen Bay Landfall Location

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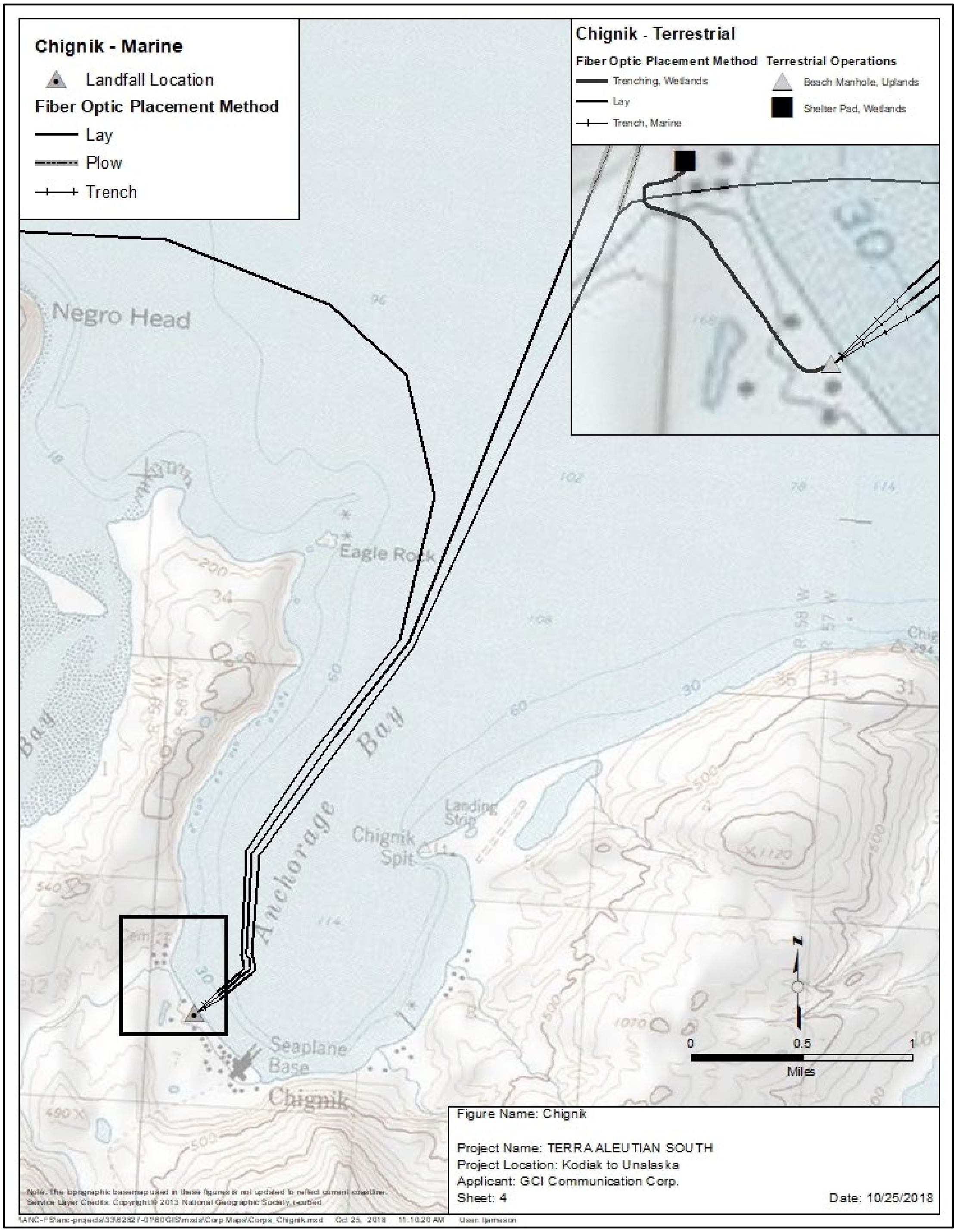

Figure 4. Chignik Landfall Location

Chignik Lagoon

The landing is in Chignik Lagoon (Figure 5) at the end of a designated utility easement.

Chignik Lake

Landfall is located between Chignik Lagoon and Chignik Lake (Figure 6) on a small, informal boat launch. The fiber optic cable will be laid in approximately 4.8 km (3 mi) of the Chignik River, AWC stream number 271-10-10310, before reaching saltwater.

Perryville

Landfall is located in an unnamed bay approximately 3 km (2 mi) north of Chiachi Island (Figure 7). The landing is on the west side of the sand road above the MHW demarcation.

Sand Point

Landfall is less than a km (0.5 mi) south of Mud Bay (Figure 8) and approximately 3 km (2 mi) south of Unga Strait. The landing is in a disturbed area outside of a road between the GCI Earth Station and a fish processing plant.

King Cove

Landfall is approximately 16 km (10 mi) east of Cold Bay (Figure 9). The landing is at the end of a street and adjacent to King Cove Corporation.

Cold Bay

Landfall is in Cold Bay (Figure 10) next to a defunct hovercraft landing pad.

False Pass

Landfall is in the northern part of the Isanotski Strait (Figure 11) and approximately 6 km (3.5 mi) from Ikatan Bay. The landing is in the middle of the village just north of the abandoned cannery and south of the brackish outlet of a small, unnamed stream. The stream is not in the AWC, but anadromous species have been observed at the mouth.

Akutan

Landfall is approximately 19 km (12 mi) from the Bering Sea in Akutan Bay (Figure 12). The landing is outside the port area at a fishing gear storage yard.

Unalaska

Landfall is approximately 16 km (10 mi) from the Bering Sea in Unalaska Bay (Figure 6). The landing is outside the port area at a fishing gear storage yard.

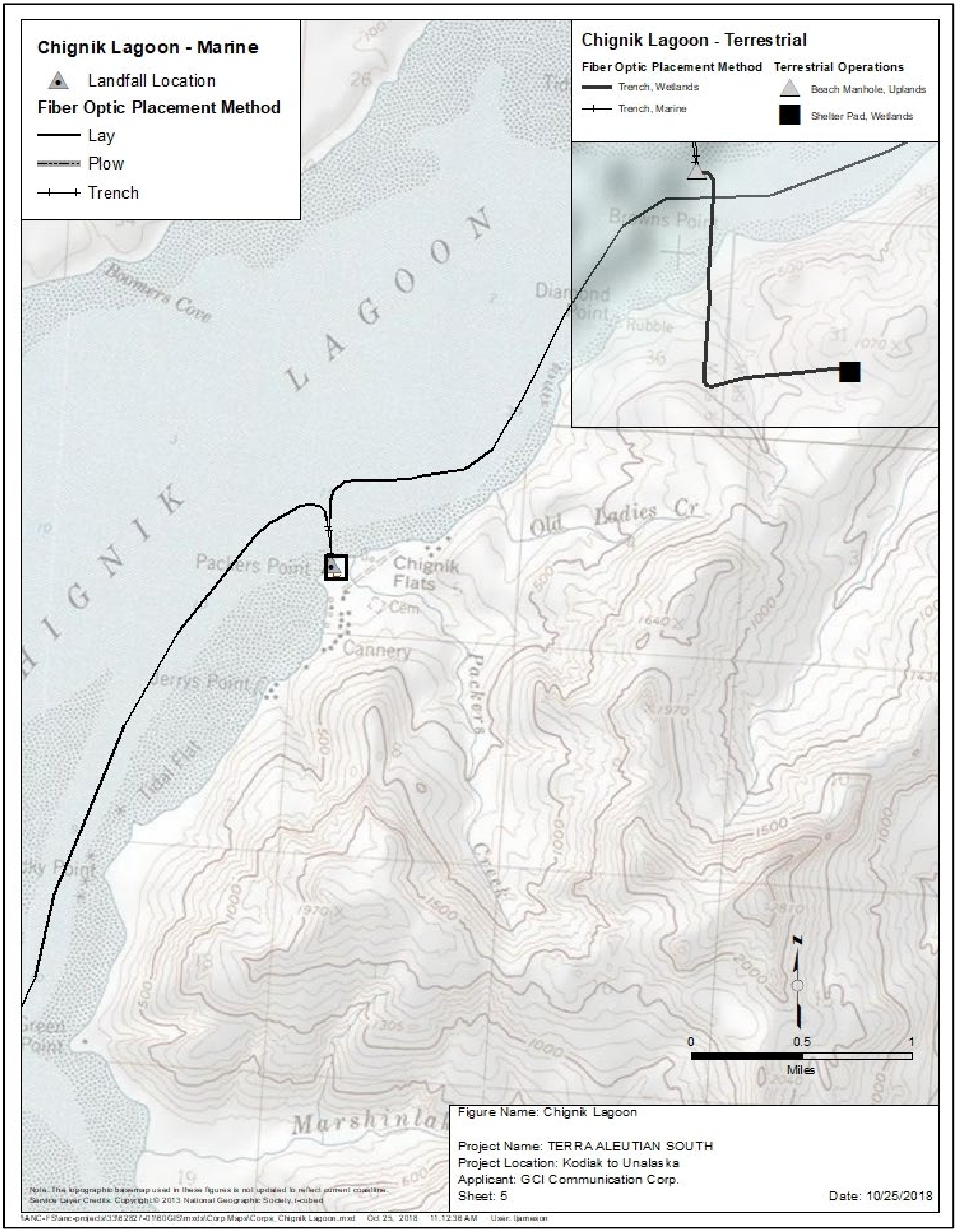

Figure 5. Chignik Lagoon Landfall Location

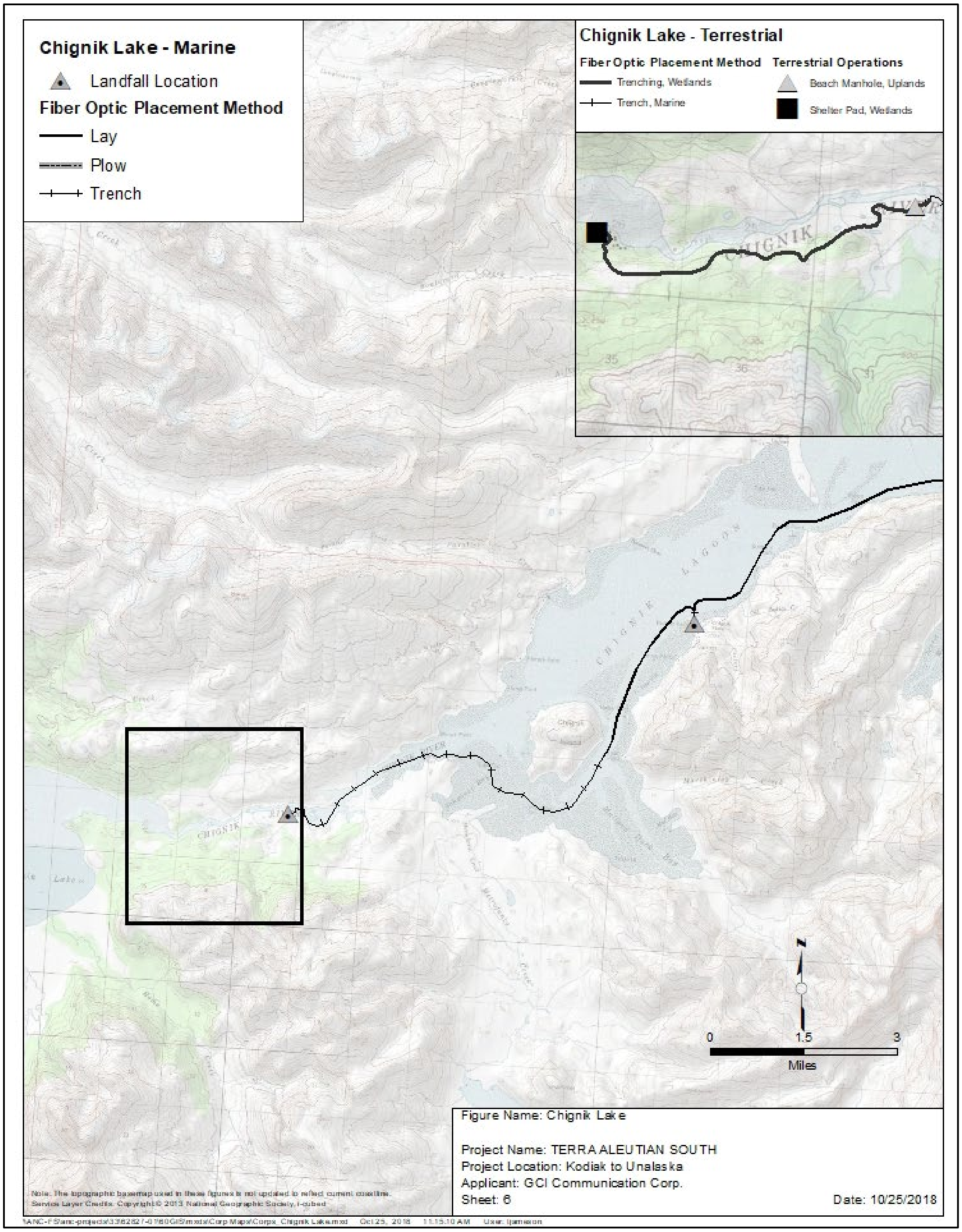

Figure 6. Chignik Lake Landfall Location

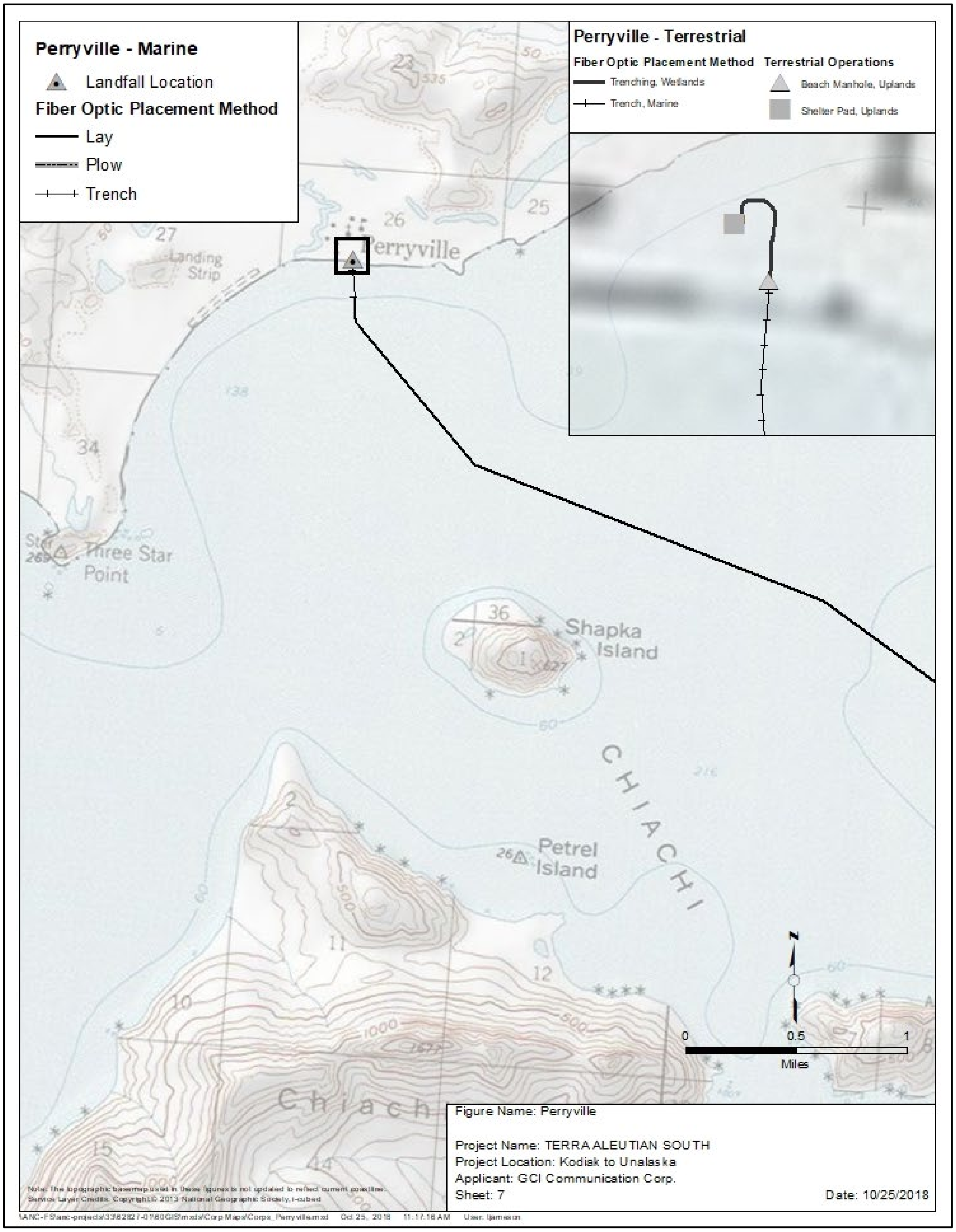

Figure 7. Unalaska Landfall Location

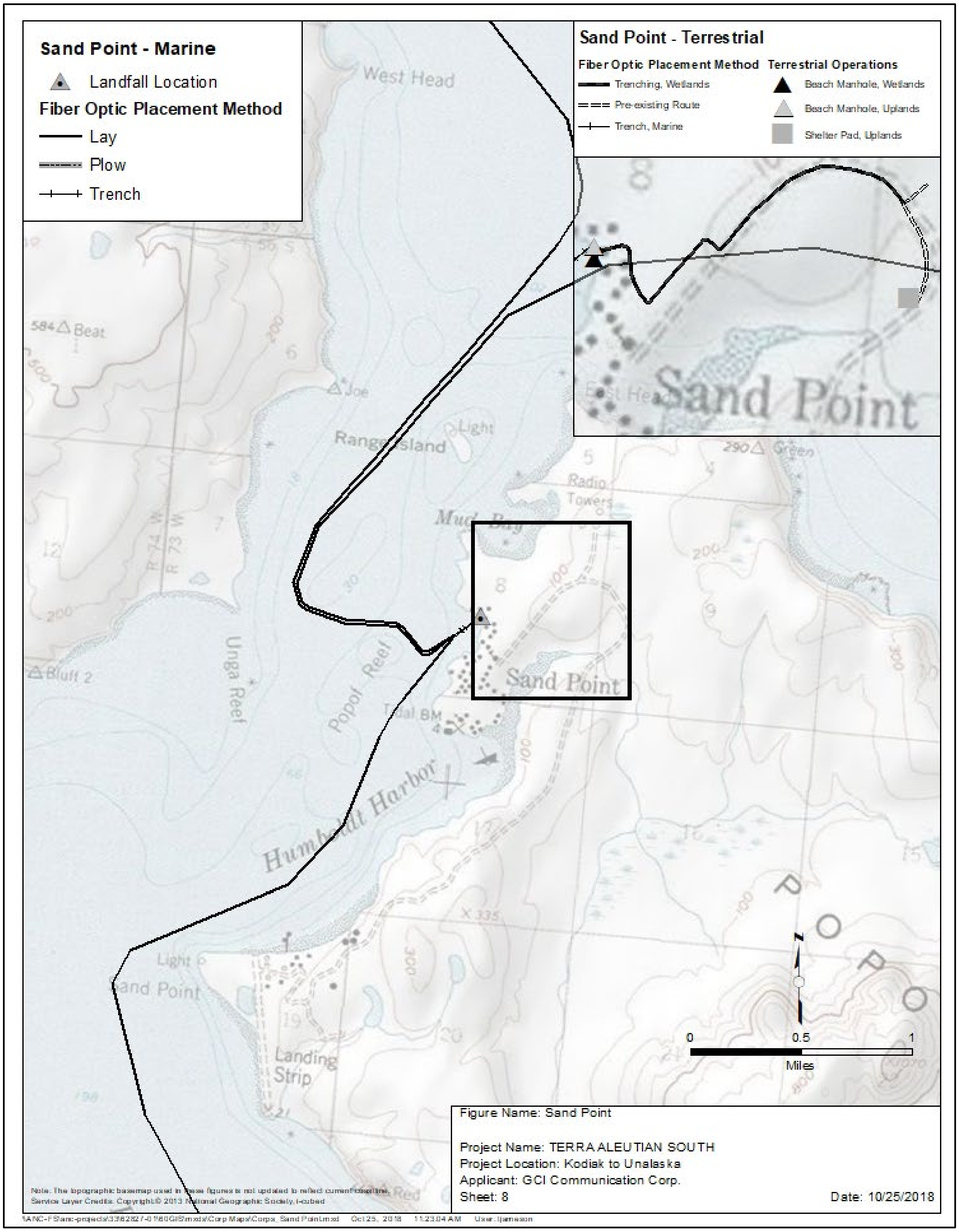

Figure 8. Sand Point Landfall Location

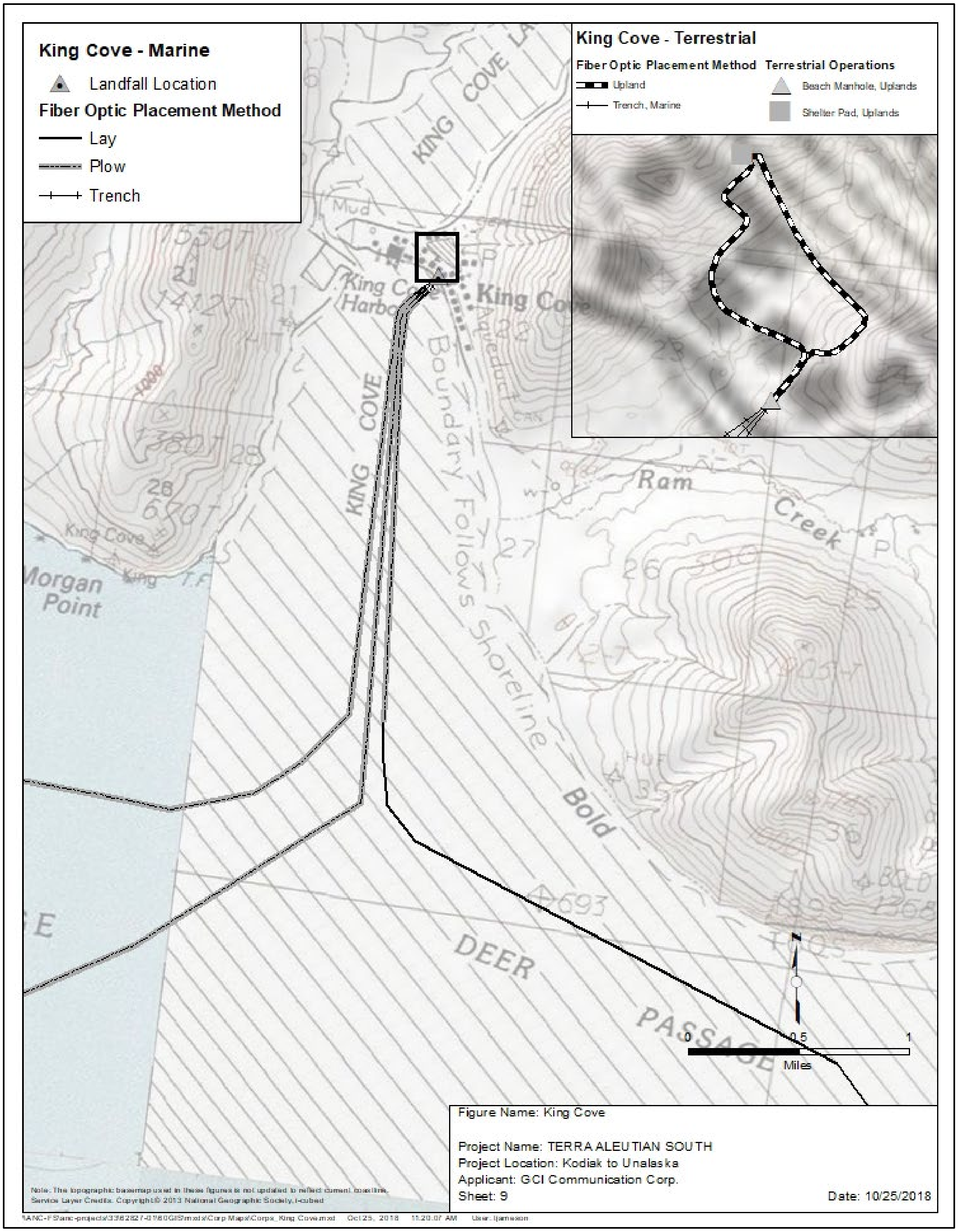

Figure 9. King Cove Landfall Location

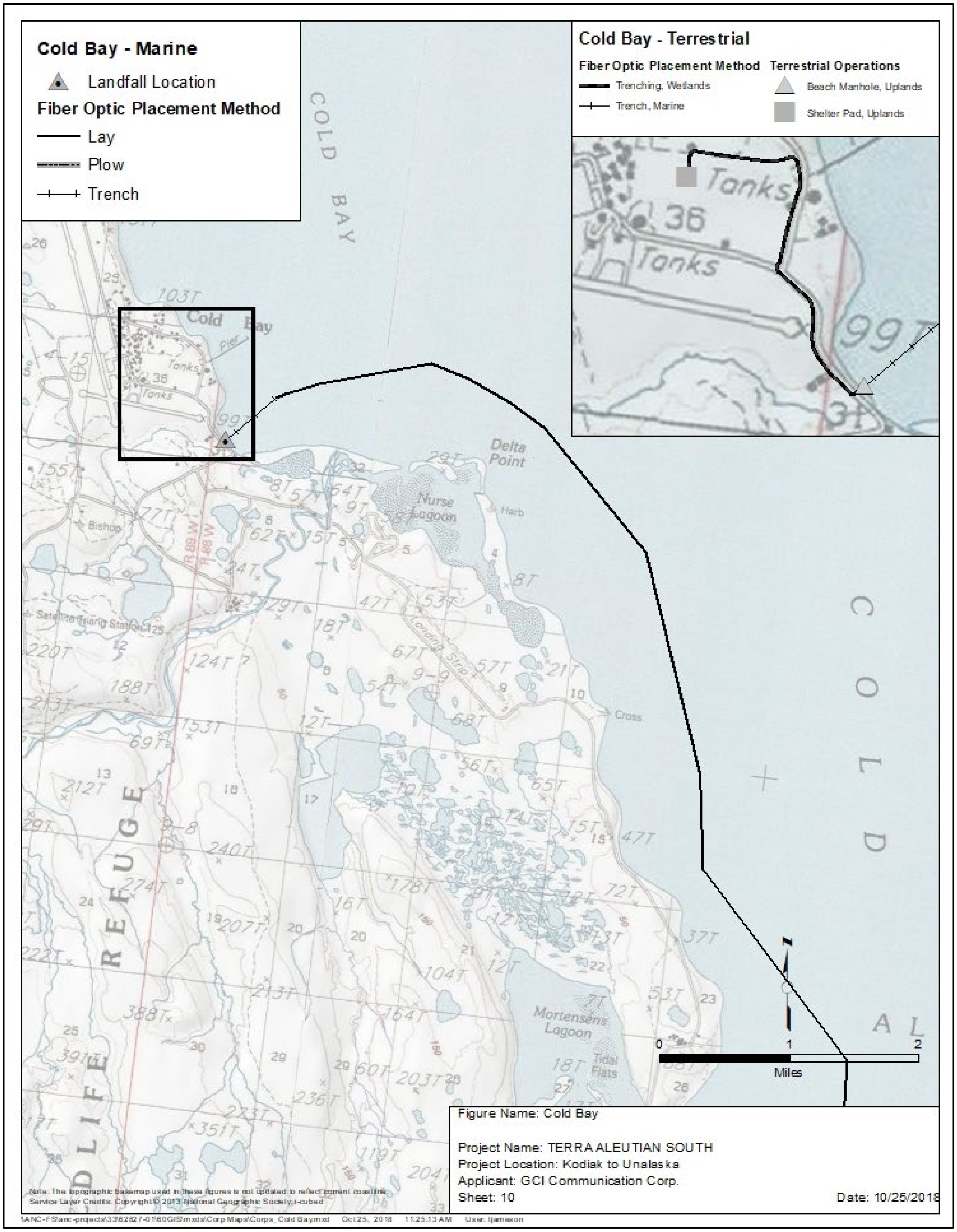

Figure 10. Cold Bay Landfall Location

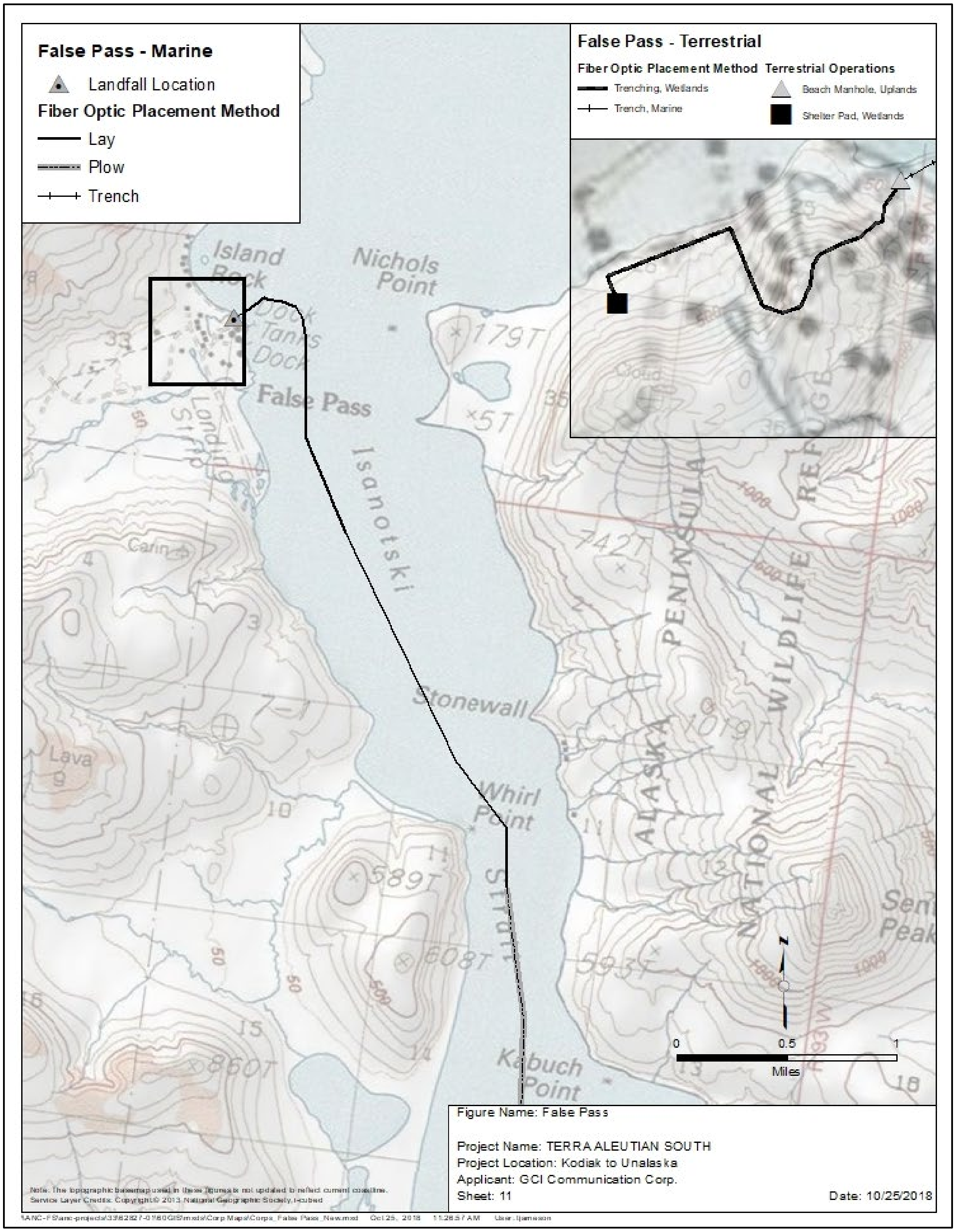

Figure 11. False Pass Landfall Location

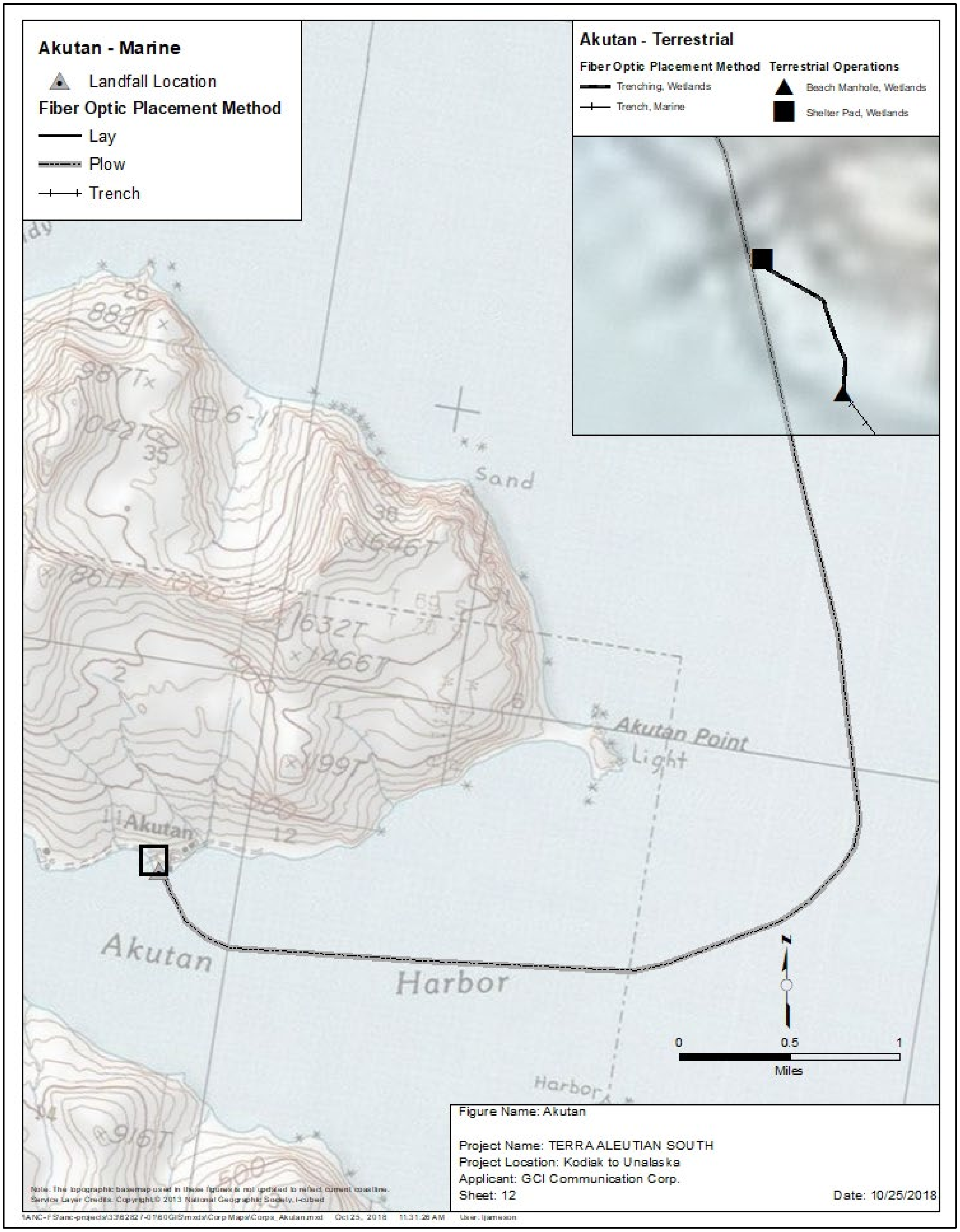

Figure 12. Akutan Landfall Location

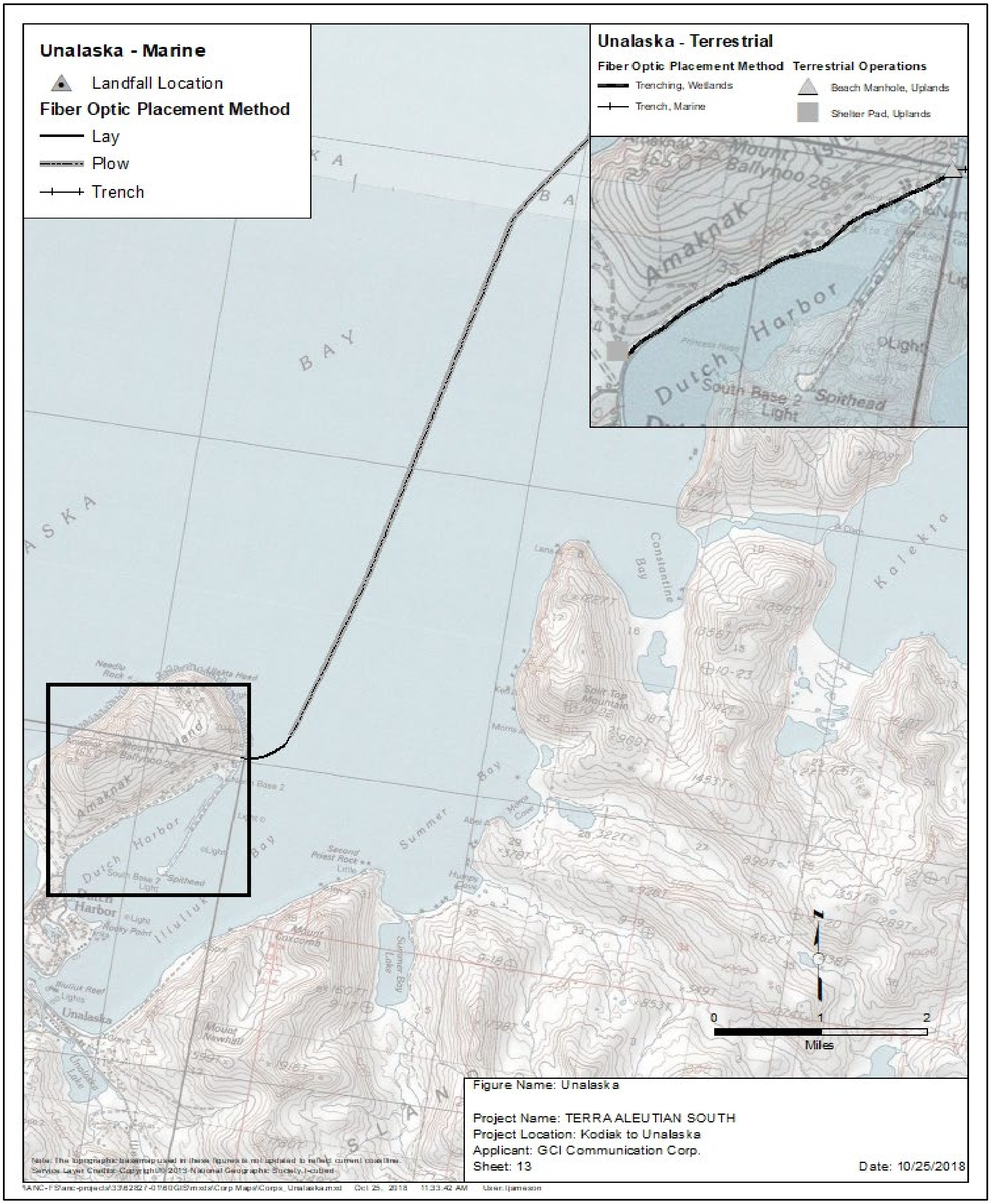

Figure 13. Unalaska Landfall Location

2.1 Project Description

The proposed 1,735 km (1,078 mi) fiber optic cable extension will be 1.9 to 3.8 centimeters (0.75 to 1.5 inches) in diameter, similar to GCI cables deployed throughout Southeast Alaska, Prince William Sound, Lake Iliamna, and Cook Inlet. The cable will lie on top of the sea floor except in areas where physical conditions or human activities could affect the line (e.g. areas with oil exploration, trawling (or other bottom contact fisheries), anchoring, etc.). In these areas (exact locations to be determined), the fiber optic cable will be buried up to approximately 1.5 meter (m) (5 ft) using a plow up to 4.6 m (15 feet [ft]) wide. No other anchors or structures will be needed.

The project will have both terrestrial and aquatic components. Cable laying will occur in the aquatic environment (both marine and freshwater), and cable connections to landfall locations will occur mainly in terrestrial environments. Some of the landfall connections will have intertidal work below mean high water (MHW), which is noted in the project description below. Terrestrial work above MHW is not detailed for the purposes of the EFH Assessment.

More site-specific details are presented in Section 4.5, *General Habitat Conditions in the Project Area*. Actions are generally described from their landfall connections down-gradient to the marine environment.

2.1.1 Landfall Work

Proposed landfall locations will have beach manholes (BMH) from which the cable will extend. All BMHs will occur above MHW (in marine areas) or OHW (ordinary high water, in freshwater areas). Some excavation for the trench connecting to the BMHs will occur in the intertidal area or below MHW/OHW, mostly on gravel and cobble beaches. Work below MHW or OHW may occur during either high or low tide; some work must be completed in-water.

Depending on the substrate and bathymetry of the approach to the landfall sites, intertidal or nearshore trenching may be necessary. Trenching in smaller-grained substrates will use hand water jetting tools. The tools are similar to a fire hose that will spray on top of the cable to liquify the sediment below and allow the cable to sink through the slurry. The hand jetting tools will have a footprint approximately 0.3 m (1 ft) wide and 0.3 m (1 ft) deep. In areas with very long stretches of mudflats (Port Heiden), an excavator deployed onto construction mats, such as sheets of plywood or other portable mats capable of supporting construction equipment on soft surfaces, from a landing craft could be used. The excavator bucket will be approximately 0.3 m (1 ft) wide. Trenching in large-grained substrates, such as cobble and boulders, will also use an excavator. At Unalaska, a larger excavator with a bucket up to 1 m (3.2 ft) wide will be required to move and replace existing boulders along the shoreline.

Some trenching will also occur above MHW in the area adjacent to designated EFH using an excavator or backhoe. Best management practices from the project's USACE Nationwide Permit will be implemented, including use of erosion and sediment control measures and revegetation of areas where vegetation is removed.

2.1.2 Nearshore Work

From the subtidal area, the cable will be laid using a barge and tug in nearshore or shallow water areas (less than 15 m [49.2 ft]) and a cable-laying ship in deep-water areas (greater than 15 m [49.2 ft]). For nearshore operations, trenches will be created just prior to the arrival of the shallow water submarine cable lay vessel and a shore-based winch or turning block will be used to pull the cable to the beach. Divers will remove the floats allowing cable to sink. The trench with the cable installed will then be back-filled with trench spoils. The shore end of the cable will be floated on the surface and then pulled to the BMH, where it will be anchor-clamped and spliced to the terrestrial cable. The floated cable portion will be lowered to the seabed from the beach seaward by divers

In nearshore or shallow areas where the cable needs to be buried to protect it from light ice scour, human activities, or surf, water jetting tools deployed either by divers (hand tools) or a tracked remotely operated vehicle (ROV) will be used for burial. The ROV will be similar to the ROVJET 207 series, which has jet tools capable of trenching to 1.5 m (4.9 ft) depth and 1 m (3.2 ft) wide. This type of ROV has skids on either side of the vehicle to allow accurate navigation, or the unit has tracks, approximately 0.5 m (1.5 ft) on each side of the vessel. The total footprint of the ROV including the skids or tracks is approximately 3 m (9.8 ft).

Trenching will occur in shallow water (less than 15 m [49.2 ft]) and plowing will occur in deep water (greater than 15 m [49.2 ft]). Figure 14 shows locations of trenching and plowing. Approximate areas that will be trenched or plowed are depicted in Figure 14 and summarized in Table 1. Trenching will have a maximum width of 3 feet and depth of 18 inches). Plowing will have a maximum width of 12 inches and depth of 5 feet. In addition to the areas that will be trenched or plowed, 245 miles of fiber optic cable will be laid directly on the substrate without ground disturbance (23% of the route).

Table 1. Acres and Miles of Trenching and Plowing

Project Element	Intertidal Area[1]	Subtidal - Up to 3 Miles from Shore	Subtidal - 3 Miles or More from Shore	Total
Acres of Trenching	0.12	0.02	0	--
Acres of Plowing	0	23.7	76.6	--
Total Acres Disturbed	**0.12**	**23.72**	**76.6**	**100.3**
Miles of Trenching	0.3	1.9	0	--
Miles of Plowing	0	195.5	631.6	--
Total Miles of Disturbance	**0.3**	**197.4**	**631.6**	**829.3**

Note: BMH (beach man hole). BU (branching unit).
[1] Area between mean low water and the high tide line.

Figure 14. Approximate Locations of Trenching and Plowing for Cable Burial

2.1.3 Deep-Water Work

In waters deeper than 15 m (50 ft), cable laying will be conducted from a cable ship. In areas where human activities warrant protection of the cable (such as areas with commercial bottom contact fishing, or signs of anchoring), the cable will be buried. Less than half the cable route will be buried, including all areas where burial is feasible west of 162 degrees latitude. The cable will be buried using a cable plow or an ROV with water jetting tools (ROV described above for shallow-water work). The plow is 4.6 m (15 ft) wide and will bury the cable up to 1.5 m (5 ft) in depth. Because t is unknown where an ROV will be used as opposed to the plow, and the plow footprint is larger, it is assumed for this EFH Assessment that the cable burial footprint will be 4.6 m (15 ft) maximum in all areas where burial is required in deep-water. It is likely that at least in some areas, the footprint will be less than 4.6 m (15 ft).

While it is expected that the cable trench will fill back in by natural current processes, it will be important to ensure that the cable is fully buried and that there are no locations where the plow skipped (did not make contact with the bottom, was brought to the surface for maintenance or poor weather, etc.). Additionally, some specific areas cannot be buried by plow, such as branching units (the junctions where the landfall cable joins the main cable, see Figure 1), and must be buried by ROVJET 207 series or similar. To ensure proper burial, a post-lay inspection will be conducted using the ROVJET 207 series mentioned above or similar ROV in all plow skip. It is expected that this inspection will be necessary for no more than about 8 km (5 mi) of the cumulative planned burial routes. In these areas, the ROV skids or tracks will still disturb the bottom, but with a smaller footprint than the cable plow. The inspection may require multiple passes over the same area to achieve burial and conduct a final inspection.

A survey of the cable route was conducted in 2018 (TerraSond 2018) to map general seabed conditions and identify potential obstacles where the cable would need to be rerouted or debris (crab pots, fishing gear, military cables, etc.) that may need to be removed. In areas where debris was identified and where cable burial is planned, a pre-lay grapnel run (PLGR) will be conducted before the cable is laid. The PLGR will clear seabed debris that may have deposited along the route. The towed grapnels will consist of a line of hooks on either side of a chain that gradually increase in size from 0.2 m (0.8 to 1 ft) across near the towed end to 0.6 to 0.9 m (2 to 3 ft) across at the free end of the line. Debris recovered during the PLGR will be deposited ashore on 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. Other obstacles identified along the initially proposed cable route during the 2018 survey, such as rock outcrops, unexploded ordinances, or areas with notable relief will be avoided and the cable will be rerouted.

2.1.4 Landfall Details

2.1.4.1 Kodiak (Figure 2)

- Intertidal trenching (linear distance between mean high and mean low water) will be approximately 61.7 m (202.4 ft).
- The landfall of the cable will use an open trench in the river bank to expose the previous buried conduit stub and provide a path for the submarine cable.

2.1.4.2 Larsen Bay (Figure 3)

- Intertidal trenching (linear distance between mean high and mean low water) will be approximately 123.4 m (404.8 ft).
- The trench and construction area will be maintained for the duration of cable landing operations that are anticipated to last a few days.
- The cable and protectors will also be buried into the offshore (deep-water) sediments using hand water jetting tools.

2.1.4.3 Chignik (Figure 4)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 62.7 m (205.7 ft).
- Landing will be completed by a shallow-water marine installation vessel, because a large shoal prevents use of the cable laying ship.
- The landfall of the cable will use an open trench to expose the previous buried conduit stub and to provide a safe path for the submarine cable from conduit end to low water shoreline.

2.1.4.4 Chignik Lagoon (Figure 5)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 116.2 m (381.1 ft).

2.1.4.5 Chignik Lake (Figure 6)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 4.5 m (14.8 ft).
- The landfall of the cable will use open trench to expose the previous buried conduit stub and to provide a safe path for the submarine cable from conduit end to low water shoreline.
- The fiber optic cable will be laid in approximately 4.8 km (3 mi) of the Chignik River, AWC stream number 271-10-10310.

2.1.4.6 Perryville (Figure 7)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 70 m (229.8 ft).
- The landfall of the cable will use open trench to expose the previous buried conduit stub and to provide a safe path for the submarine cable from conduit end to low water shoreline.

2.1.4.7 Sand Point (Figure 8)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 65.4 m (214.6 ft).
- The landfall of the cable will use open trench to expose the previous buried conduit stub and to provide a safe path for the submarine cable from conduit end to low water shoreline.

2.1.4.8 King Cove (Figure 9)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 21 m (68.8 ft).
- The landfall of the cable will use open trench to expose the previous buried conduit stub and to provide a safe path for the submarine cable from conduit end to low water shoreline.

2.1.4.9 Cold Bay (Figure 10)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 25 m (82.3 ft).
- The landfall of the cable will use open trench to expose the previous buried conduit stub and to provide a safe path for the submarine cable from conduit end to low water shoreline.

2.1.4.10 False Pass (Figure 11)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 8.8 m (28.9 ft).
- The landfall of the cable will use open trench to expose the previous buried conduit stub and to provide a safe path for the submarine cable from conduit end to low water shoreline.

2.1.4.11 Akutan (Figure 12)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 15 m (49.2 ft).
- The landfall of the cable will use open trench to expose the previous buried conduit stub and to provide a safe path for the submarine cable from conduit end to low water shoreline.

2.1.4.12 Unalaska (Figure 13)

- Intertidal trenching (linear distance between mean high and mean low water) is approximately 15.2 m (50 ft).
- The water off the Unalaska landing is deep enough to allow a direct shore end landing from the main submarine lay burial vessel.

2.2 Project Timeline

The anticipated construction schedule is as follows (contingent upon receipt of permits and environmental authorizations):

- May 2021 – Complete subsea geophysical and geotechnical survey
- Summer 2021/2022 – Install terrestrial fiber optic cable between existing shelters and end users in Unalaska

- Summer 2021 – Install terrestrial fiber optic cable between BMHs to existing shelter in all communities
- Summer 2022 – Install terrestrial fiber optic cable between existing facilities and end users in Akutan; install subsea fiber cable from Mill Bay (Kodiak) to Unalaska including making the needed stops in the other 5 communities, and powering up the undersea fiber optic system.
- Summer 2023 – Install terrestrial fiber optic cable between existing facilities and end users King Cove and Sand Point
- Summer 2024 – Install terrestrial fiber optic cable between existing facilities and end users in Chignik Bay and Larsen Bay.

3.0 ESSENTIAL FISH HABITAT IN THE PROJECT AREA

3.1 Species and EFH Descriptions

Table 2 summarizes species that have designated EFH within one mile from the proposed cable route. There are no Habitat Areas of Particular Concern or Habitat Conservation Areas within 1 mile of the proposed cable route. Subsequent sections provide more information on and maps of each species designated EFH.

Table 2. Species with Designated EFH Within One Mile from the Proposed Cable Route

Species	Common Name	Designated EFH
Pleuronectes quadrituberculatus	Alaska Plaice	EFH widely distributed
Atheresthes stomias	Arrowtooth Flounder	EFH in eastern project area – False Pass to Unalaska
Pleurogrammus monopterygius	Atka Mackerel	EFH near Unalaska and Akutan
Sebastes melanostictus and Sebastes aleutianus	Blackspotted Rockfish and Rougheye Rockfish	EFH widely distributed
Microstomus pacificus	Dover Sole	EFH in eastern project area – False Pass to Unalaska
Sebastes ciliatus	Dusky Rockfish	EFH near Akutan and Unalaska
Hippoglossoides elassodon	Flathead Sole	EFH widely distributed
Lithodes aequispinus	Golden King Crab	EFH near Unalaska
Reinhardtius hippoglossoides	Greenland Turbot	EFH in eastern project area – False Pass to Unalaska
Atheresthes evermanni	Kamchatka Flounder	EFH widely distributed
Lepidopsetta polyxystra	Northern Rock Sole	EFH widely distributed
Sebastes polyspinis	Northern Rockfish	EFH near Unalaska and Akutan
Octopus sp	Octopus	EFH widely distributed
Gadus macrocephalus	Pacific Cod	EFH widely distributed
Hippoglossus stenolepis	Pacific Halibut	EFH widely distributed
Sebastes alutus	Pacific Ocean Perch	EFH near Akutan and Unalaska
Glyptocephalus zachirus	Rex Sole	EFH in eastern project area – Port Heiden to Unalaska
Lepidopsetta bilineata	Rock Sole	EFH widely distributed
Sebastes sp	Rockfish (various)	EFH widely distributed
Anoplopoma fimbria	Sablefish	EFH False Pass to Unalaska
Oncorhynchus tshawytscha	Chinook	EFH widely distributed
Oncorhynchus keta	Chum	EFH widely distributed
Oncorhynchus kisutch	Coho	EFH widely distributed
Oncorhynchus gorbuscha	Pink	EFH widely distributed
Oncorhynchus nerka	Sockeye	EFH widely distributed
Various species	Sculpin	EFH widely distributed
Sebastes borealis	Shortraker Rockfish	EFH near Akutan and Unalaska

Species	Common Name	Designated EFH
Sebastolobus alascanus	Shortspine Thornyhead Rockfish	EFH widely distributed
Raja binoculata	Skate	EFH widely distributed
Chionoecetes opilio	Snow Crab	EFH between False Pass and Akutan
Doryteuthis sp	Squid	EFH from False Pass to Unalaska
Sebastolobus alascanus	Shortspine Thornyhead Rockfish	EFH near Akutan and Unalaska
Gadus chalcogrammus	Walleye Pollock	EFH widely distributed
Patinopecten caurinus	Weathervane Scallop	EFH from False Pass to Unalaska
Sebastes ruberrimus	Yelloweye Rockfish	EFH near Akutan and Unalaska
Limanda aspera	Yellowfin Sole	EFH widely distributed

3.1.1 Alaska Plaice

Alaska plaice (*Pleuronectes quadrituberculatus*) is a species of flatfish found primarily on the eastern Bering Sea continental shelf, with a summer distribution at depths less than 110 m. They are known to occur in aggregations large enough to form target species. Recruitment of Alaska plaice has been stable since the late 1970s. Alaska plaice are often associated with schools of Yellowfin sole. Alaska plaice can live for up to 30 years and grow to 60 centimeters long (NPFMC 2017).

3.1.1.1 EFH Description

EFH is described for Alaska plaice eggs, late juveniles, and adults only. Insufficient data are available to describe EFH for other life stages. EFH for eggs is located in pelagic waters along the entire Bering Sea shelf (0 to 200 m) and upper slope (200 to 500 m), throughout the Bering Sea and Aleutian Islands Management Area (BSAI) in the spring (Figure 15). For late juvenile and adult Alaska plaice, EFH is located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI, where there are softer substrates consisting of sand and mud (NPFMC 2017).

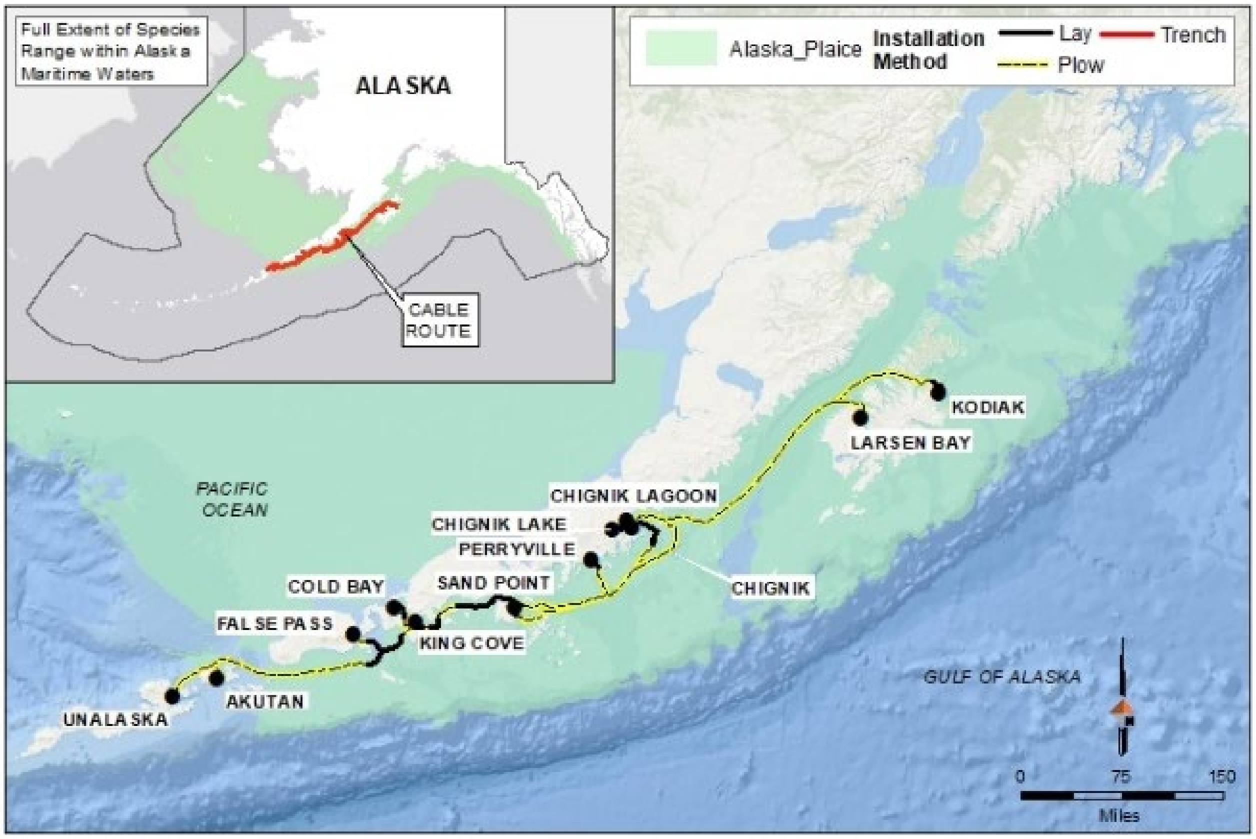

Figure 15. Designated Essential Fish Habitat for Alaska Plaice

3.1.2 Arrowtooth Flounder

Arrowtooth flounder (*Atheresthes stomias*) is a flatfish species that is most abundant in the eastern Bering Sea, but also ranges into the Aleutian Islands region. They are known to occur in aggregations large enough to form target species. Arrowtooth flounder are primarily caught with bottom trawl gear and have a low perceived commercial value, resulting in high discard rates (NPFMC 2017).

3.1.2.1 EFH Description

EFH is described for Arrowtooth flounder late juveniles and adults only (Figure 16). Insufficient data are available to describe EFH for other life stages. For late juvenile and adult Alaska plaice, EFH is located in the lower portion of the water column along the inner (0 to 50 m), middle (50 to 100 m), and outer (100 to 200 m) shelf throughout the BSAI, where there are softer substrates consisting of gravel, sand, and mud (NPFMC 2017).

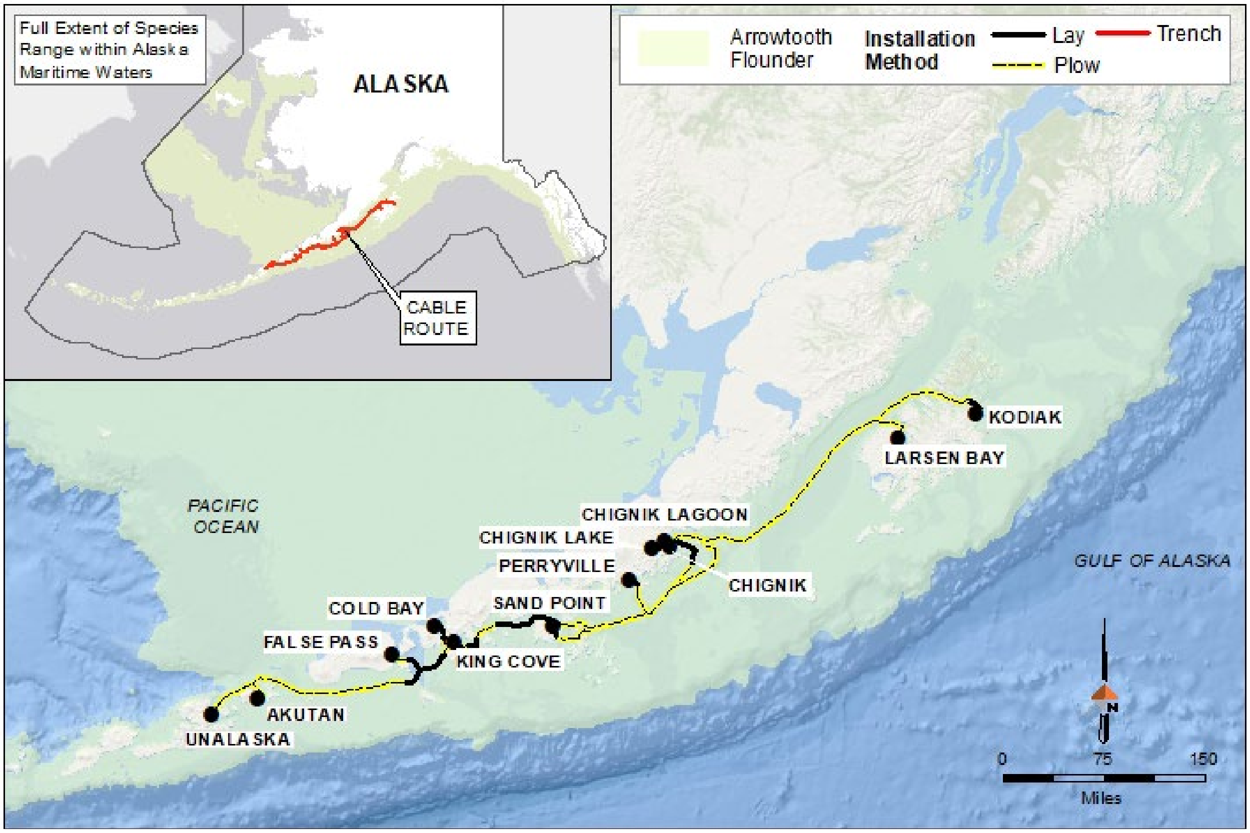

Figure 16. Designated Essential Fish Habitat for Arrowtooth Flounder

3.1.3 Atka Makerel

Atka makerel (*Pleurogrammus monopterygius*) occurs in abundance in the Aleutian Islands region, with a geographical range extending to the waters off Kamchatka, the eastern Bering Sea, and the Gulf of Alaska. Research suggests that Atka mackerel populations are localized and do not travel long distances. They are not targeted in the eastern Bering Sea. Atka makerel is a key prey species of Steller sea lions; therefore, directed fishing is prohibited in the event that spawning biomass is projected to be low (NPFMC 2017).

3.1.3.1 EFH Description

EFH is described for Atka makerel larvae and adults only (Figure 17). Insufficient data are available to describe EFH for other life stages. The general distribution for larval Atka mackerel is located in epipelagic waters along the shelf (0 to 200 m), upper slope (200 to 500 m), and intermediate slope (500 to 1,000 m) throughout the BSAI. EFH for adult Atka mackerel is the entire water column, from sea surface to sea floor, along the inner, middle, and out shelf, throughout the BSAI, where there are substrates of gravel and rock, and in vegetated areas of kelp (NPFMC 2017).

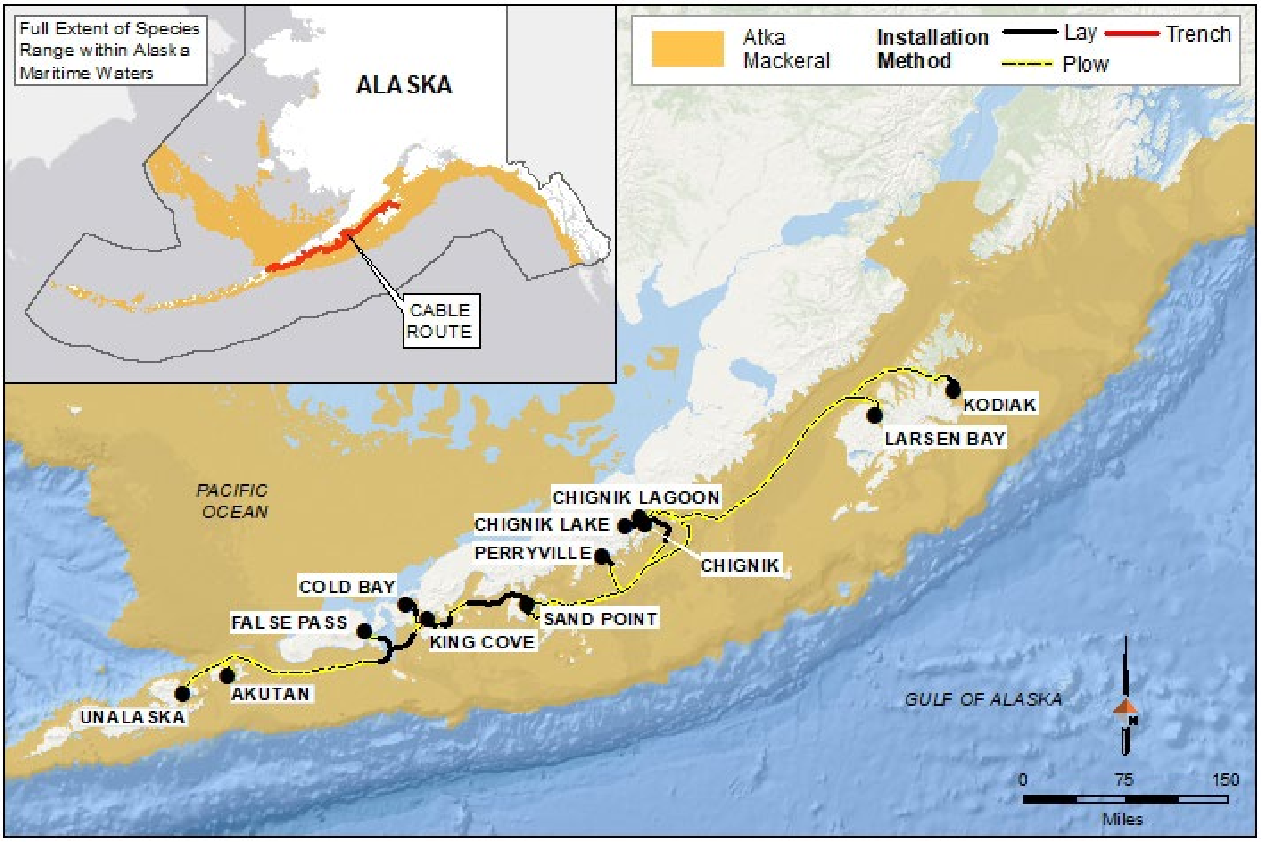

Figure 17. Designated Essential Fish Habitat for Atka Mackerel

3.1.4 Blackspotted and Rougheye Rockfish

Blackspotted (*Sebastes melanostictus*) and Rougheye rockfish (*S. aleutianus*) are found from Japan to California with the center of abundance appearing to be in Alaskan waters. They are generally inhabiting the outer continental shelf and upper continental slope of the northeastern Pacific (NPFMC 2017).

3.1.4.1 EFH Description

EFH is described for all life stages for the Rougheye and Blackspotted Rockfishes. late juveniles and adults only (Figure 18). The rockfish eggs are in the lower portion of the water column along the outer shelf and upper slope. The general distribution for the larvae and early juvenile are located in pelagic waters along the middle and outer shelf and slope in the Gulf of Alaska. Late juveniles are generally found in the lower portion of the water column along the inner, middle outer shelf and upper slope. Adult blackspotted and rougheye rockfish are found in the lower water column along the outer shelf and upper slope regions. (NPFMC 2017).

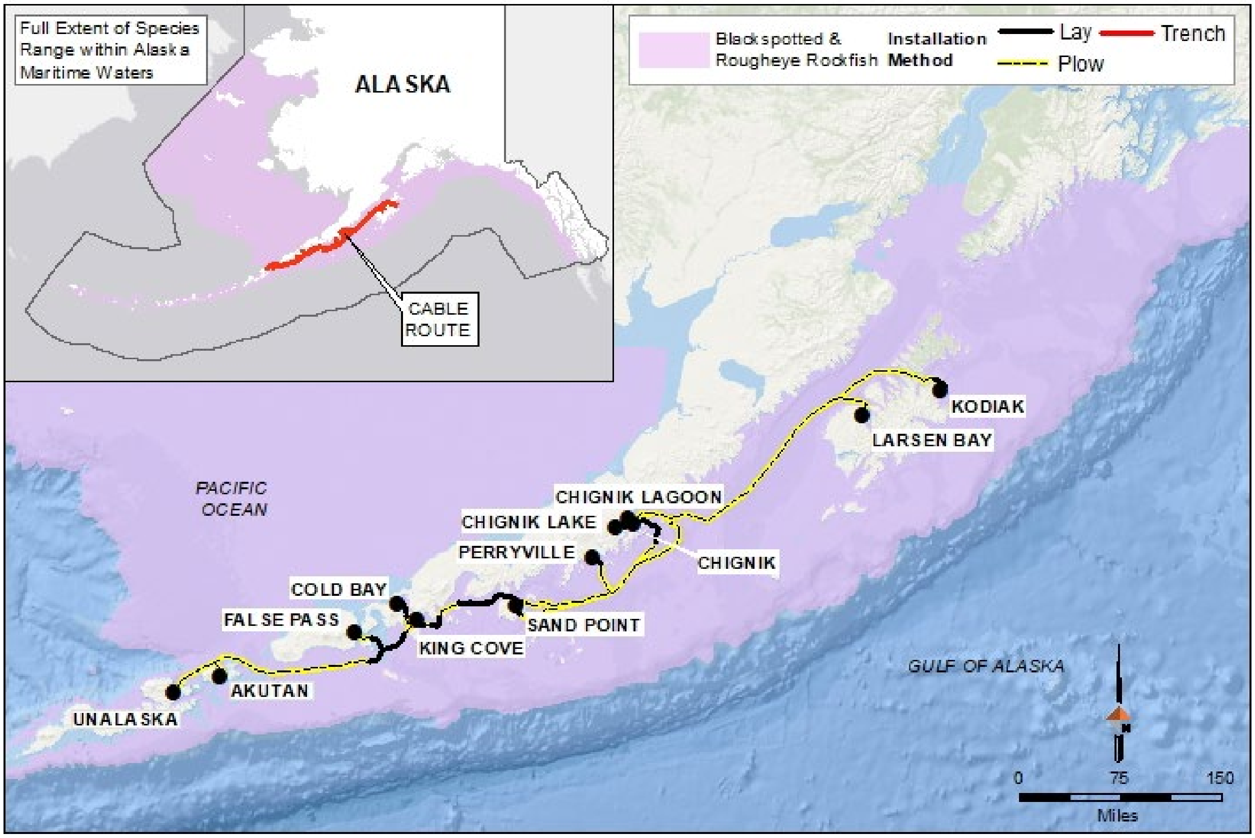

Figure 18. Designated Essential Fish Habitat for Blackspotted and Rougheye Rockfish

3.1.5 Dover Sole

Dover sole (*Microstomus pacificus*) is a flounder species that ranges from Baja California to the Bering Sea. It is generally found at depths of 10 to 1,200 m. They have a complex life history that includes an extended pelagic larval phase of one year or more (NPFMC 2017).

3.1.5.1 EFH Description

EFH is described for Dover sole late juveniles and adults only (Figure 20). Insufficient data are available to describe EFH for other life stages. The general distribution for late juvenile and adult Dover sole is located in the lower portion of the water column along the middle and outer shelf, and upper slope throughout the BSAI, where there are substrates of sand and mud (NPFMC 2017).

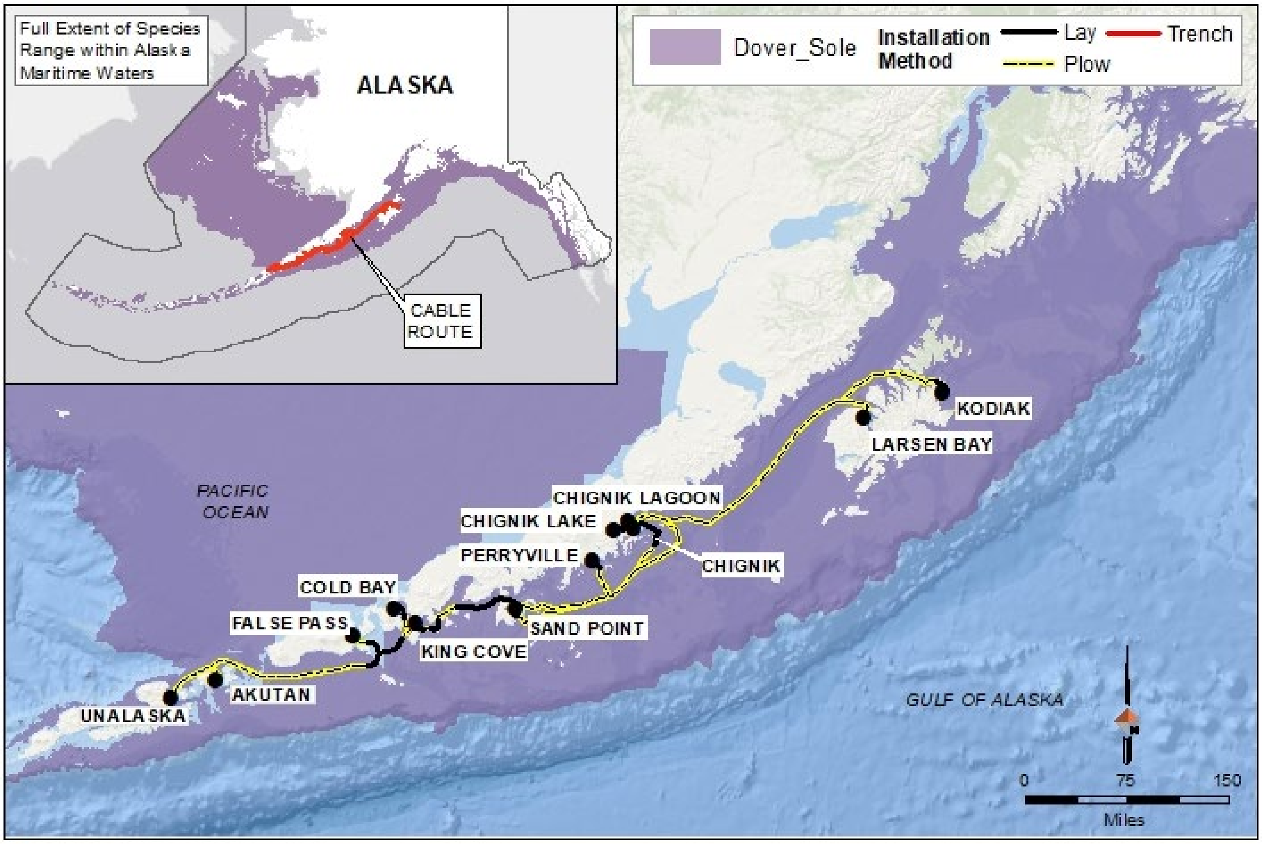

Figure 19. Designated Essential Fish Habitat for Dover Sole

3.1.6 Dusky Rockfish

Dusky rockfish (*Sebastes ciliatus*) are distributed through the North Pacific, in the western Aleutian Islands and eastern Bering Sea, through the Gulf of Alaska, to southeast Alaska, including south to Johnstone Strait, British Columbia. Dusky rockfish occur in loosely organized groups just above rocky reefs and along shorelines, or they may rest singly upon rocky substrate (NPFMC 2017).

3.1.6.1 EFH Description

EFH is described for Dusky rockfish larvae and adults only (Figure 21). Insufficient data are available to describe EFH for other life stages. Larval Dusky rockfish generally use pelagic waters along the entire shelf and slope, throughout the BSAI. EFH for Dusky rockfish is located in the middle and lower portions of the water column along the out shelf and upper slope throughout the BSAI, where there are substrates of cobble, rock, and gravel (NPFMC 2017)

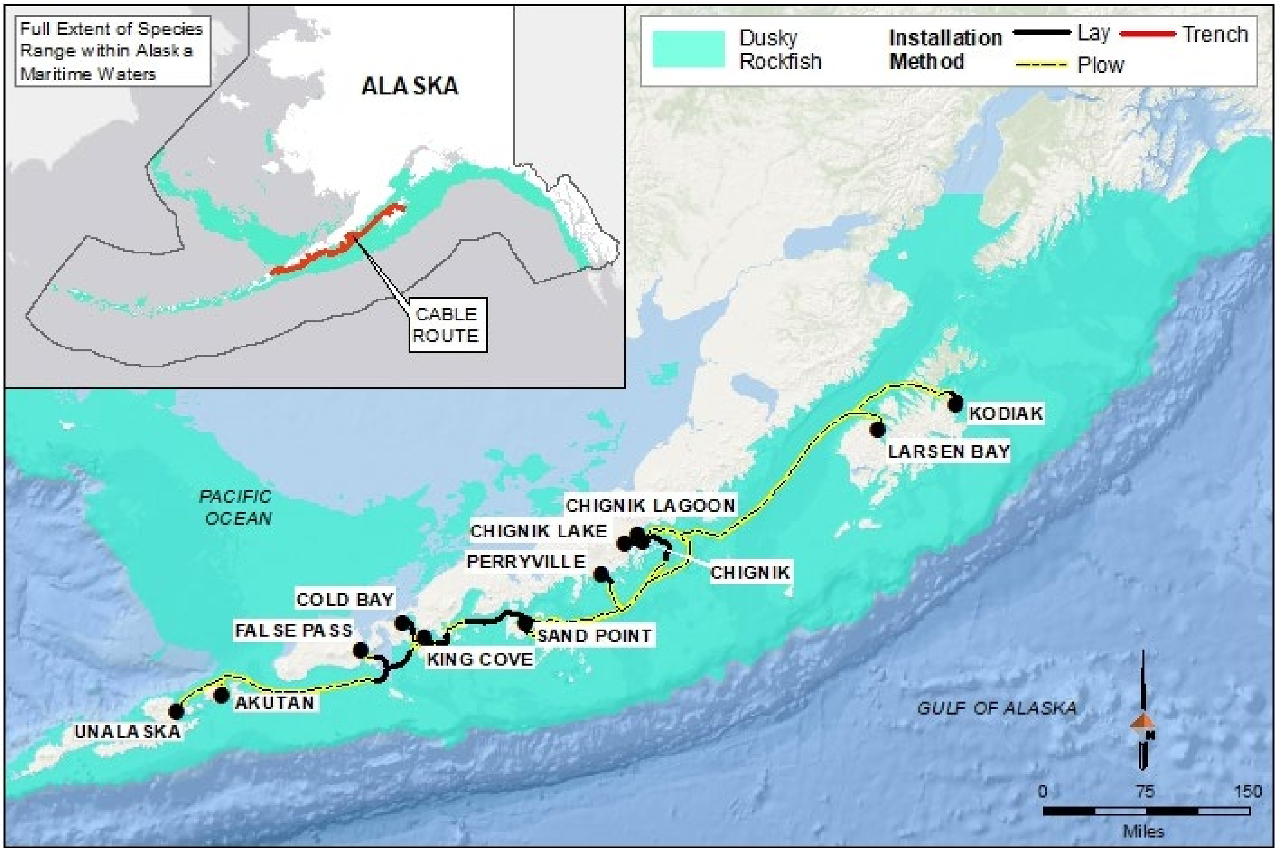

Figure 20. Designated Essential Fish Habitat for Dusky Rockfish

3.1.7 Flathead Sole

Flathead sole (*Hippoglossoides elassodon*) are distributed in the North Pacific, in the Sea of Japan, Sea of Okhotsk, and the Bering Sea along the western coast of America to Pt. Reyes, central California. They occur on soft bottoms, with the adults usually below 180 m (NPFMC 2017).

3.1.7.1 EFH Description

EFH is described for Flathead sole eggs, larvae, late juveniles, and adults only (Figure 22). Insufficient data are available to describe EFH for other life stages. EFH for Flathead sole eggs and larvae is located in pelagic waters along the entire shelf and slope throughout the BSAI, in the spring (eggs only). EFH for late juveniles and adults is the lower portion of the water column along the inner, middle, and outer shelf throughout the BSAI, where there are softer substrates consisting of sand and mud (NPFMC 2017).

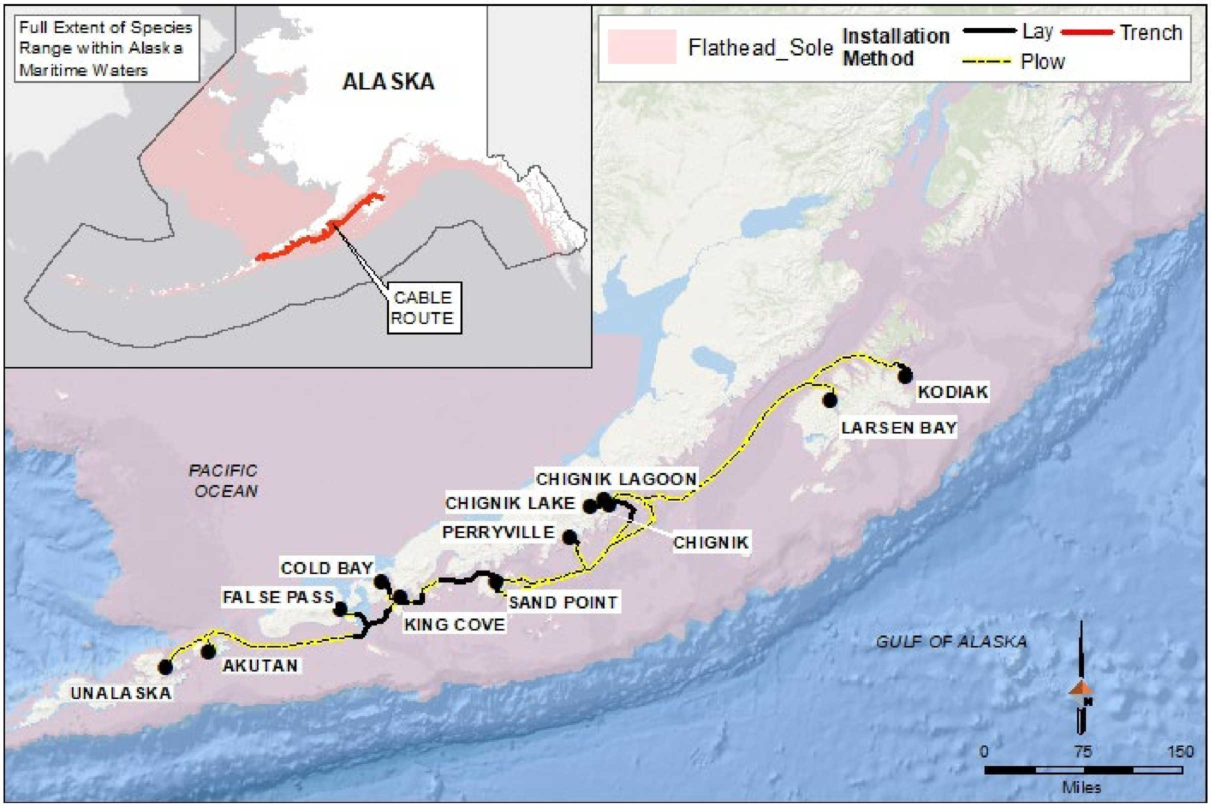

Figure 21. Designated Essential Fish Habitat for Flathead Sole

3.1.8 Golden King Crab

Golden King Crab (*Lithodes aequispina*), also known as brown king crab, ranges from Japan to British Columbia. It is generally found at depths of 100 to 1,000 m, generally in high relief habitat and are usually slope dwelling (NPFMC 2011).

3.1.8.1 EFH Description

EFH is described for Golden King Crab eggs, late juveniles, and adults only (Figure 23). Insufficient data are available to describe EFH for other life stages. The EFH for eggs is inferred from the adult crab habitat. The late juvenile and adult Golden King Crab are located in the bottom habitats along the upper slope, intermediate slope, lower slope, and basins of the BSAI where there are high-relief living habitats such as coral and vertical substrates (NPFMC 2011).

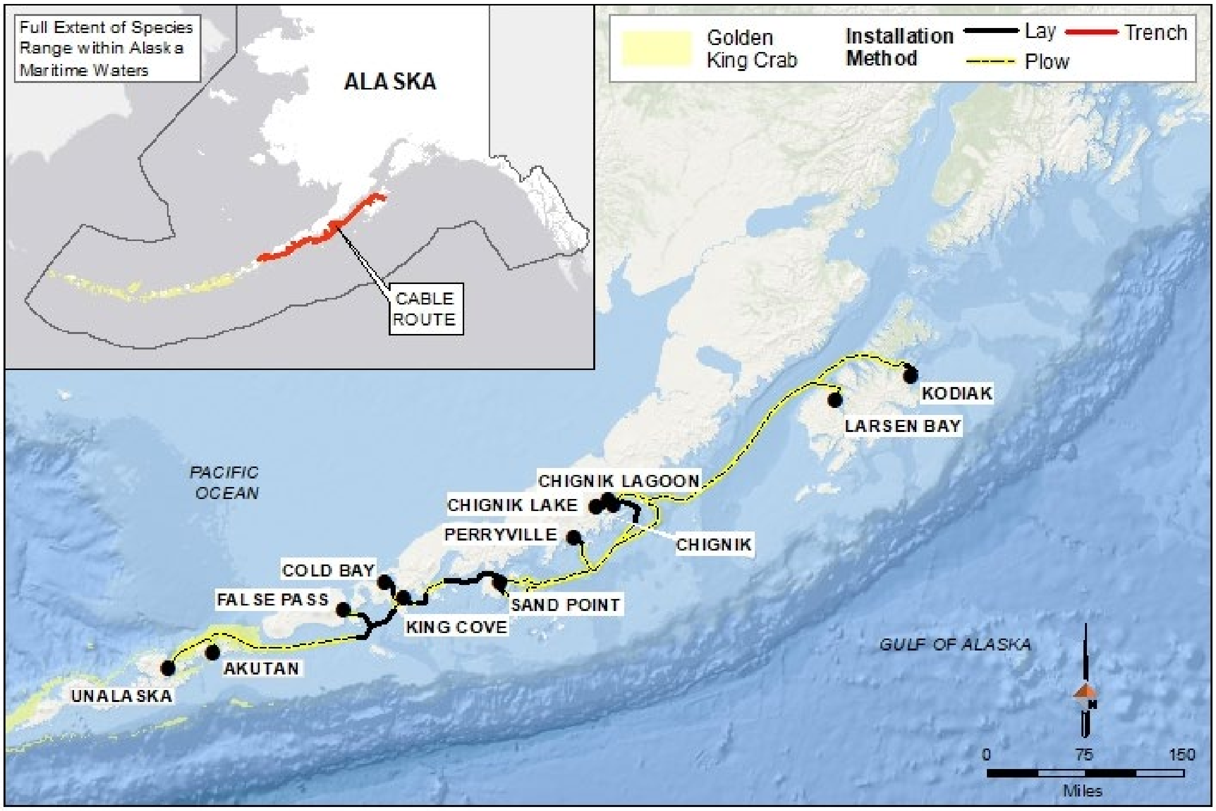

Figure 22. Designated Essential Fish Habitat for Golden King Crab

3.1.9 Greenland Turbot

Greenland turbot (*Reinhardtius hippoglossoides*) has a circumglobal distribution. They use arctic and temperate waters in the northern hemisphere, and are distributed throughout the BSAI management area. Currently, Greenland turbot biomass is declining due to poor year classes from 1981 to 1997 (NPFMC 2017).

3.1.9.1 EFH Description

EFH is described for Greenland turbot eggs, larvae, late juveniles, and adults only (Figure 14). Insufficient data are available to describe EFH for other life stages. EFH for Greenland turbot eggs and larvae is located in benthypelagic waters along the outer shelf and slope throughout the BSAI, in the fall (eggs) and spring (larvae). EFH for late juveniles and adults is the lower and middle portion of the water column along the inner, middle, and outer shelf, and upper slope throughout the BSAI, where there are softer substrates consisting of mud and sandy mud (NPFMC 2017).

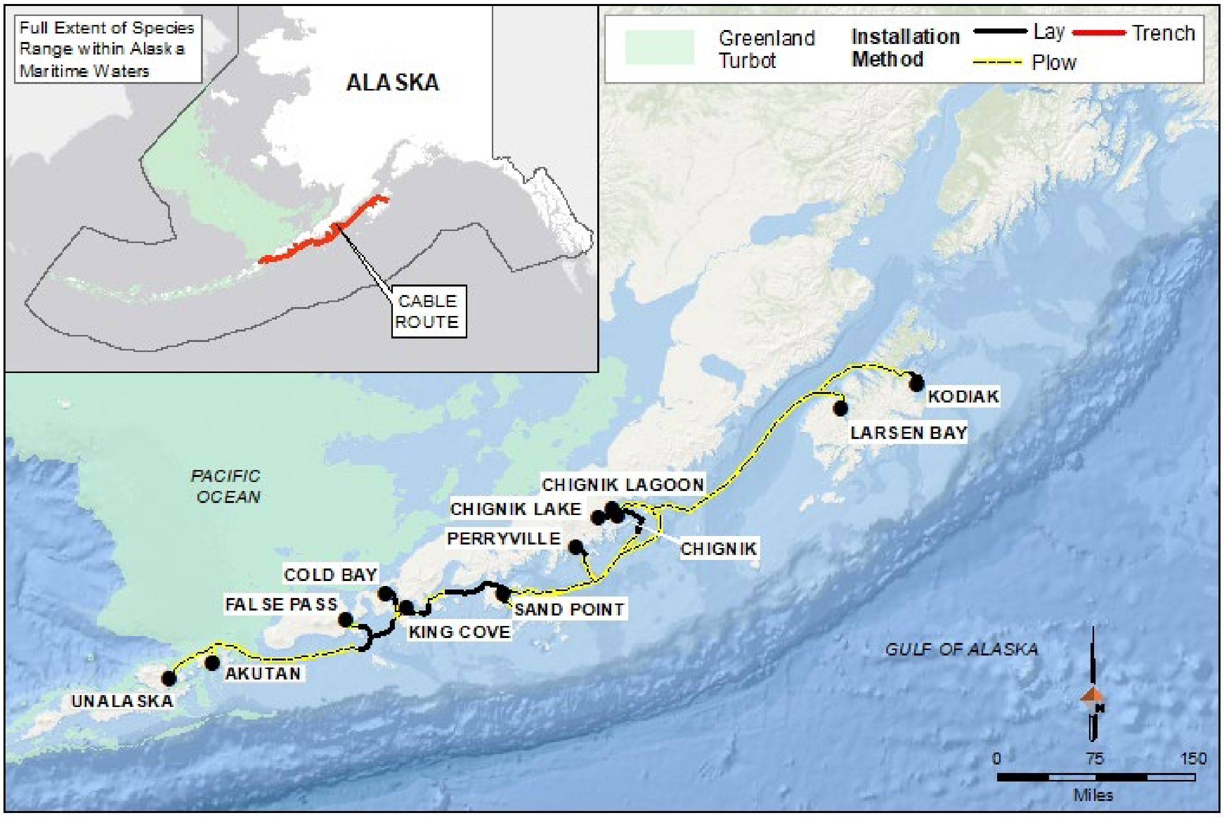

Figure 23. Designated Essential Fish Habitat for Greenland Turbot

3.1.10 Kamchatka Flounder

Kamchatka flounder (*Atheresthes evermanni*) is a flounder species that ranges from Shelikof Strait and the Aleutian Islands, across the Bering Sea, to the Gulf of Anadyr, Kamchatka Peninsula and the seas of Okhotsk and Japan. It is generally found at depths of 20 to 1,200 m.

3.1.10.1 EFH Description

EFH is described for Kamchatka flounder for all life stages (Figure 11). The general distribution for eggs and larvae is demersal habitat in the middle (50 to 100 m) and outer (100 to 200 m) shelf and upper slope (200 to 500 m). For late juvenile and adult Kamchatka flounder is located in the lower portion of the water column along the middle (50 to 100 m), and outer (100 to 200 m) shelf and upper slope (200 to 500 m) throughout the Bering Sea and Aleutian Islands wherever there are softer substrates consisting of gravel, sand, and mud (NPFMC 2017).

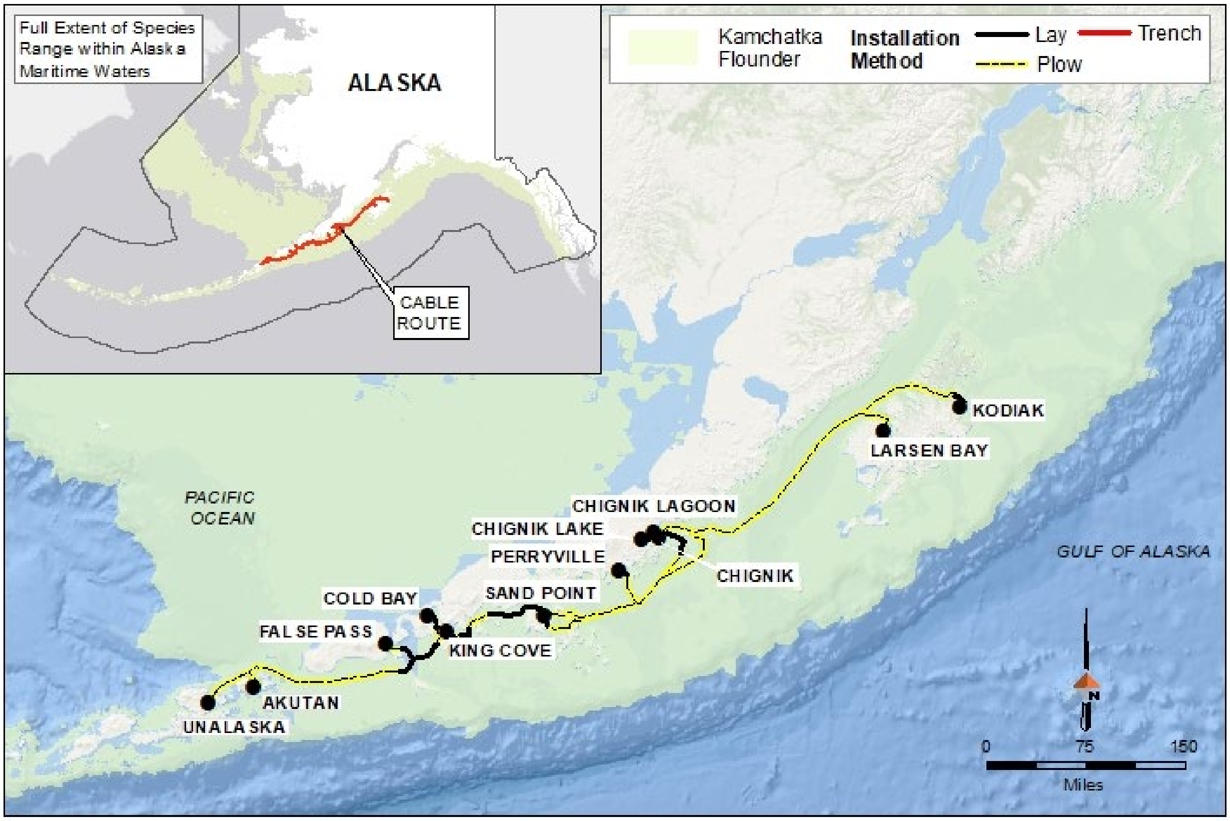

Figure 24. Designated Essential Fish Habitat for Kamchatka Flounder

3.1.11 Northern Rock Sole

Northern Rock Sole (*Lepidopsetta polyxystra*) is a flatfish species that is distributed from Puget Sound through the BSAI to the Kuril Islands. The centers of abundance occur off the Kamchatka Peninsula, British Columbia, central Gulf of Alaska, and in the eastern Bering Sea (NPFMC 2017).

3.1.11.1 EFH Description

EFH is described for all life stages of Northern Rock Sole (Figure 26). Eggs of the Northern Rock Sole are in demersal waters along the entire shelf throughout the Gulf of Alaska. The general distribution for larvae are in pelagic waters along the entire shelf and upper slope through the GOA. Early juveniles are located in the lower portion of the water column along the inner shelf. Late juvenile and adult Northern Rock Sole are located in the lower portion of the water column along the middle and outer shelf, and upper slope throughout the GOA, where there are softer substrates of sand, gravel, and cobble (NPFMC 2017).

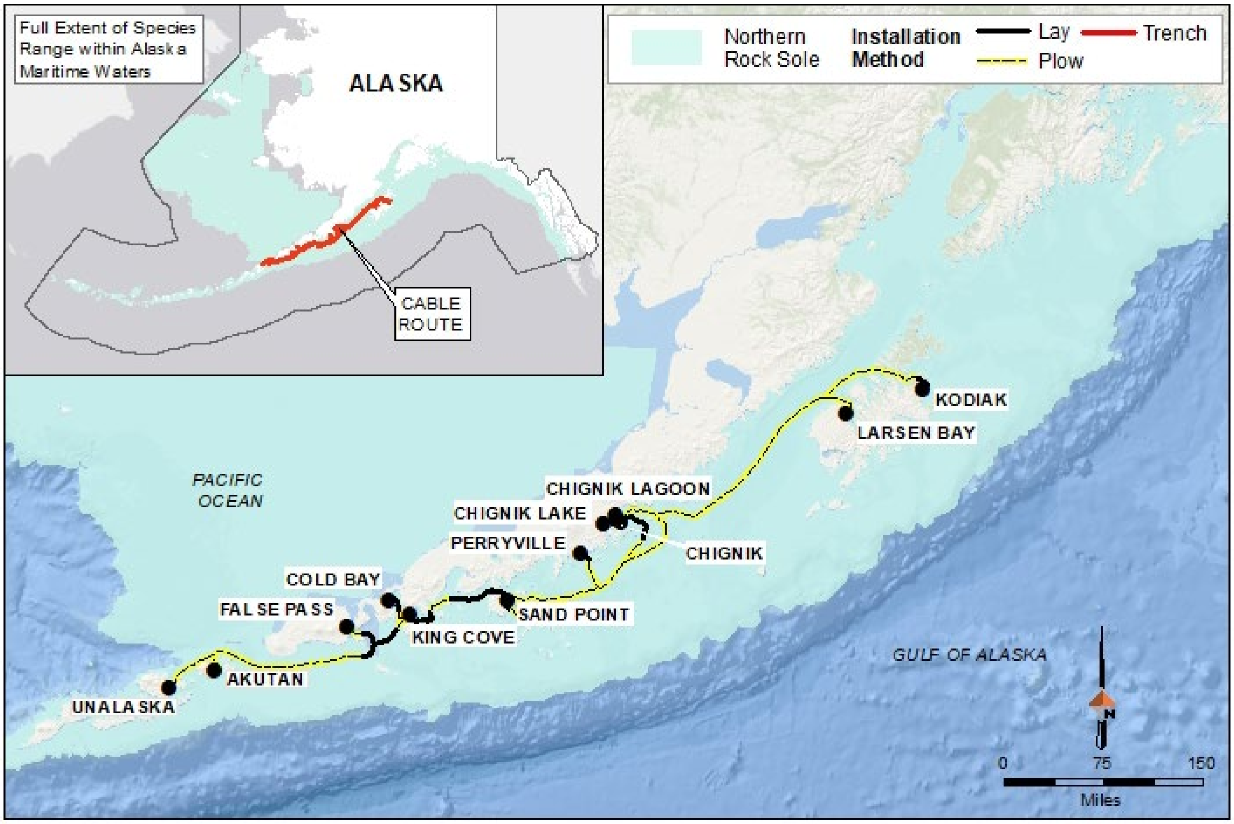

Figure 25. Designated Essential Fish Habitat for Northern Rock Sole

3.1.12 Northern Rockfish

Northern rockfish (*Sebastes polyspinis*) have a patchy distribution in the BSAI, and are also found in the Queen Charlotte Islands, British Columbia (NPFMC 2017).

3.1.12.1 EFH Description

EFH is described for Northern rockfish larvae, late juveniles, and adults only (Figure 27). Insufficient data are available to describe EFH for other life stages. EFH for Northern rockfish larvae is located in pelagic waters along the entire shelf and slope throughout the BSAI. EFH for late juveniles and adults is located in the middle and lower portions of the water column along the outer slope throughout the BSAI, where there are softer substrates of cobble and rock (NPFMC 2017).

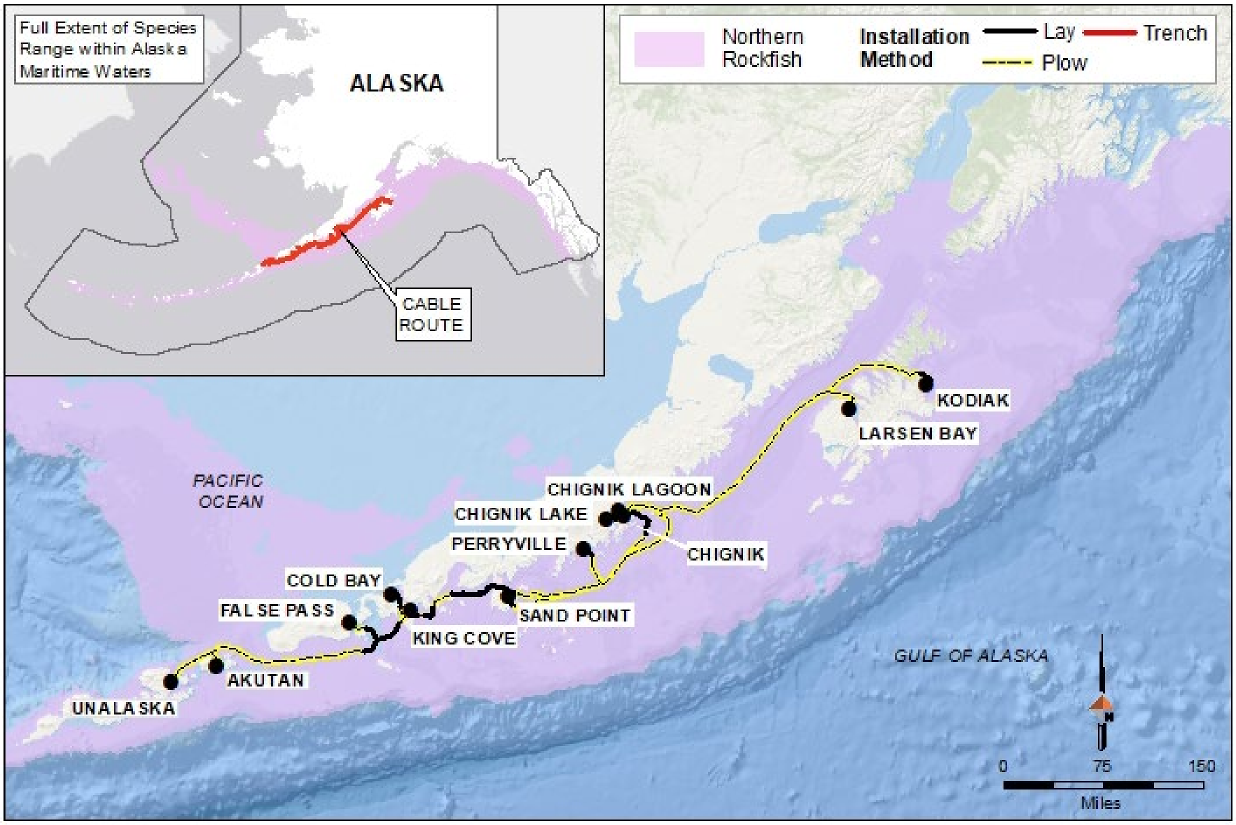

Figure 26. Designated Essential Fish Habitat for Northern Rockfish

3.1.13 Octopus

There are at least seven species of octopuses currently identified in the Gulf of Alaska. The most abundant species at depths less than 200 m is the giant Pacific octopus (*Enteroctopus dofleini*). Several species are primarily found in deeper waters along the shelf break and slope (NPFMC 2017).

3.1.13.1 EFH Description

EFH is described for Octopus adults only (Figure 28). Insufficient data are available to describe EFH for other life stages. The general distribution for adult octopus is located in demersal habitat throughout the intertidal, subtidal, shelf, and slope (NPFMC 2017).

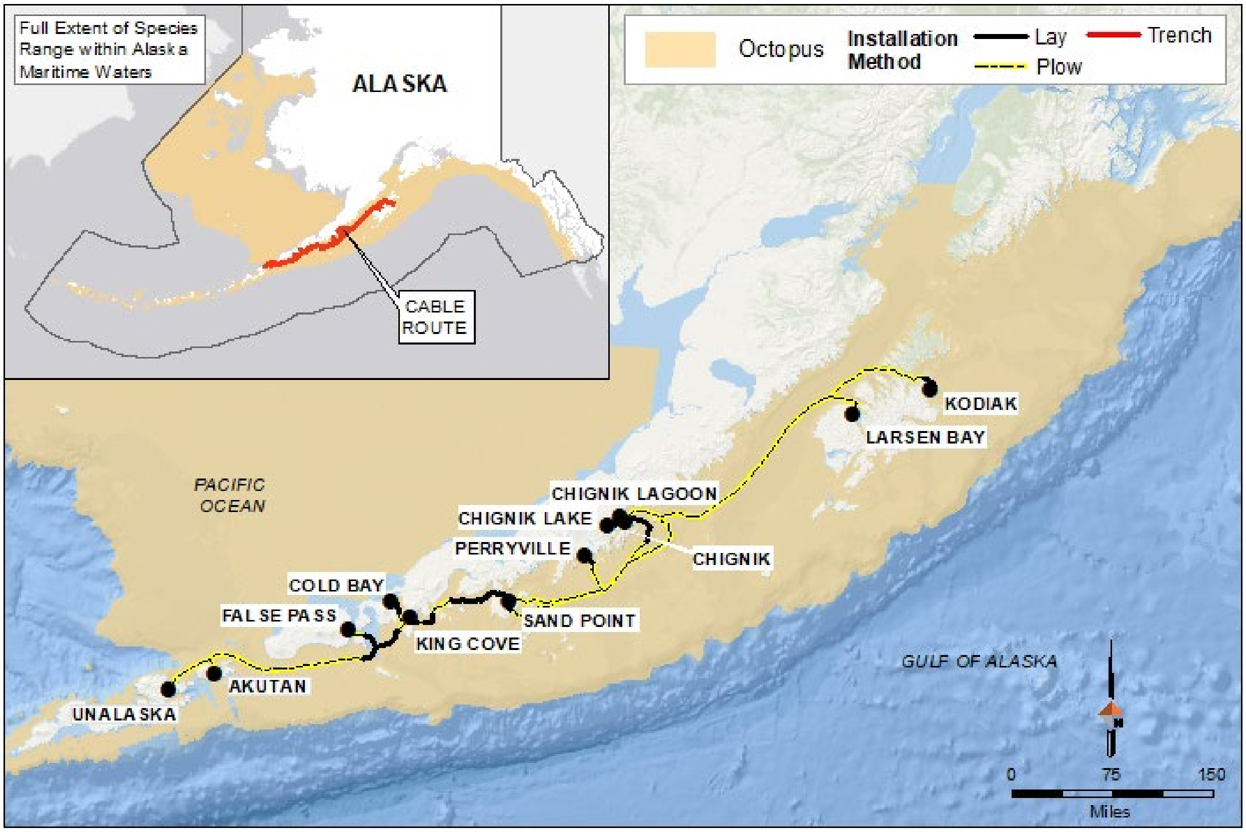

Figure 27. Designated Essential Fish Habitat for Octopus

3.1.14 Pacific Cod

Pacific cod (*Gadus macrocephalus*) are distributed widely over the eastern Bering Sea and the Aleutian Island area, as well as from the eastern Beaufort Sea and eastward across the Canadian Arctic. Tagging studies have demonstrated significant migration both within and between the eastern Bering Sea, Aleutian Islands, and Gulf of Alaska. Pacific cod form schools and appear to be indiscriminate predators (NPFMC 2017).

3.1.14.1 EFH Description

EFH is described for Pacific cod larvae, late juveniles, and adults only (Figure 29). Insufficient data are available to describe EFH for other life stages. EFH for Pacific cod larvae is located in epipelagic waters along the entire shelf, upper slope, and intermediate slope throughout the BSAI. EFH for late juveniles and adults is located in the lower portion of the water column along the inner, middle, and outer slope throughout the BSAI, where there are soft substrates consisting of sand, mud, sandy mud, and muddy sand (NPFMC 2017).

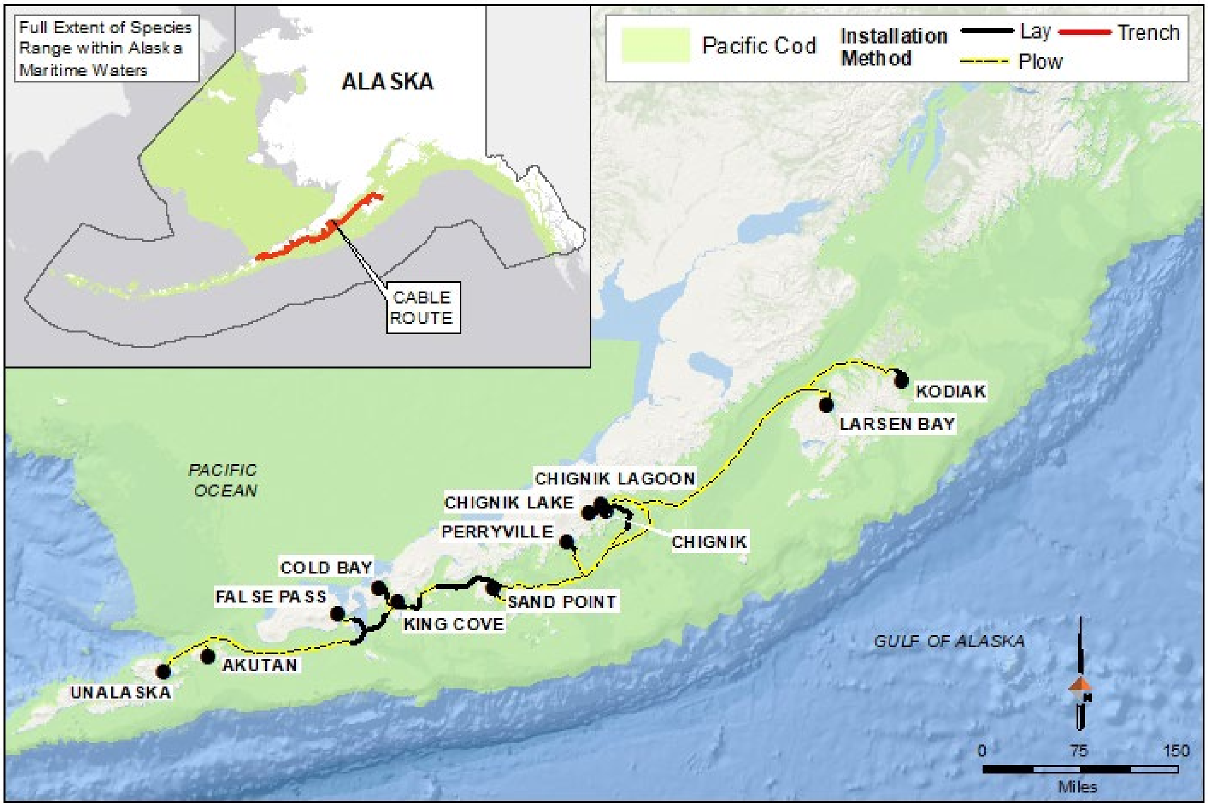

Figure 28. Designated Essential Fish Habitat for Pacific Cod

3.1.15 Pacific Ocean Perch

Pacific Ocean perch (*Sebastes alutus*) inhabit the outer continental shelf and upper slope regions of the north Pacific Ocean and Bering Sea. They are the dominant red rockfish species in the North Pacific (NPFMC 2017).

3.1.15.1 EFH Description

EFH is described for Pacific Ocean perch larvae, late juveniles, and adults only (Figure 31). Insufficient data are available to describe EFH for other life stages. EFH for Pacific Ocean perch larvae is located in pelagic waters along the entire shelf and slope throughout the BSAI. EFH for late juveniles is located in the middle to lower portion of the water column along the inner, middle, and outer shelf, and upper slope throughout the BSAI, where there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand. EFH for Pacific Ocean perch adults is located in the lower portion of the water column along the outer shelf and upper slope throughout the BSAI, where there are substrates consisting of cobble, gravel, mud, sandy mud, or muddy sand (NPFMC 2017).

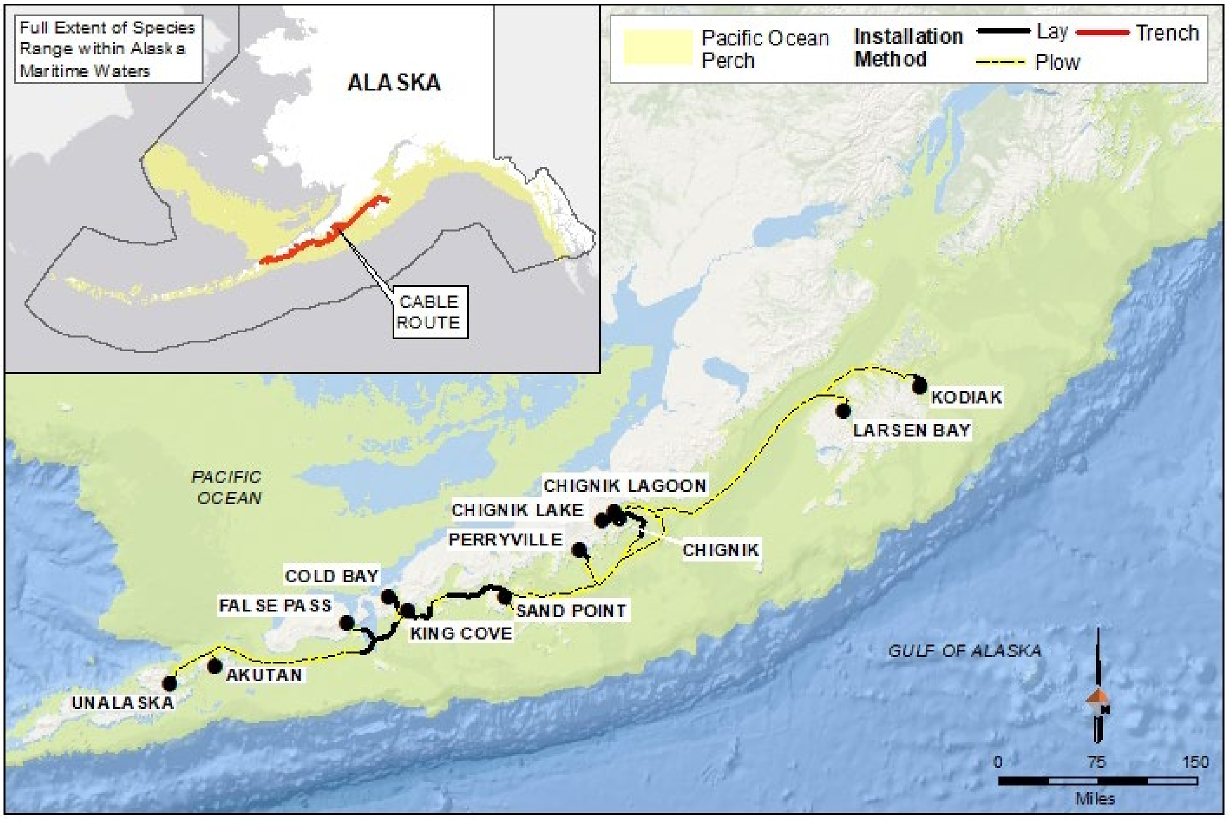

Figure 29. Designated Essential Fish Habitat for Pacific Ocean Perch

3.1.16 Rex Sole

Rex sole (*Glyptocephalus zachirus*) occur in the North Pacific, from Kuril Island to the Bering Sea coasts of Russia and Alaska and to Cedros Island, northern Baja California, Mexico. Rex sole are a slow growing species found on sand or mud bottoms (NPFMC 2017).

3.1.16.1 EFH Description

EFH is described for Rex sole late juveniles and adults only (Figure 32). Insufficient data are available to describe EFH for other life stages. EFH for Rex sole late juveniles and adults is located in the lower portion of the water column along the inner, middle, and outer shelf throughout the BSAI, where there are substrates consisting of gravel, sand, and mud (NPFMC 2017).

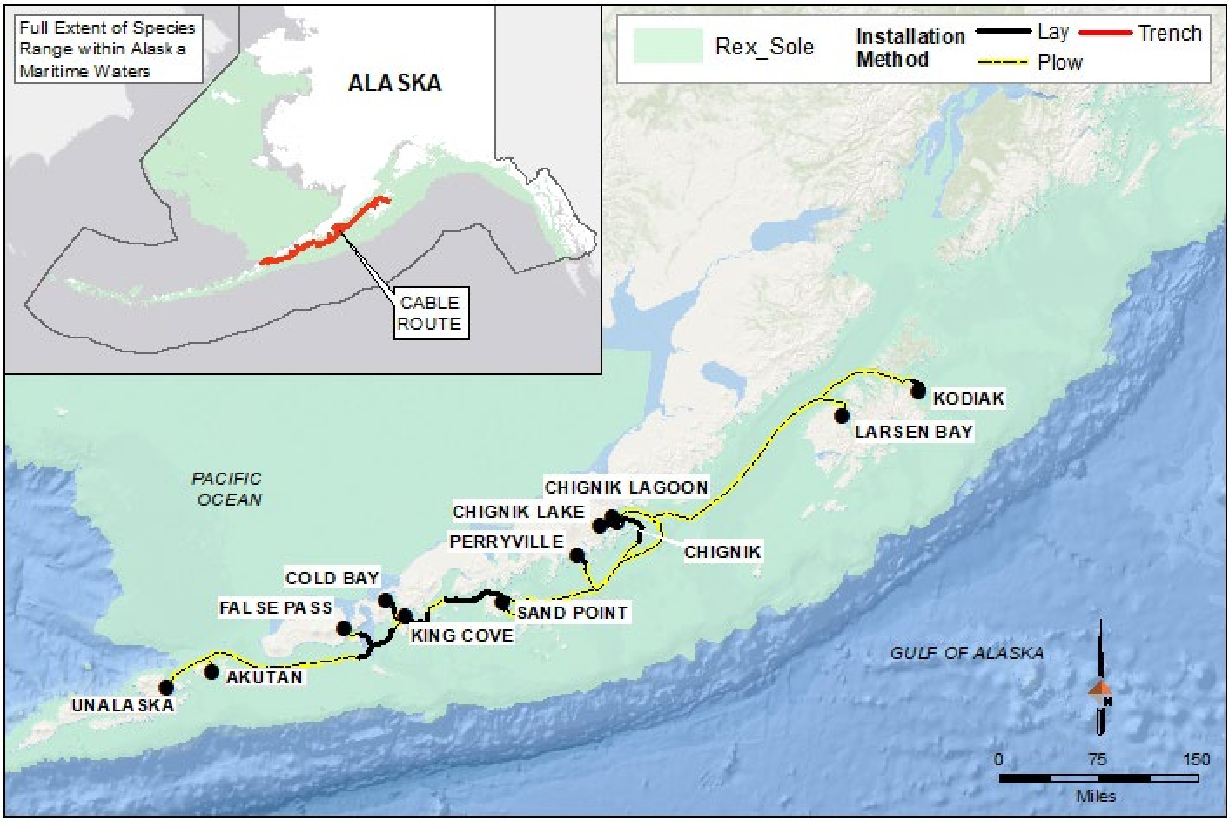

Figure 30. Designated Essential Fish Habitat for Rex Sole

3.1.17 Rock sole

Rock sole (*Lepidopsetta bilineata*) range from Baja California to the eastern Aleutian Islands and extreme southeastern Bering Sea. Adults occur over sand and gravel substrates to depths of 339 m and larvae have been collected over depths less than 1,000 m (NPFMC 2017).

3.1.17.1 EFH Description

EFH is described for Rock sole larvae, late juveniles, and adults only (Figure 33). Insufficient data are available to describe EFH for other life stages. EFH for Rock sole larvae is located in pelagic waters along the entire shelf and upper slope throughout the BSAI. EFH for Rock sole late juveniles and adults is located in the lower portion of the water column along the inner, middle, and outer shelf throughout the BSAI, where there are substrates consisting of gravel, sand, and cobble (NPFMC 2017).

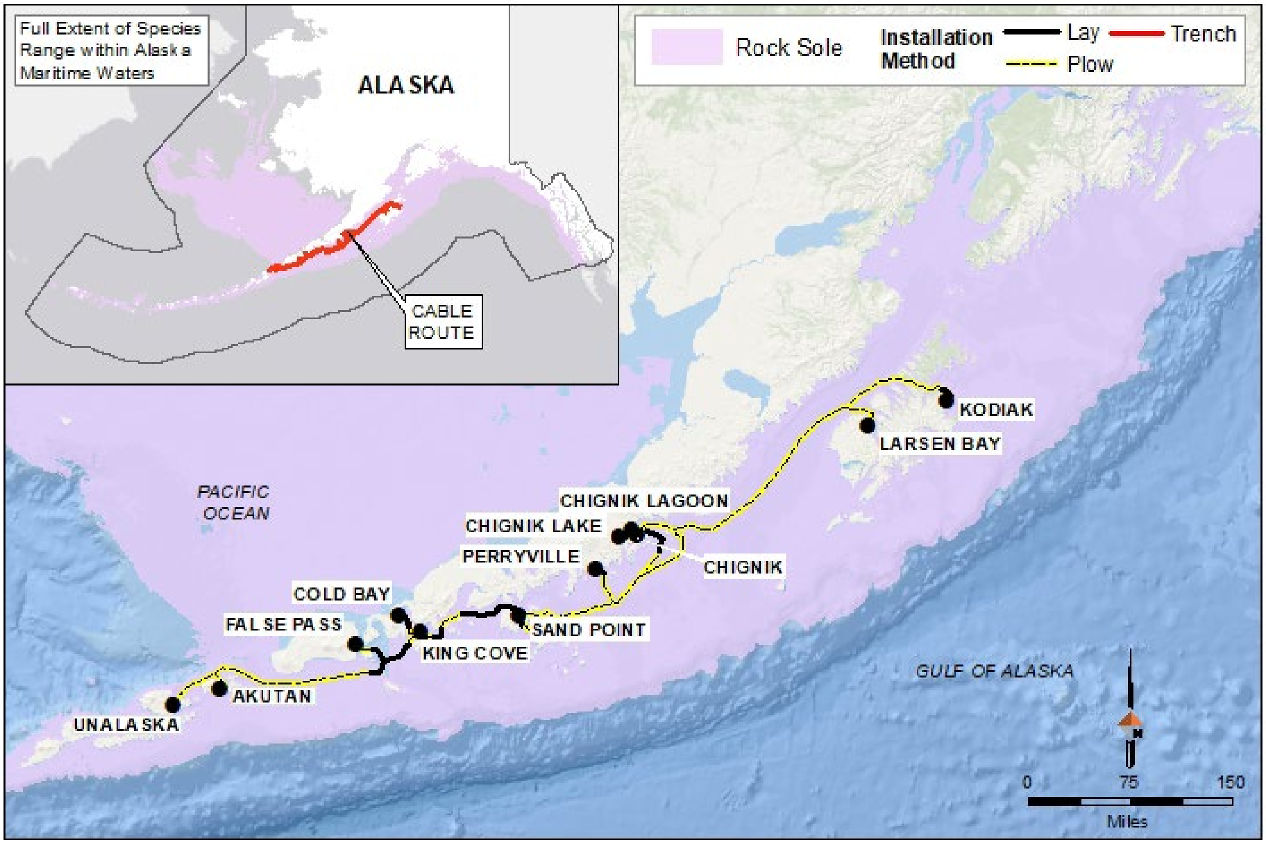

Figure 31. Designated Essential Fish Habitat for Rock Sole

3.1.18 Rockfish (various)

A variety of rockfish species use the Aleutian Islands. Most species are generally found at depths of 10 to 1,200 m. Many rockfish are not thought to exhibit large-scale movements as adults (NPFMC 2018).

3.1.18.1 EFH Description

Rockfish EFH is described for late juveniles and adults (Figure 34). Insufficient data are available to describe EFH for other life stages. Late juveniles are located in the lower portion of the water column along the middle (50 to 100 m) and outer shelf (100 to 200 m) throughout the GOA. The general distribution for adult rockfish is located in the lower portion of the water column along the shelf (0 to 200 m) and upper slope (200 to 500 m) (NPFMC 2017).

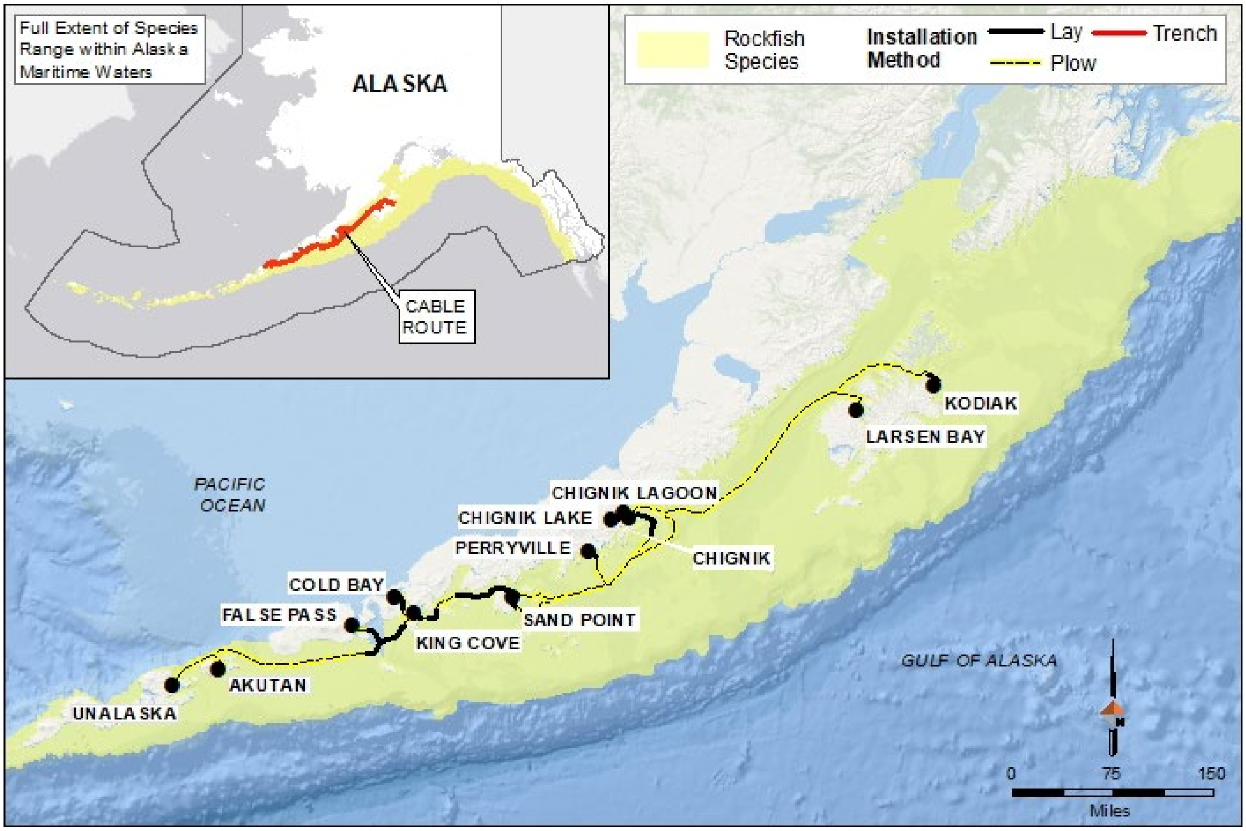

Figure 32. Designated Essential Fish Habitat for Rockfish

3.1.19 Sablefish

Sablefish (*Anoplopoma fimbria*) range from the Bering Sea costs of Kamchatka, Russia, and Alaska southward to Hatsu Shima Island, southern Japan, and Cedros Island, Baja California, Mexico. Adult sablefish occur on mud bottoms from 305 to 2,740 m depth. Young-of-the-year juveniles are pelagic and found on the surface and near-shore waters. Sablefish are generally localized, but have also been documented to migrate over 2,000 miles in 6 or 7 years (NPFMC 2017).

3.1.19.1 EFH Description

EFH is described for sablefish larvae, late juveniles, and adults only (Figure 35). Insufficient data are available to describe EFH for other life stages. EFH for Rock sole larvae is located in pelagic waters along the entire shelf and slope throughout the BSAI. EFH for sablefish late juveniles and adults is located in the lower portion of the water column, varied habitats, generally softer substrates, and deep shelf gulleys along the slope throughout the BSAI (NPFMC 2017).

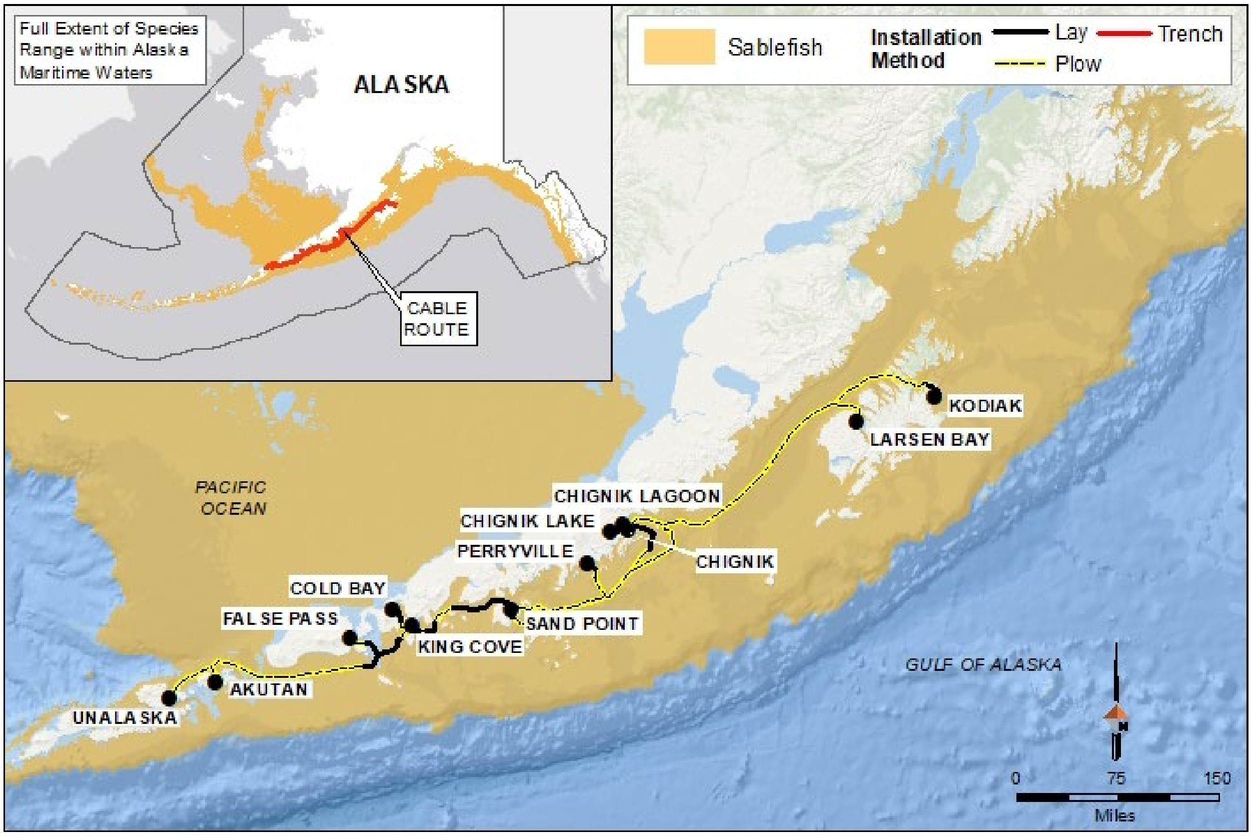

Figure 33. Designated Essential Fish Habitat for Sablefish

3.1.20 Salmon

Five species of anadromous salmon range throughout the North Pacific (NPFMC 2012). Chinook (*Oncorhynchus tshawytscha*) are the least abundant and largest of the Pacific salmon. In marine environments, Chinook salmon range widely throughout the North Pacific Ocean and the Bering Sea.

Chum (*O. keta*) and pink (*O. gorbuscha*) salmon are the most abundant in coastal Alaska. They depend heavily on estuarine areas and the lower reaches of low gradient streams for both spawning and rearing. Young quickly smolt and migrate to saltwater.

Coho (*O. kisutch*) and sockeye (*O. nerka*) salmon are also wide ranging in the action area. Sockeye rely most heavily on-stream basins with lakes with gravels and cold water for spawning and some rearing. These species generally spend the most time in freshwater before migration to saltwater.

3.1.20.1 EFH Description

EFH for all 5 species of Pacific salmon is described for all life stages (Figure 36) and occurs in both freshwater and marine habitats (NPFMC 2012). All freshwaters documented to contain anadromous salmon by Alaska Department of Fish and Game (ADF&G) in the AWC (Johnson and Blossom 2018) are designated Pacific salmon EFH. Marine EFH for all 5 Pacific salmon species consists of all marine waters off the coast of Alaska from the mean higher tide line to the 200-nautical mile limit of the U.S. Exclusive Economic Zone (EEZ).

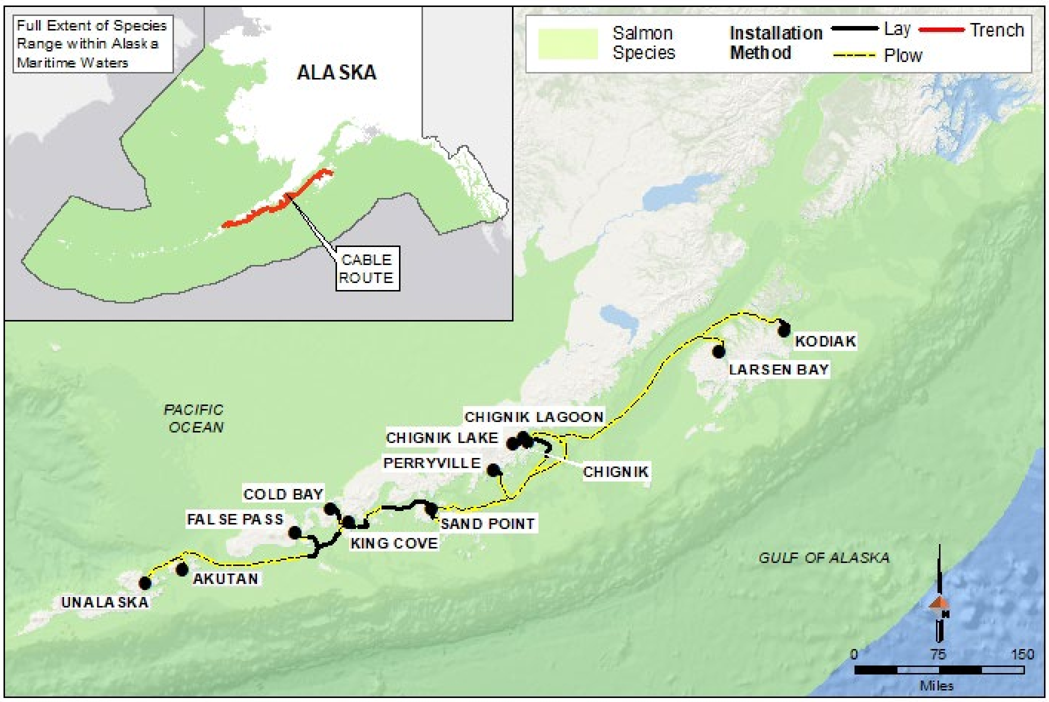

Figure 34. Designated Essential Fish Habitat for all Pacific Salmon Species

3.1.21 <u>Sculpin</u>

Sculpin (various species) range throughout the Bering Sea and Aleutian Islands region, occupying all benthic habitats and depths. There is a large diversity of sculpin species, suggesting that each sculpin population may react differently to various natural or anthropogenic environmental changes. There are differences in fecundity, egg size, and other life history characteristics (Spies et al. 2012)

3.1.21.1 EFH Description

EFH is described for sculpin juveniles and adults only (Figure 37). Insufficient data are available to describe EFH for other life stages. EFH for juvenile and adult sculpins is located in the lower portion of the water column along the inner, middle, and outer shelf, and portions of the upper slope throughout the BSAI, where substrates contain rock, sand, mud, cobble, and sandy mud (NPFMC 2017).

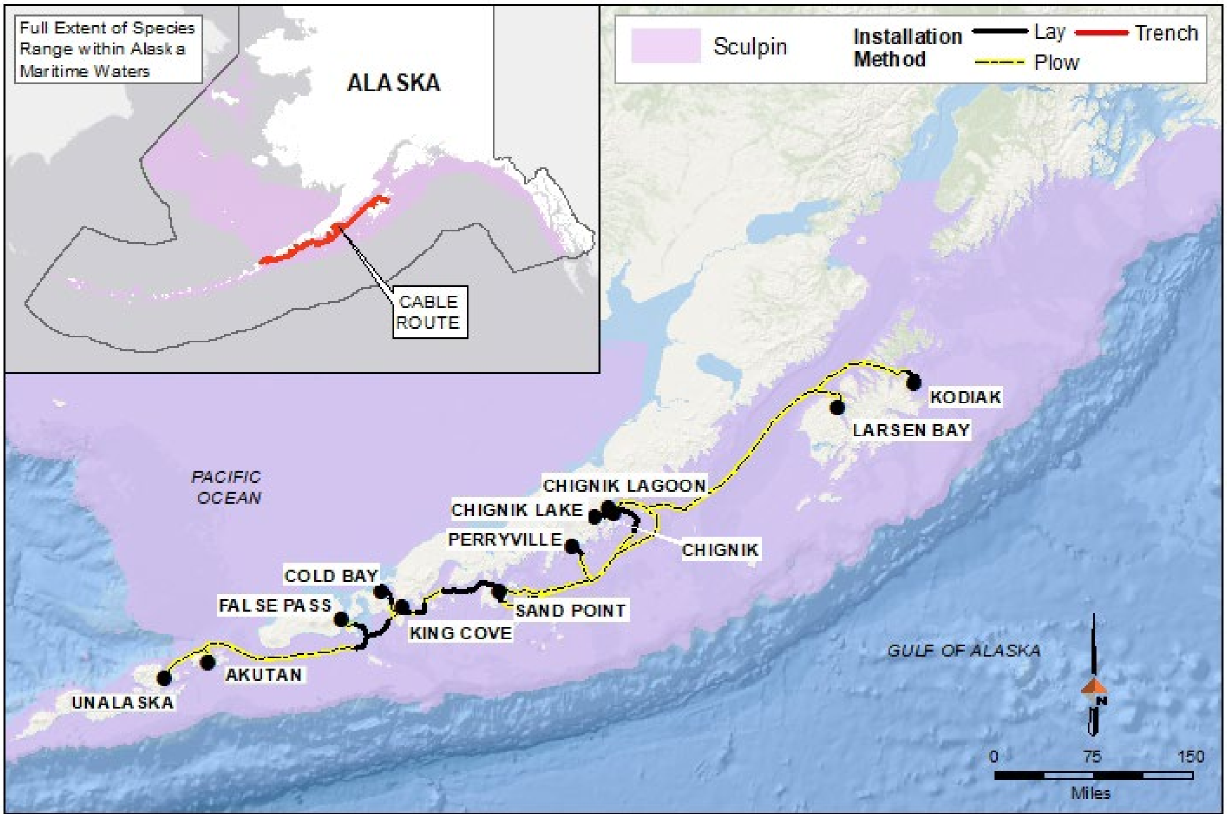

Figure 35. Designated Essential Fish Habitat for Sculpin

3.1.22 Shortraker Rockfish

Shortraker (*Sebastes borealis*) is found from Japan to Navarin Canyon in the Bering Sea, throughout the Aleutian Islands, and south to San Diego, California. They are generally found offshore at depths of 25 to 900 m (NPFMC 2017).

3.1.22.1 EFH Description

EFH is described for Shortraker and Rougheye rockfish adults only (Figure 38). Insufficient data are available to describe EFH for other life stages. EFH for adult Shortraker and Rougheye rockfish is located in the lower portion of the water column along the outer shelf and upper slope regions throughout the BSAI, where substrates contain mud, sand, sandy mud, muddy sand, rock, cobble, and gravel (NPFMC 2017).

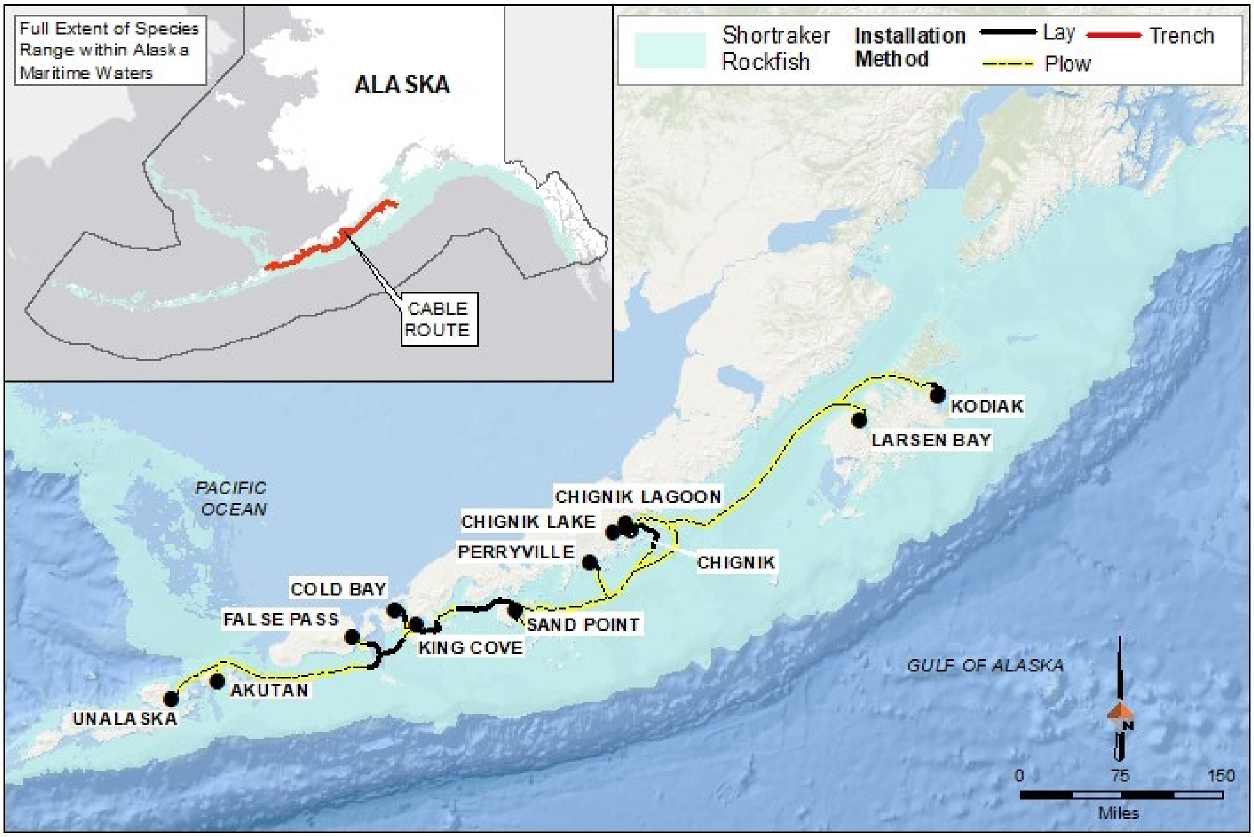

Figure 36. Designated Essential Fish Habitat for Shortraker Rockfish

3.1.23 Shortspine Thornyhead Rockfish

Shortspine thornyhead rockfish (*Sebastolobus alascanus*) are distributed in the North Pacific, from the Sea of Okhotsk north to the Navarin Canyon in the Bering Sea and from Stalemate Bank and Ulm Plateau in the Aleutian Islands southeast to Cedros Island, Baja California, Mexico. They are very common on soft bottoms (NPFMC 2017).

3.1.23.1 EFH Description

EFH is described for shortspine thornyhead rockfish larvae, late juveniles, and adults only. Insufficient data are available to describe EFH for other life stages (Figure 39). EFH for shortspine thornyhead rockfish larvae is located in epipelagic waters along the out shelf and slope throughout the BSAI. EFH for shortspine thornyhead rockfish late juveniles and adults is located in the lower portion of the water column along the middle and outer shelf and upper to lower slope throughout the BSAI, where substrates consist mainly of mud, sand, rock, sandy mud, muddy sand, cobble, and gravel (NPFMC 2017).

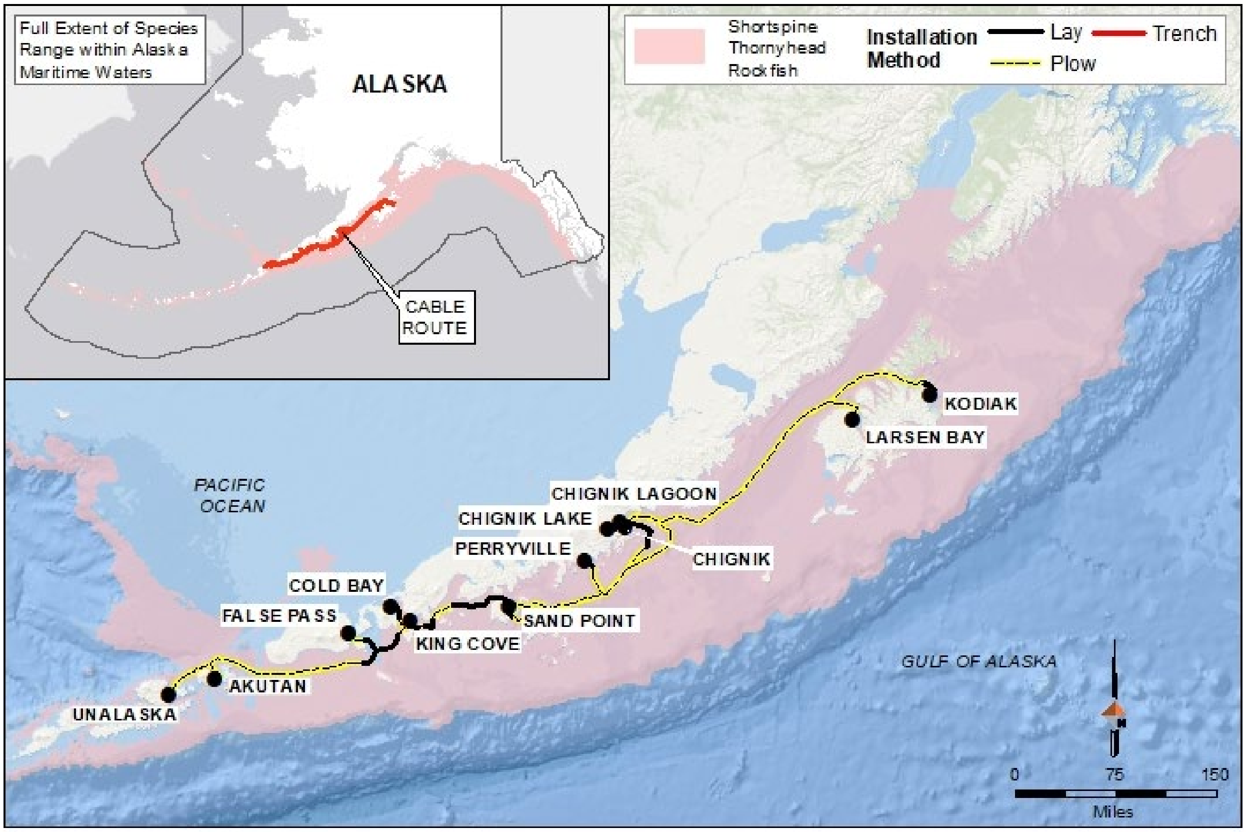

Figure 37. Designated Essential Fish Habitat for Shortspine Thornyhead Rockfish

3.1.24 Skate

Skate (*Raja binoculata*) are found in the North Pacific from Glubokaya Bay, Cape Navarin, and Stalemate Bank to Cedros Island, Baja California, Mexico. They are found in depth ranges of 3 to 800 m (NPFMC 2017).

3.1.24.1 EFH Description

EFH is described for skate eggs and adults only (Figure 40). Insufficient data are available to describe EFH for other life stages. EFH for skate eggs is defined as the seafloor below the shelf-slope interface in the eastern Bering Sea, in depths from 140 to 360 m. Adult skate EFH is located in the lower portion of the water column on the shelf and upper slope throughout the BSAI, where substrates contain mud, sand, gravel, and rock (NPFMC 2017).

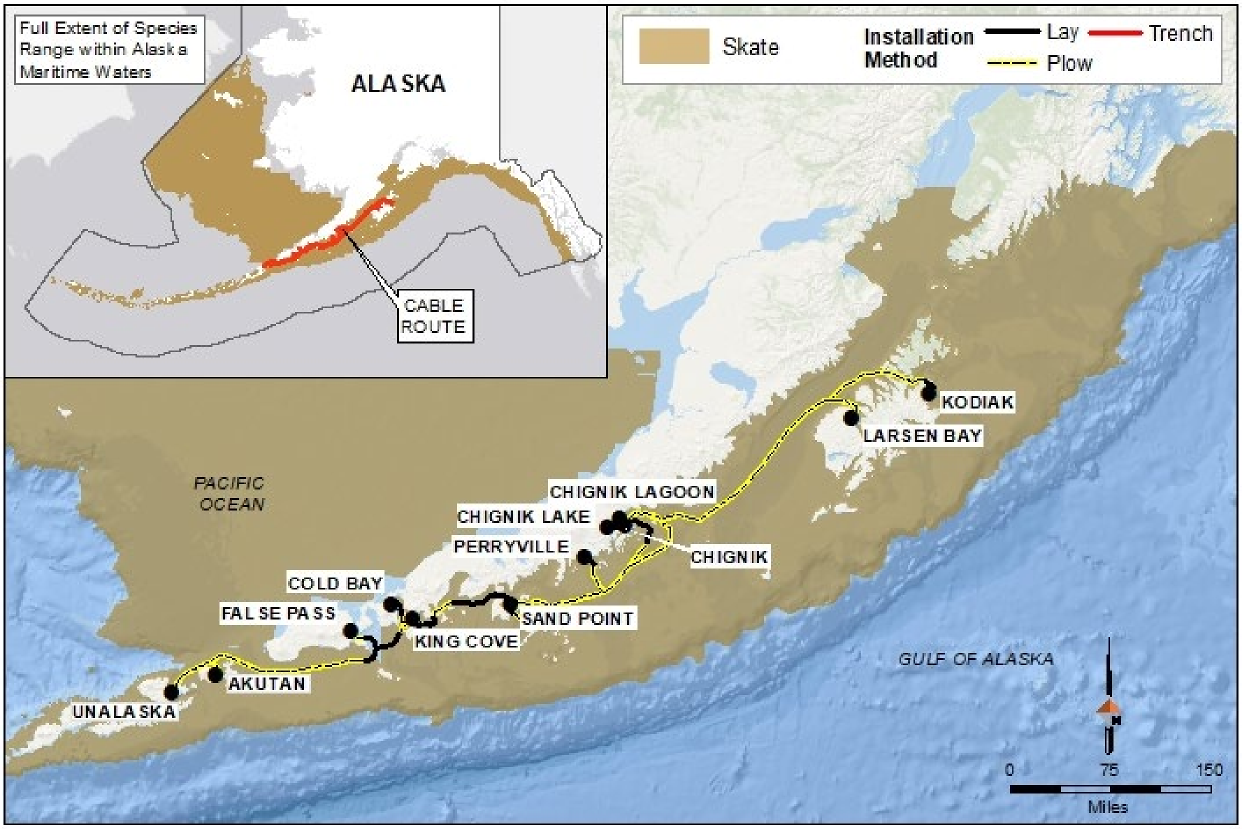

Figure 38. Designated Essential Fish Habitat for Skate

3.1.25 Snow Crab

Snow crab (*Chionoecetes opilio*) are widely distributed on the continental shelf of the Bering Sea, Chukchi Sea, and in the western Atlantic Ocean as far south as Maine, but are not present in the Gulf of Alaska. In the Bering Sea, snow crab are common at depths less than 200 m. Females stop growing and molting when they reach maturity, males continue growing and are much larger than females (NPFMC 2011).

3.1.25.1 EFH Description

EFH is described for snow crab eggs, late juveniles, and adults only (Figure 41). Insufficient data are available to describe EFH for other life stages. EFH for snow crab eggs is inferred from the general distribution of egg-bearing female crab. EFH for snow crab late juveniles and adults is located in bottom habitats along the inner, middle, and outer shelf throughout the BSAI, where substrates consist mainly of mud (NPFMC 2011).

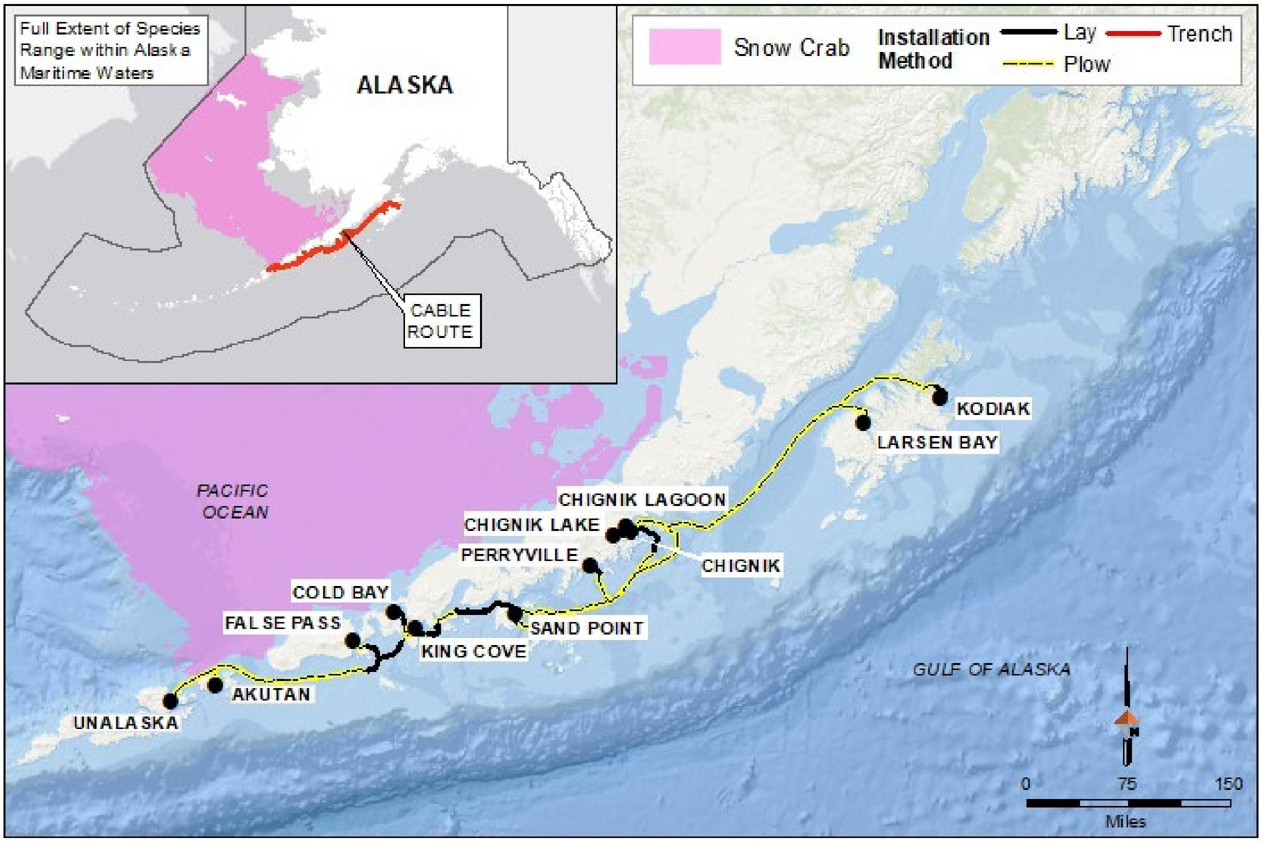

Figure 39. Designated Essential Fish Habitat for Snow Crab

3.1.26 Squid

There are approximately 15 species of squid documented from the Bering Sea and Aleutian Islands region. These species use water depths from 10 m to greater than 1,500 m. All but one species are pelagic, and two species are common in close proximity to the bottom. Most species are associated with the slope and basin; the highest species diversity along the Bering Sea slope region occurs between 200 and 1,500 m (Ormseth and Spital 2010).

3.1.26.1 EFH Description

EFH is described for squid late juveniles and adults only (Figure 42). Insufficient data are available to describe EFH for other life stages. EFH for late juvenile and adult squid is located in the entire water column, from the sea surface to the sea floor, along the inner, middle, and outer shelf and the entire slope throughout the BSAI (NPFMC 2017).

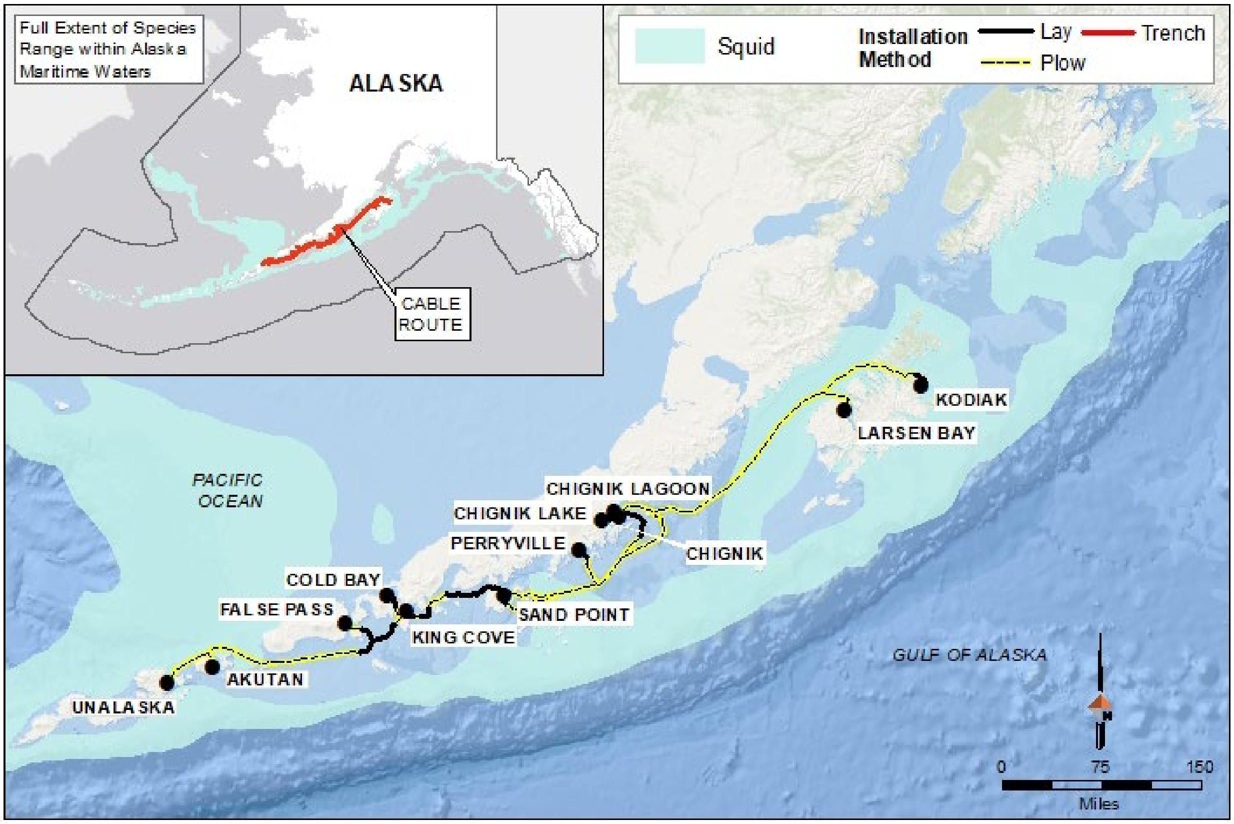

Figure 40. Designated Essential Fish Habitat for Squid

3.1.27 Walleye Pollock

Walleye pollock (*Gadus chalcogrammus*) range in the North Pacific, from Kivalina, Alaska to the southern Sea of Japan and Carmel, California. The adults usually live near to the sea floor, but can also appear up near the surface, performing diurnal vertical migrations (NPFMC 2017).

3.1.27.1 EFH Description

EFH is described for Walleye Pollock eggs, larvae, late juveniles, and adults only (Figure 43). Insufficient data are available to describe EFH for other life stages. EFH for Walleye Pollock eggs and larvae is located in pelagic waters along the entire shelf and upper and intermediate slope throughout the BSAI. EFH for Walleye pollock late juveniles and adults is located in the lower and middle portion of the water column along the inner, middle, and outer shelf and upper to lower slope throughout the BSAI. Substrate preferences are unknown (NPFMC 2017).

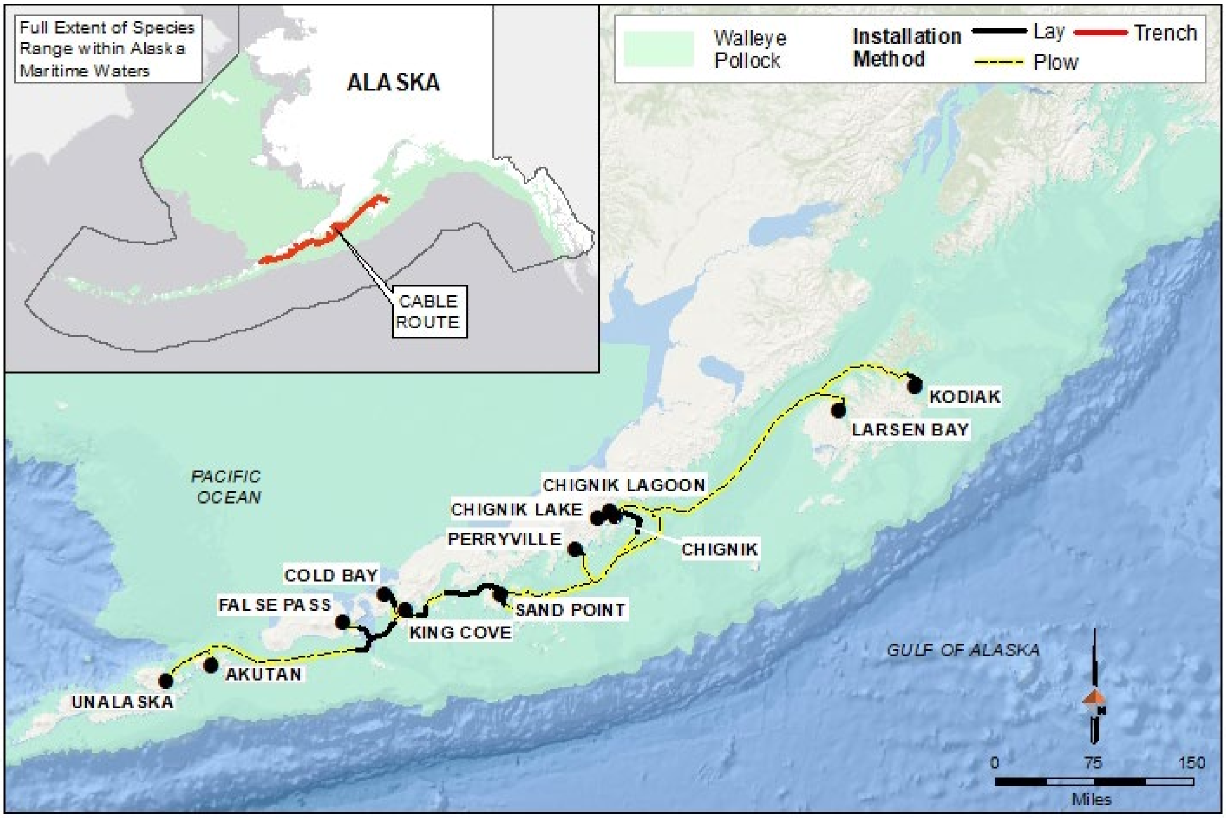

Figure 41. Designated Essential Fish Habitat for Walleye Pollock

3.1.28 Weathervane Scallop

Weathervane scallop (*Patinopecten caurinus*) range from Point Reyes, California to the Pribilof Islands, Alaska. In Alaska, the highest densities of weathervane scallop are documented along the eastern gulf coast from Cape Spencer to Cape St. Elias, around Kodiak Island, and in the Bering Sea (NPFMC 2014).

3.1.28.1 EFH Description

EFH is described for Weathervane scallop late juveniles and adults only (Figure 44). Insufficient data are available to describe EFH for other life stages. EFH for Weathervane late juveniles and adults is located in the seafloor along the inner, middle, and outer shelf in concentrated areas of the Gulf of Alaska and BSAI, where substrates are clay, mud, sand, and gravel that are generally elongated in the direction of the current flow (NPFMC 2014).

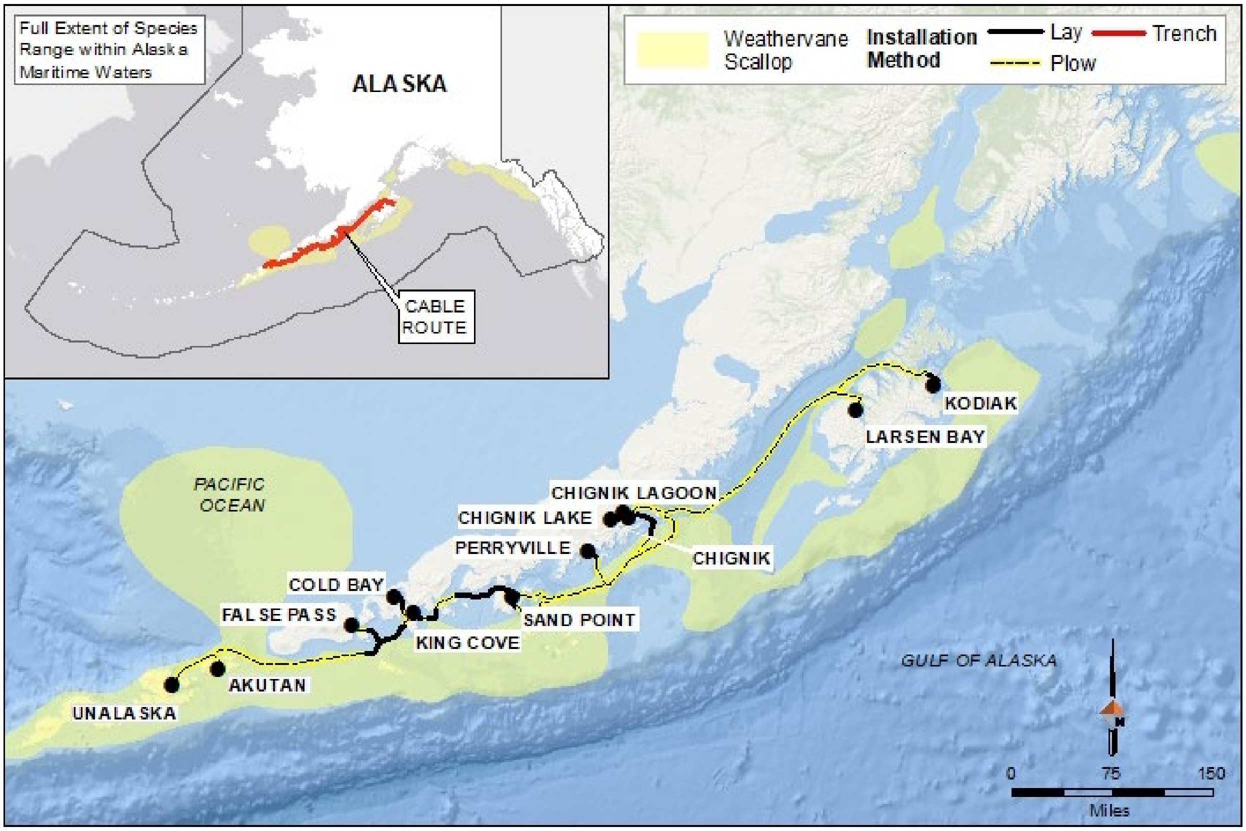

Figure 42. Designated Essential Fish Habitat for Weathervane Scallop

3.1.29 Yelloweye Rockfish

Yelloweye rockfish (*Sebastes ruberrimus*) are distributed in the Gulf of Alaska to northern Baja California, Mexico. They occur on rocky reefs and boulder fields, although the young can be found in shallower regions (NPFMC 2017).

3.1.29.1 EFH Description

EFH is described for Yelloweye rockfish larvae, late juveniles, and adults only (Figure 45). Insufficient data are available to describe EFH for other life stages. EFH for Yelloweye rockfish larvae is located in epipelagic waters along the entire shelf and slope throughout the BSAI. EFH for Yelloweye rockfish late juveniles and adults is located in the lower portion of the water column within bays and island passages and along the inner, middle, and outer shelf throughout the BSAI, where substrates are of rock and in areas of vertical relief such as crevices, overhangs, vertical walls, coral, and larger sponges (NPFMC 2017).

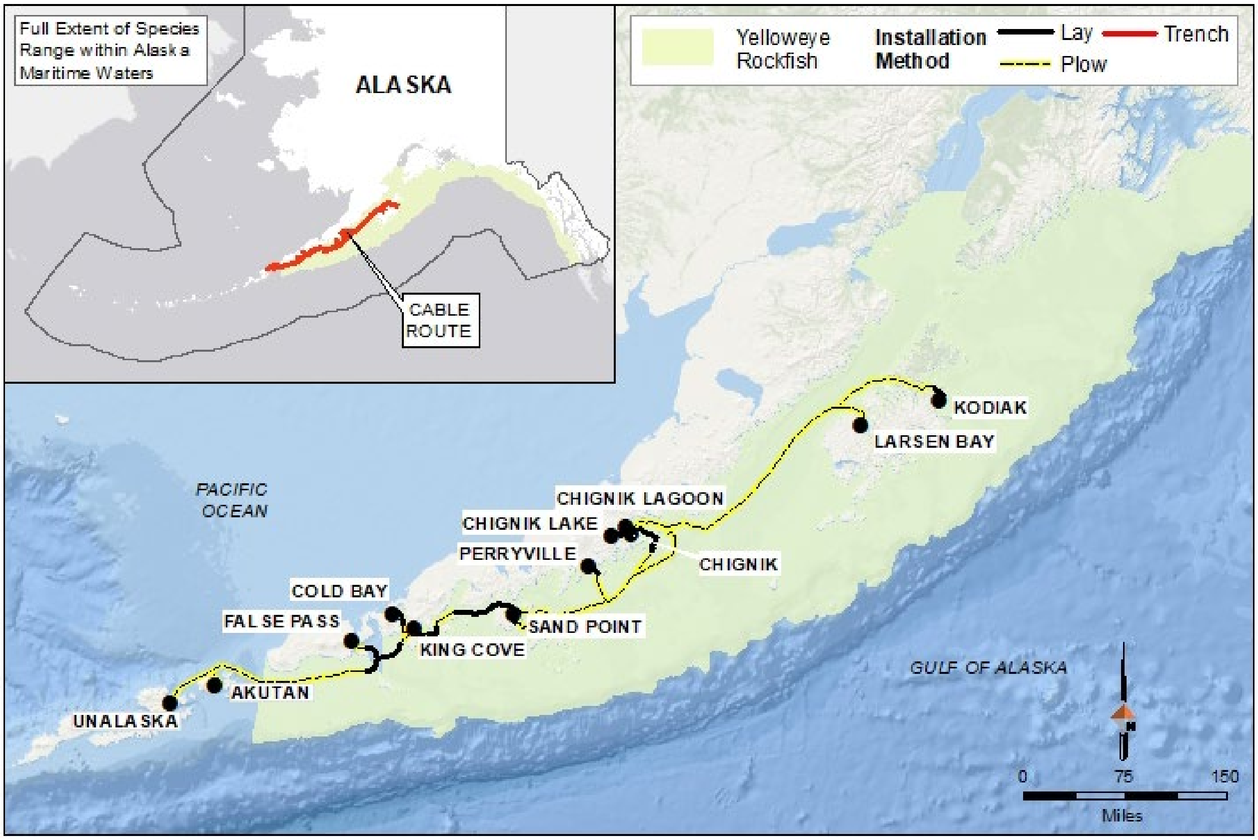

Figure 43. Designated Essential Fish Habitat for Yelloweye Rockfish

3.1.30 Yellowfin Sole

Yellowfin sole (*Limanda aspera*) occur in the North Pacific from Korea and the Sea of Japan to the Sea of Okhotsk, the Bering Sea, and Barkley Sound, Canada (NPFMC 2017).

3.1.30.1 EFH Description

EFH is described for Yellowfin sole late juveniles and adults only (Figure 46). Insufficient data are available to describe EFH for other life stages. EFH for Yellowfin sole late juveniles and adults is located in the lower portion of the water column within nearshore bays and along the inner, middle, and outer shelf throughout the BSAI, where there are soft substrates consisting mainly of sand (NPFMC 2017).

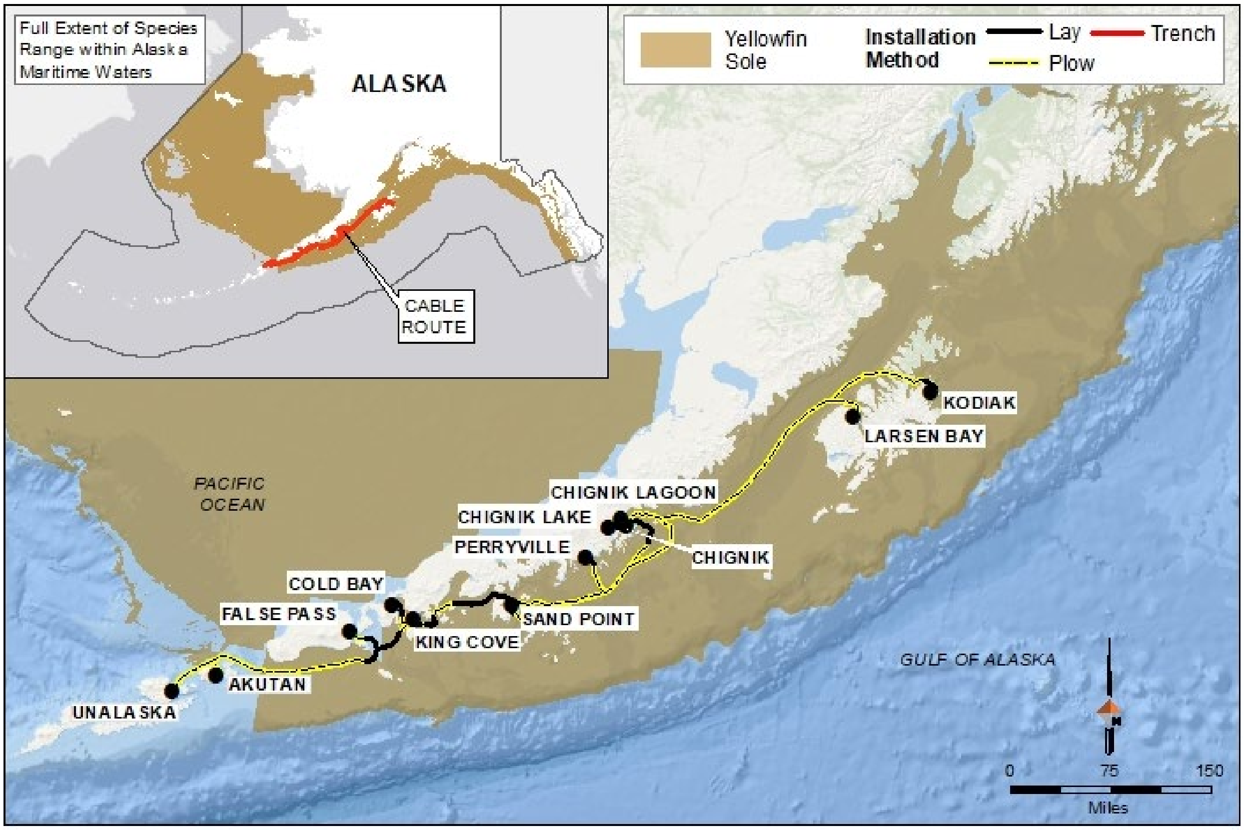

Figure 44. Designated Essential Fish Habitat for Yellowfin Sole

3.2 General Habitat Conditions in the Project Area

Bathymetric and substrate surveys of the proposed route were completed in 2018 (TerraSond 2018), existing conditions of the environmental baseline are described below. Existing development at the shoreline or in-water at the landfall locations includes typical infrastructure for human communities in the Aleutian Islands: harbors, marinas, jetties, docks, piers, canneries, boat ramps, ferry terminals, fuel docks, etc. Infrastructure close to the proposed cable landfall locations are described for each site below.

3.2.1 Kodiak

Landfall is located on a beach at Mill Bay (Figure 2). The landing is existing and designated a required landing along the trunk route. The beach consists mostly of poorly sorted compacted aggregate ranging in size from silt to boulder. Visible bedrock outcrops are present in the near vicinity to the landing and massive blocks are erratically distributed around the bay shoreline (Figures 47 and 48). The waters surrounding Kodiak are heavily fished. Additional to fishing activity, vessel traffic is heavy due to freight ships.

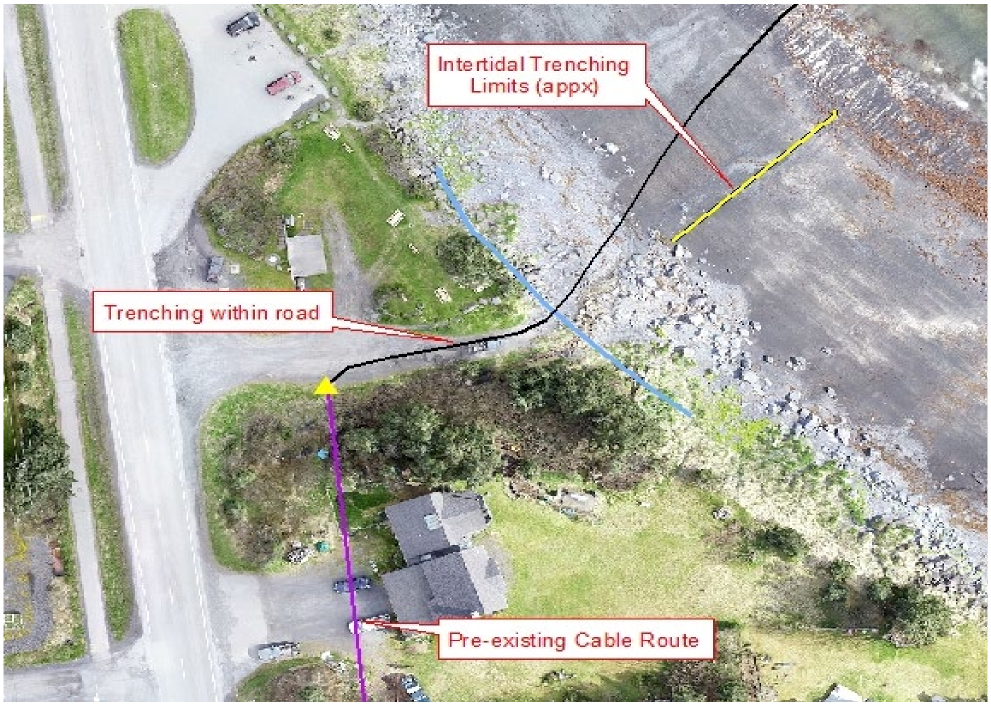

Figure 45. Kodiak Landfall Existing Conditions Aerial

Figure 46. Kodiak Landfall Existing Substrates facing BMH

3.2.2 Larsen Bay

Landfall is located within Larsen Bay (Figure 3). Bedrock outcrops precede the shore, which is comprised of poorly sorted aggregate ranging in size from silt to cobble (Figures 49 through 51). Larsen Bay is a center for commercial and sport fishing with heavy use of trawling which has impacted EFH.

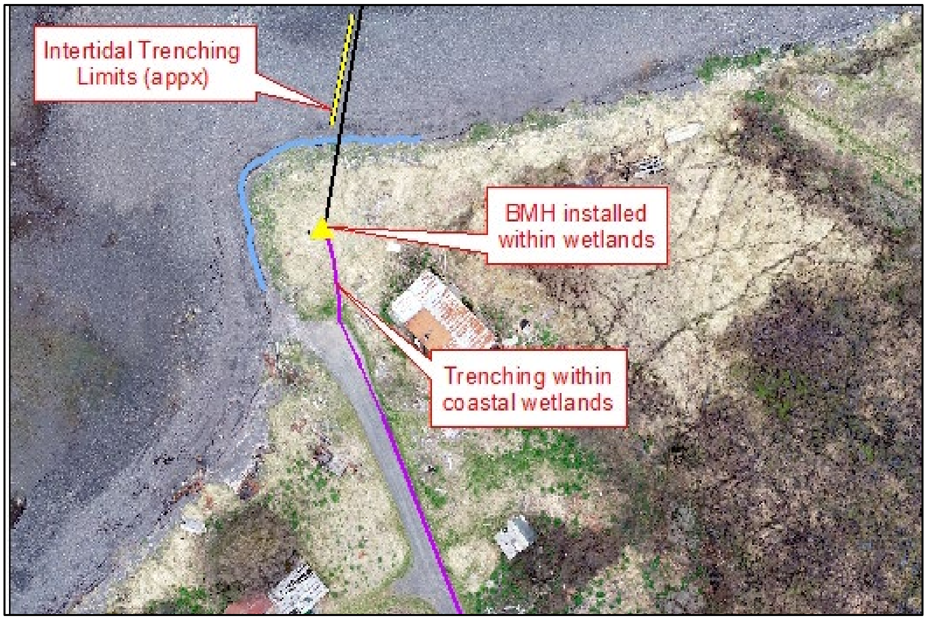

Figure 47. Larsen Bay Landfall Existing Conditions Aerial

Figure 48. Larsen Bay Landfall Existing Substrates facing BMH

Figure 49. Larsen Bay Landfall BMH Facing Coast

3.2.3 Chignik

Landfall is located within Anchorage Bay (Figure 4). The landing will cross perpendicularly through a waste water pipeline operated by the fish processing plant before terminating at the BMH. Additionally, the approach consists mostly of banded well sorted unconsolidated aggregate ranging in size from sand to cobble. The beach is comprised of well worked cobble with a steep termination incline (Figures 52 and 53). Heavy vessel traffic is seasonal with commercial fishing with barge services occurring weekly or monthly depending on time of year.

Figure 50. Chignik Landfall Existing Conditions Aerial

Figure 51. Chignik Landfall Existing Substrates

3.2.4 Chignik Lagoon

Landfall is located at the end of a designated Utility Easement (Figure 5). The approach to the landing is comprised of poorly sorted aggregate ranging in size from glacial flour to boulder (Figures 54 and 55). Chignik Lagoon has shallow water, so vessel traffic is limited to small fishing vessels and local skiffs. Chignik Lagoon does not have a dock.

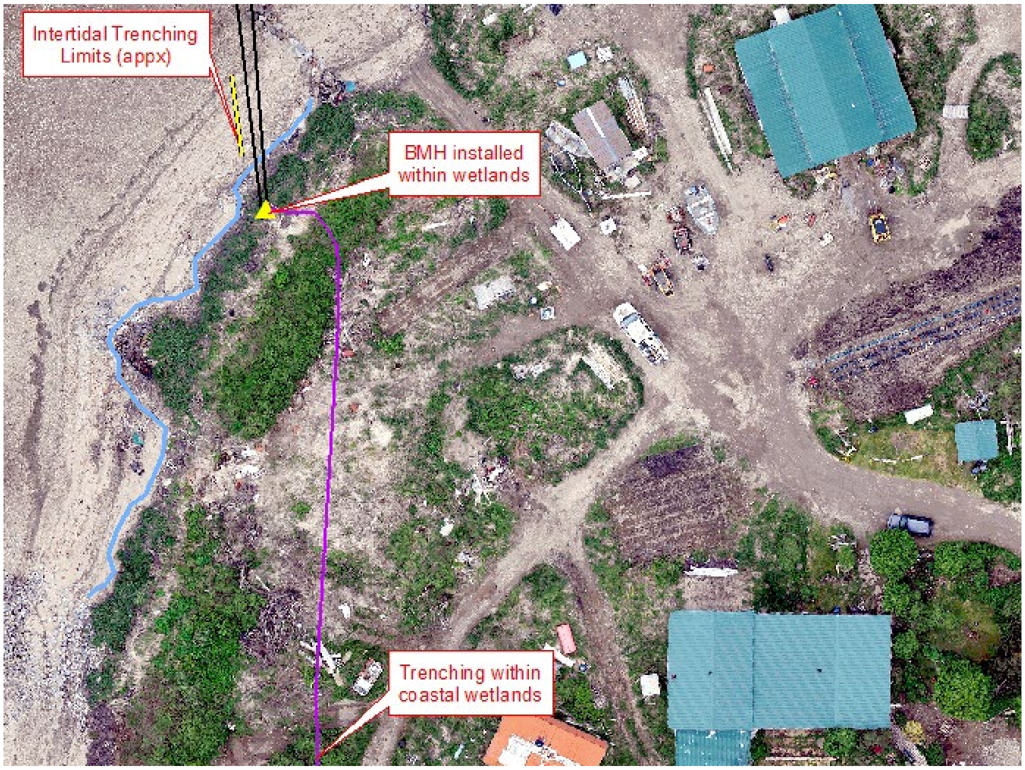

Figure 52. Chignik Lagoon Landfall Existing Conditions Aerial

Figure 53. Chignik Lagoon Landfall Existing Substrates

3.2.5 Chignik Lake

Landfall is located on a small, informal boat launch at the end of the main access road (Figure 6). The beach consists mostly of compacted aggregate ranging in size from silt to gravel (Figures 56). There is a local salmon fishery but there are no docks, harbor, barge access, or boat haul-outs in Chignik Lake (Figure 55).

An open contaminated site (ADEC site #3787) occurs 70 m (230 ft) south of the proposed BMH in Chignik Lake (ADEC 2018). That site will be avoided; the current cable route bypasses it.

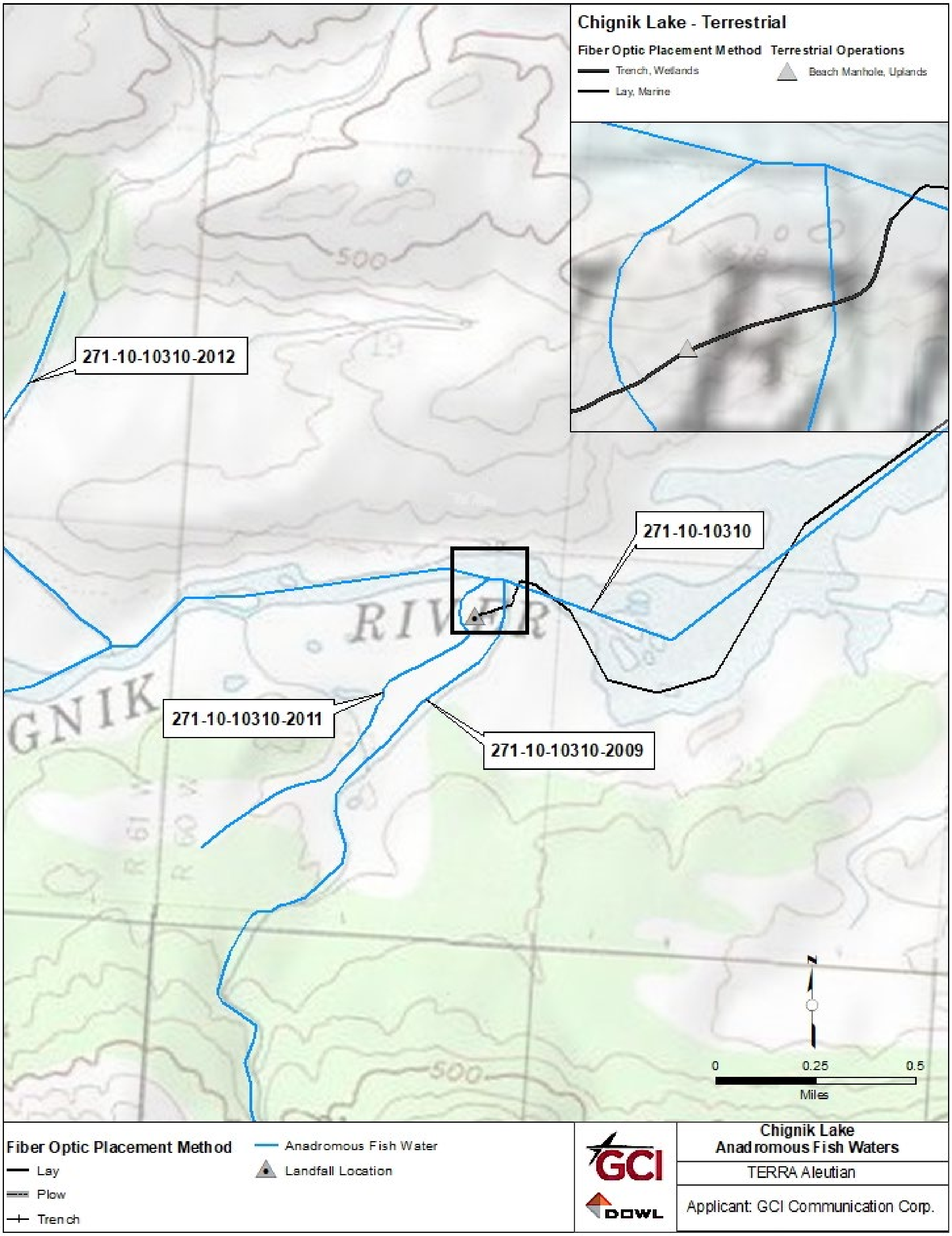

Figure 54. Chignik Lake Landfall Area Streams

Figure 55. Chignik Lake Landfall Conditions Aerial

3.2.6 Perryville

The landfall in Perryville is on the west side of the sand road above the MHW demarcation (Figure 7). Perryville has little to no marine infrastructure. There is no harbor or dock and the seabed fronting the community is too steep for anchoring. The approach is expected to be trenchable as the it consists mostly of fine black sand (Figure 58).

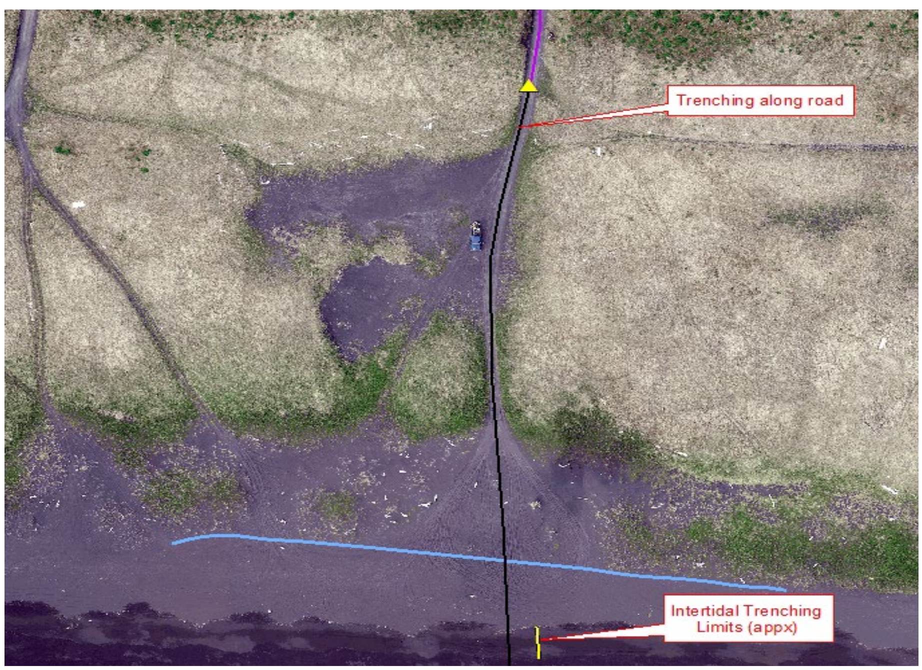

Figure 56. Perryville Landfall Conditions Aerial

Figure 57. Perryville Landfall Existing Substrates facing Water Line

3.2.7 Sand Point

Landfall is located within vegetation on city property (Figure 8). The approach consists mostly of poorly sorted compacted aggregate ranging in size from sand to boulder Figure 60 and 61). Sand Point has existing marine infrastructure and heavy amount of vessel traffic that has impacted EFH. It is the largest fishing port, and home to the largest fishing fleet, on the Alaska Peninsula (Terrasond, 2018).

Figure 58. Sand Point Landfall Conditions Aerial

Figure 59. Sand Point Landfall Existing Substrates facing BMH

Figure 60. Sand Point Landfall Existing Substrates BMH facing North

3.2.8 King Cove

The landfall in King Cove is adjacent to the King Cove Corporation (Figure 9). There is existing conduit infrastructure which is expected to reduce the impact upon asphalt disturbance (Figure 62 and 63). King Cove is a part of the main transit route along the Alaska Peninsula so heavier vessel traffic is expected. Vessels may anchor in 27m of water, 800m off the wharf, and about midway between two shores.

Figure 61. King Cove Landfall Conditions Aerial

Figure 62. King Cove Landfall Existing Substrates facing BMH

3.2.9 Cold Bay

The landfall in Cold Bay is adjacent to the Landing Craft Pad (Figure 10). The approach is unconsolidated sandy muds with the beach being well sorted and comprised of fine - medium sized sand with gravel (Figure 66). Cold Bay has light vessel traffic and does not see commercial fishing activity.

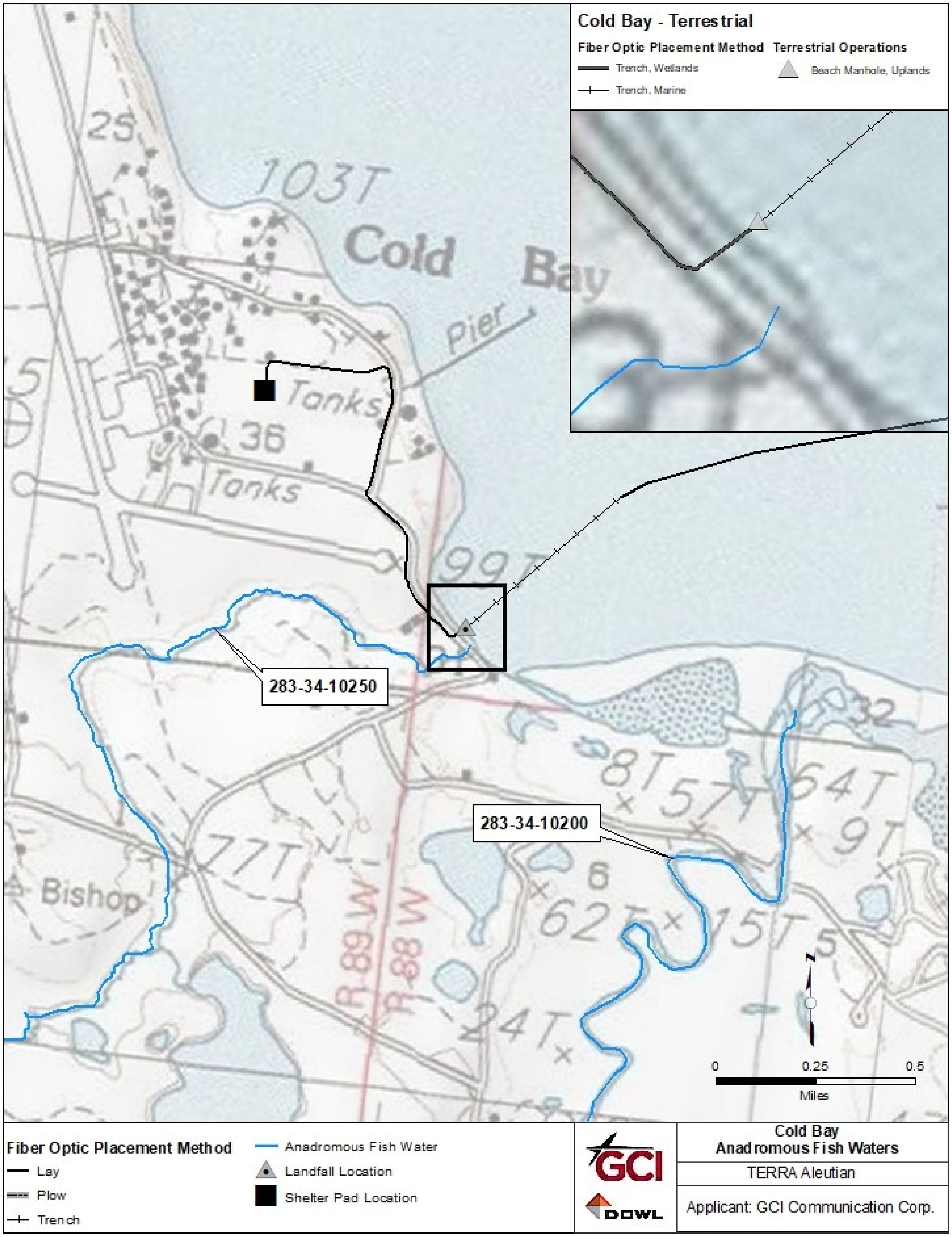

Figure 63. Cold Bay Landfall Area Streams

Figure 64. Cold Bay Landfall Conditions Aerial

Figure 65. Cold Bay Landfall Existing Substrates facing BMH

3.2.10 False Pass

Landfall is approximately 16 miles from Bristol Bay in Bechevin Bay and Isanotski Strait (Figure 11). The landing is located in the middle of the village just south of a small, unnamed stream (Figure 67). GCI staff have observed salmon in the stream, though it is not in the AWC (Johnson and Blossom 2018). The stream appears to have characteristics appropriate for salmonid rearing (low gradient, sufficient flow), and thus is assumed to be Pacific salmon EFH. The stream mouth lies approximately 79.2 m (260 ft) northwest of the BMH (Figure 68).

To the south of the BMH (approximately 122 m (400 ft) southeast), is an abandoned cannery and pile supported dock (Figures 69 and 70). The community has a variety of other existing marine infrastructure including a harbor with breakwater, a jetty, ferry terminal and other large docks, etc. The beach at the landfall location is mainly gravels and cobbles.

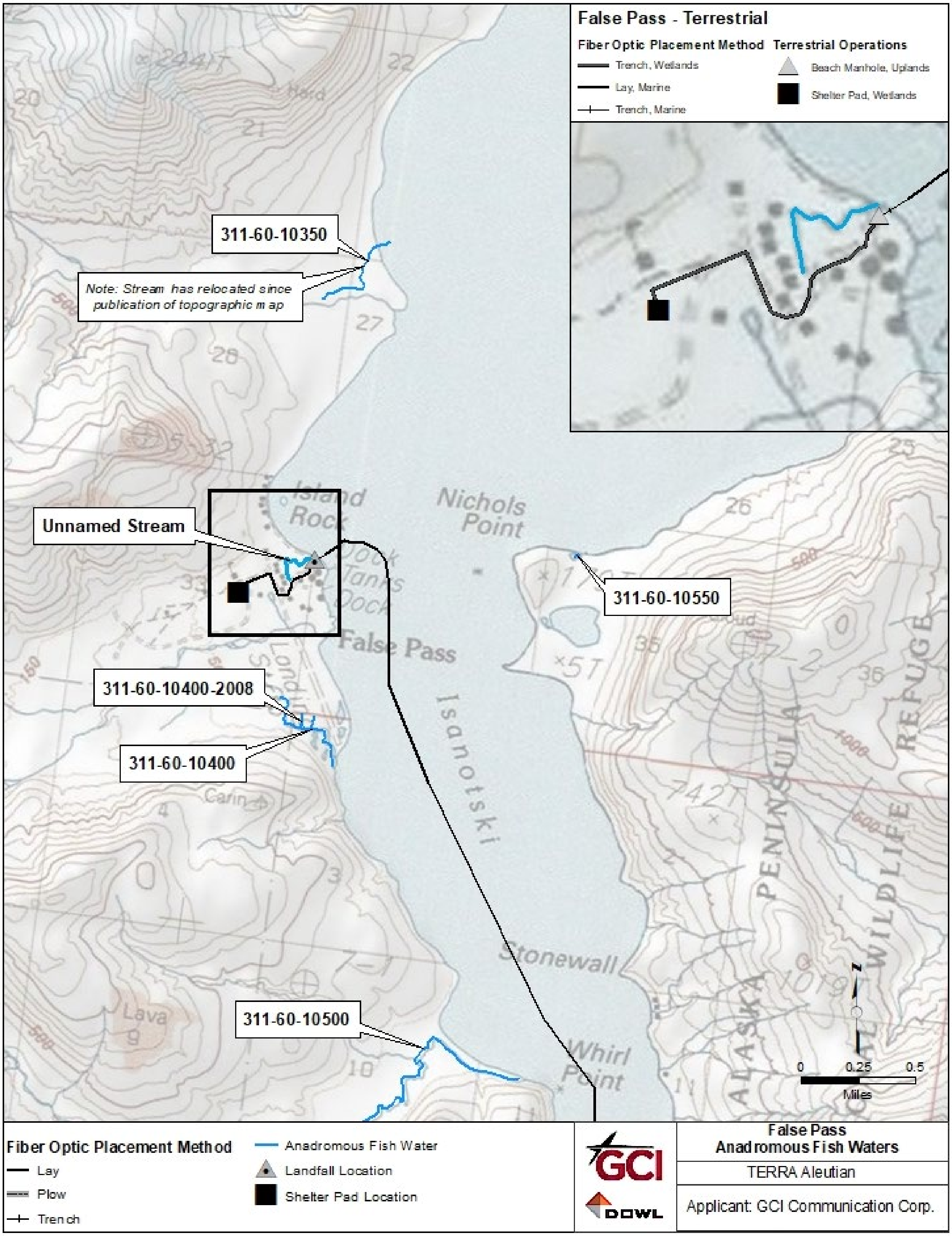

Figure 66. False Pass Landfall Area Streams

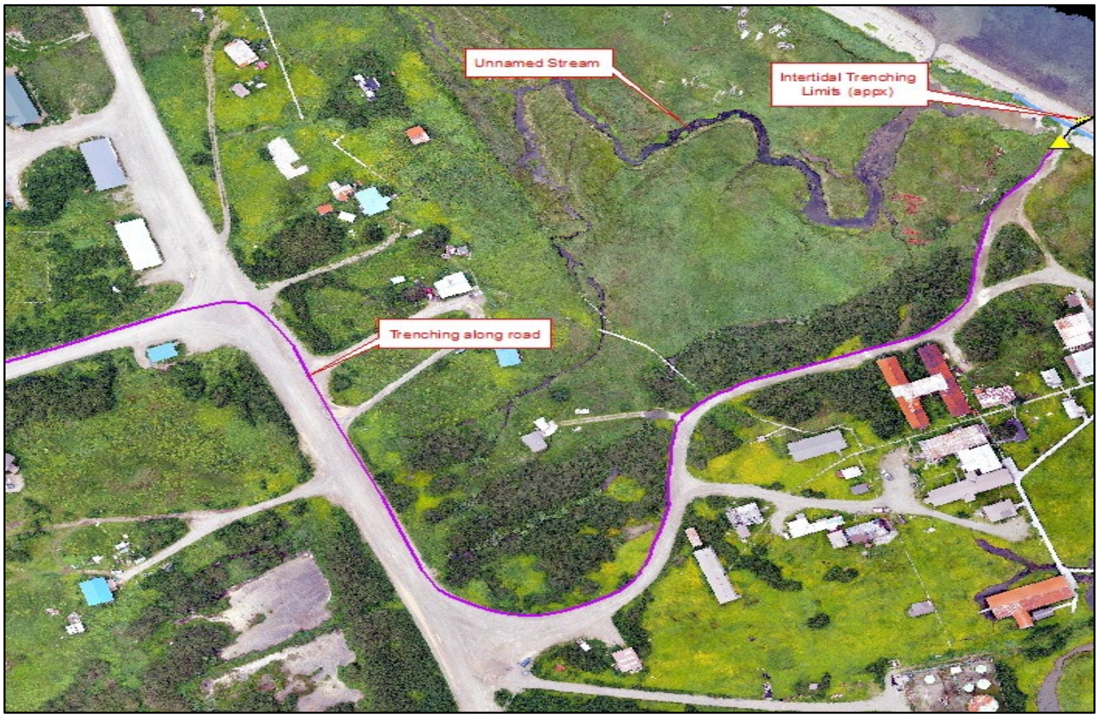

Figure 67. False Pass Landfall Existing Conditions Aerial

Figure 68. False Pass Landfall Existing Conditions Facing the Peter Pan Dock

Figure 69. False Pass Landfall Existing Substrates Facing the Peter Pan Dock

3.2.11 Akutan

Landfall is approximately 12 miles from the Bering Sea in Akutan Bay (Figure 12). The landing is located in the middle of the village just west of the village outfall pipe. The water off the Akutan landing is deep enough to allow a direct shore end landing from the deep-water cable burial vessel. The beach is mainly cobbles (Figures 71 and 72). Akutan has existing marine infrastructure that has impacted EFH: several seafood processing facilities and docks, ferry terminal, and riprapped slopes around the community.

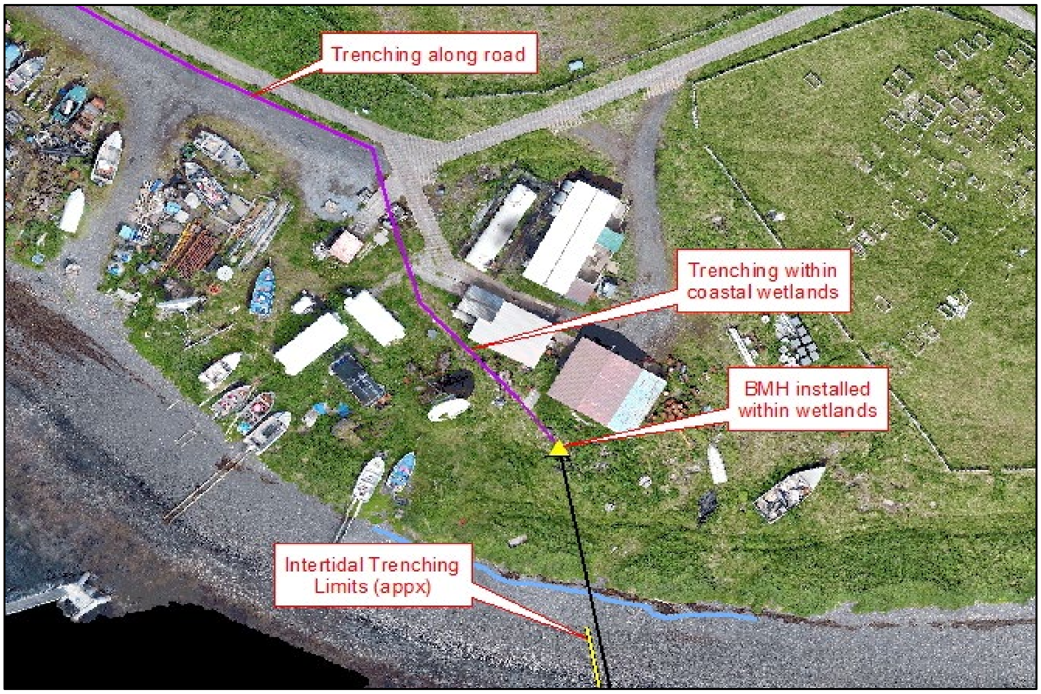

Figure 70. Akutan Landfall Existing Conditions

Photo credit NOAA 2017

Figure 71. Akutan Landfall Substrate

3.2.12 Unalaska

Landfall is approximately 10 miles from the Bering Sea within Unalaska Bay (Figure 12). The beach where the BMH will be located is dominated by cobbles and boulders (Figure 74). The waters off the Unalaska landing are deep enough to allow a direct shore end landing from the deep-water cable burial vessel.

The area around Unalaska has some development that has affected the current baseline conditions of EFH in the area: there is regular commercial fishing traffic and infrastructure to support the activities, a port area with a sea wall, ferry terminal and other large docks, piers, bridges, outfalls, and riprapped slopes around the community.

Figure 72. Unalaska Landfall Existing Conditions Aerial

DOWL

Figure 73. Unalaska Landfall Existing Substrates

4.0 EFFECTS ANALYSIS

Potential effects of the AU Aleutian project on EFH for the species listed in Table 2 are summarized in Table 3 and detailed in the sections below. All effects described in Table 3 will occur only during construction and are not expected to occur once the Project is operational.

Table 3. Potential Effects to Essential Fish Habitat from the AU Aleutian Project

Project Action	Potential Effects EFH	Type of Effect	Potential EFH Species Affected
Trenching, plowing	Alteration of habitat	Direct Temporary to short term	All species in Table 2
Trenching, plowing	Mortality (entrainment) of organisms in the excavation path	Direct Short term	All species in Table 2
Trenching, plowing	Turbidity	Indirect Temporary	All species in Table 2

Though NMFS's *Non-Fishing Impacts to EFH and Recommended Conservation Measures* (Limpinsel et al. 2017) mentions resuspension and release of contaminants and destruction of vertically complex hard bottom habitat (e.g., hard corals and vegetated rocky reef) as a potential effect of cable installation, these effects are not expected to occur as part of the project. Initial searches of contaminated sites databases show one existing contaminated sites in general vicinity of the cable route (ADEC 2018); this will be avoided. Additionally, marine surveys have identified areas with reefs and notable relief (TerraSond 2018) and the cable path will be rerouted to avoid them.

4.1 Direct Effects

4.1.1 Alteration of Habitat

Trenching and plowing will temporarily alter habitats in the plow path (4.6 m [15 ft] wide and up to 1.5 m [5 ft] deep) by disturbing substrates. Effects will occur once during construction and be short term; the proposed action will not permanently damage habitats. Trench spoils will be backfilled. In areas with large boulders, boulders will be replaced. Trenching and plowing will be used in areas where physical conditions or human activities could affect the line (e.g. areas with oil exploration, trawling, anchoring, bottom contact fisheries, etc.). Approximately 100.3 acres of temporary disturbance to the surface of the substrate over roughly 829.3 miles (Table 1 and Figure 14). Temporary alteration of habitat could affect EFH for all species in Table 2. Habitat would be expected to recover to pre-plowing or trenching conditions within 1 to 2 years. Recovery could be quicker if substrates are not colonized with algae or invertebrates.

4.1.2 Entrainment or Mortality

Entrainment or mortality of organisms in the plow path (4.6 m [15 ft] wide and up to 1.5 m [5 ft] deep) could occur. This will mainly occur for small species or juvenile fish that are benthic and use soft substrates, such as flounder, sole, turbot, some species of sculpin, skates, snow and tanner crab, some species of rockfish, squid, and scallops. Effects will occur once during construction, be short term, and occur to individual fish not populations. Trench spoils will be backfilled and will not be removed from the water, thus if organisms are entrained, but not injured, they will simply be displaced. The plowing and trenching footprint in which entrainment could occur will be approximately 100.3 acres over roughly 829.3 miles (Table 1 and Figure 14).

4.2 Indirect Effects

4.2.1 Increased Turbidity

Trenching and plowing below MHW will cause a temporary increase in suspended sediment and turbidity in areas with mobile substrates. Trenching and plowing will occur during construction, and will be limited to areas where physical conditions or human activities could affect the cable (e.g. areas with oil exploration, trawling, anchoring, bottom contact fisheries, etc.). This could cause temporary turbidity over the trenching and plowing route, which will be approximately 100.3 acres over roughly 829.3 miles (Table 1 and Figure 14). Increased turbidity can decrease primary production and temporarily alter phytoplankton communities. However, because the duration and severity of turbidity are expected to be localized and temporary, large changes in productivity or fish function are not expected. Temporary increases in turbidity could affect EFH for all species in Table 2.

Though trenching will occur above MHW in the area adjacent to designated EFH, best management practices from the project's USACE Nationwide Permit will be implemented. These include use of erosion and sediment control measures and revegetation of areas where vegetation is removed. With these BMPs in place, no suspended sediment or turbidity is expected to runoff to down gradient habitats, and thus no effects to EFH are anticipated from work above MHW.

4.3 Cumulative Effects

Though the MSA does not define cumulative effects, the Endangered Species Act defines them as future state, city/borough, or private activities that are reasonably certain to occur within the Action Area (50 CFR 402.02). Future federal actions are excluded because they would have their own consultation process. Cumulative effects include synergistic effects in which two stressors collectively cause greater harm than the effects of the overall impacts of an individual stressor.

Coastal Development

Coastal zone development may result in the loss of habitat, increased vessel traffic, increased pollutants and increased noise (during both construction and operations). As the population in human communities in Bristol Bay continue to grow, an increase in amount of pollutants that enter the bay may occur. Sources of pollutants in developed areas include runoff from streets and discharge from wastewater treatment facilities. Gas, oil, and coastal zone development projects also contribute to pollutants that may enter Bristol Bay through discharge. Significant development is not expected to take place in Bristol Bay; therefore, it would be expected that pollutants will likely not increase in Bristol Bay. Further, the Environmental Protection Agency and the ADEC will continue to regulate the amount of pollutants that enter Bristol Bay from point and non-point sources through Alaska Pollutant Discharge Elimination System (PDES) and National (PDES) permits. As a result, permitees will be required to renew their permits, verify they meet permit standards and potentially upgrade facilities. Additionally, the extreme tides and strong currents in Bristol Bay may contribute in reducing the amount of pollutants found in the region.

The proposed project will result in a minor and temporary increase in turbidity and entrainment of small benthic species, as well as a temporary alteration of EFH. While the broadband service will improve communications for communities throughout the region, it is not expected to result in substantial coastal development.

Commercial Fishing

Fishing is the primary industry in Bristol Bay. As long as fish stocks are sustainable, subsistence, personal use, recreational, and commercial fishing will continue to occur. As a result, there will be continued anchoring or trawling on the seafloor and lost or abandoned fishing gear. NMFS and the ADF&G will continue to manage fish stocks and regulate fishing to maintain sustainable stocks.

Oil and Gas Exploration and Development

It is unknown if the North Aleutian Basin will be re-opened to oil and gas exploration in the future. Potential impacts from gas and oil development on EFH include increased noise from seismic activity, construction of platforms and well drilling, discharge of wastewater, habitat loss from the construction of oil and gas facilities; and increased risk of a potential oil spill. The risk of these impacts may increase as oil and gas development increases; however, new development will undergo consultation with NMFS prior to exploration and development.

Mining

The potential impacts from mineral exploration and development, such as the Pebble Mine, include changes to water quality and/or quantity, increased wastewater discharges, and loss of habitat. The risk of these impacts may increase; however, new development will undergo consultation prior to start of work.

5.0 PROPOSED CONSERVATION MEASURES

GCI proposes the following conservation measures, which are in alignment with Limpinsel et al. (2017).

1. Align crossings to avoid rock reefs and shoals to the extent possible.
2. Avoid construction of permanent access channels since they disrupt natural drainage patterns and destroy wetlands through excavation, filling, and bank erosion.
3. Backfill excavated wetlands with either the same or comparable material capable of supporting similar wetland vegetation. Original marsh elevations will be restored, to the extent practicable. Topsoil and 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 so that following settling and compaction of the material, the proper pre-project elevation is attained. If excavated materials are insufficient to accomplish this, similar grain size material will be used to restore the trench to the required elevation. After backfilling, erosion protection measures will be implemented where needed.
4. Use existing rights-of-way whenever possible to lessen overall encroachment and disturbance of wetlands.

5. Access for equipment will be limited to the immediate project area. Tracked vehicles are preferred over wheeled vehicles. Consideration will be given to the use of mats and boards to minimize impacts.
6. Limit construction equipment to the minimum size necessary to complete the work. Shallow-draft equipment will be employed in shallow areas so as to minimize impacts and eliminate the necessity of temporary access channels.
7. The cable trench or plow path will be opened for the shortest duration possible and backfilled as soon as work is complete.
8. When possible, conduct construction during the time of year that will have the least impact on sensitive habitats and species (as determined by NMFS and/or ADF&G).
9. Use horizontal directional drilling where cables or pipelines would cross anadromous fish streams, salt marsh, vegetated intertidal zones, or steep erodible bluff areas adjacent to the intertidal zone.
10. Bury pipelines and submerged cables where possible. Unburied pipelines or pipelines buried in areas where scouring or wave activity eventually exposes them run a much greater risk of damage leading to leaks or spills.
11. Remove inactive pipelines and submerged cables unless they are located in sensitive areas (e.g., marsh, reefs, seagrass). If pipelines are allowed to remain in place, ensure that they are properly pigged, purged, filled with seawater, and capped.
12. Use silt curtains or other barriers to reduce turbidity and sedimentation near the project site whenever possible.
13. Locate alignments along routes that will minimize damage to marine and estuarine habitat. Avoid laying cable over high-relief bottom habitat and across live bottom habitats such as corals and sponges.

6.0 CONCLUSION AND EFFECTS DETERMINATION

The project will adversely affect EFH due to:

- Temporary habitat alteration in the plow or trench path during construction.
- Temporary localized increase in turbidity in the plow or trench path during construction.
- Short term entrainment or mortality of individuals in the plow or trench path during construction.

Although EFH in the action area will be adversely impacted, the Project will not impact EFH to the point of causing adverse impacts to fish populations. Individuals of a variety of species are expected to move successfully into similar habitats, since the types of habitats that will be affected are not unique or rare.

All effects would be temporary during construction and GCI has proposed a number of conservation measures to avoid and minimize impacts to the extent possible.

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