UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, AK 99802-1668

Endangered Species Act (ESA) Section 7(a)(2) Conference Opinion and Concurrence

Activity: AU-Aleutians II Fiber Optic Cable Project, Alaska

Action Agencies: National Telecommunications and Information Administration

Consulting Agency: National Marine Fisheries Service, Alaska Region

NMFS Consultation Number: AKRO-2023-03226

Issued by:

Jonathan M. Kurland

Regional Administrator

Date Issued: June 7, 2024

Affected Species and Determinations:

ESA-Listed Species	Status	Is the Action Likely to Adversely Affect the Species?	Is the Action Likely to Adversely Affect Critical Habitat?	Is the Action Likely To Jeopardize the Species?	Is the Action Likely To Destroy or Adversely Modify Critical Habitat?
Gray Whale, Western North Pacific DPS (*Eschrichtius robustus*)	Endangered	No	N/A	No	N/A
North Pacific Right Whale (*Eubalaena japonica*)	Endangered	No	No	No	No
Humpback Whale, Mexico DPS (*Megaptera novaeangliae*)	Threatened	No	No	No	No

ESA-Listed Species	Status	Is the Action Likely to Adversely Affect the Species?	Is the Action Likely to Adversely Affect Critical Habitat?	Is the Action Likely To Jeopardize the Species?	Is the Action Likely To Destroy or Adversely Modify Critical Habitat?
Humpback Whale, Western North Pacific DPS (*Megaptera novaeangliae*)	Endangered	No	No	No	No
Blue Whale (*Balaenoptera musculus*)	Endangered	No	N/A	No	N/A
Fin Whale (*Balaenoptera physalus*)	Endangered	No	N/A	No	N/A
Sperm Whale (*Physeter macrocephalus*)	Endangered	No	N/A	No	N/A
Steller Sea Lion, Western DPS (*Eumetopias jubatus*)	Endangered	No	No	No	No
Sunflower Sea Star (*Pycnopodia helianthoides*)	Proposed	Yes	N/A	No	N/A

N/A = Not Applicable

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AKR	Alaska Region
AKRO	Alaska Regional Office
BA	Biological Assessment
BHP	Brake Horsepower
BIA	Biologically Important Area
BMH	Beach manhole
CFR	Code of Federal Regulations
cm	Centimeter(s)
CV	Coefficient of Variation
dB rms re 1µPa	Decibel root-mean-squared as measured at 1 micropascal (in water)
DPS	Distinct Population Segment
DQA	Data Quality Act
ECO	Environmental Consultation Organizer
ESA	Endangered Species Act
FOC	Fiber Optic Cable
FR	Federal Register
ft	Foot/Feet
GCI	GCI Communication Corporation
in	Inch(es)
ITS	Incidental Take Statement
IWC	International Whaling Commission
kg	Kilogram(s)
km	Kilometer(s)
km^2	Square Kilometer(s)
KMA	Kodiak Management Area
km/hr	Kilometer(s)/Hour
kn	Knot(s)
kW	Kilowatt(s)
lb	Pound
lin ft	Linear Foot/Feet
m	Meter(s)
m^2	Square Meter(s)

mi	Mile(s)
mi^2	Square Mile(s)
MHW	Mean High Water
MLW	Mean Low Water
MLLW	Mean Lower Low Water
MMPA	Marine Mammal Protection Act
µPa	Micro Pascal(s)
N/A	Not Applicable
NEPA	National Environmental Policy Act
nm	Nautical Mile(s)
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NTIA	National Telecommunications and Information Administration
NVPL	Native Village of Port Lions
Opinion	Biological Opinion
Pa	Pascal(s)
RMS	Root Mean Square
RPM	Reasonable and Prudent Measure
SSWS	Sea Star Wasting Syndrome
SSL	Steller Sea Lion
TTS	Temporary Threshold Shift
Unicom	Unicom Incorporated
U.S.	United States
Weston	Weston Solutions, Incorporated
WNP	Western North Pacific
yd	Yard

1 INTRODUCTION

Section 7(a)(2) of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. § 1536(a)(2)) requires each Federal agency to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a Federal agency's action "may affect" a protected species, that agency is required to consult with the National Marine Fisheries Service (NMFS) or the U.S. Fish and Wildlife Service (USFWS), depending upon the endangered species, threatened species, or designated critical habitat that may be affected by the action (50 CFR § 402.14(a)). Federal agencies may fulfill this general requirement informally if they conclude that an action may affect, but "is not likely to adversely affect" endangered species, threatened species, or designated critical habitat, and NMFS or the USFWS concurs with that conclusion (50 CFR § 402.14(b)).

Section 7(b)(3) of the ESA requires that at the conclusion of consultation, NMFS and/or USFWS provide an opinion stating how the Federal agency's action is likely to affect ESA-listed species and their critical habitat. If incidental take is reasonably certain to occur, Section 7(b)(4) requires the consulting agency to provide an incidental take statement (ITS) that specifies the impact of any incidental taking, specifies those reasonable and prudent measures necessary or appropriate to minimize such impact, and sets forth terms and conditions to implement those measures.

Section 7(a)(4) of the ESA provides a mechanism for identifying and resolving potential conflicts between a proposed action and species or critical habitat proposed to be listed at an early planning stage. While consultations are required when the proposed action may affect listed species, a conference is required only when the proposed action is likely to jeopardize the continued existence of a proposed species or destroy or adversely modify proposed critical habitat. However, Federal action agencies may request a conference on any proposed action that may affect proposed species or proposed critical habitat. Conferences follow the same procedures, contents, and format as formal consultation and biological opinion. However, the incidental take statement provided with a conference opinion does not take effect until the Services adopt the conference opinion as a biological opinion on the proposed action - after the species is listed.

Updates to the regulations governing interagency consultations (50 CFR part 402) were effective on May 6, 2024 (89 Fed. Reg. 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to the Services' existing practice in implementing section 7(a)(2) of the Act. 89 Fed. Reg. at 24268; 84 Fed Reg. at 45015. We have considered the prior rules and affirm that the substantive analysis and conclusions articulated in this biological opinion and incidental take statement would not have been any different under the 2019 regulations or pre-2019 regulations.

In this document, the action agency is the National Telecommunications and Information Administration (NTIA), which proposes to add connecting fiber optic cable (FOC) to service seven communities along the Aleutian Islands. NTIA has contracted with Weston Solutions, Incorporated (Weston) to provide concept planning and environmental review (Biological

Assessment (BA)) for the project. The consulting agency for this proposal is the NMFS Alaska Region (AKR). This document represents NMFS's concurrence on the effects of the proposed action on the endangered Western North Pacific distinct population segment (DPS) gray whale, endangered North Pacific right whale, threatened Mexico DPS humpback whale, endangered Western North Pacific DPS humpback whale, endangered blue whale, endangered fin whale, endangered sperm whale, and endangered Western DPS Steller sea lion and a conference opinion (opinion) on the effects of the proposed action on the sunflower sea star, which is proposed for listing at threatened under the ESA (88 FR 16212, March 16, 2023).

The opinion and ITS were prepared by the NMFS AKR in accordance with Section 7(b) of the ESA (16 U.S.C. § 1536(b)) and implementing regulations at 50 CFR part 402.

The opinion and ITS are in compliance with the Data Quality Act (44 U.S.C. § 3504(d)(1)) and underwent pre-dissemination review.

1.1 Background

This opinion is based on information provided in the December 21, 2023, BA and subsequent revisions prepared and submitted by Weston. A complete record of this consultation is on file at NMFS's Alaska Regional Office (AKRO).

The proposed action involves the laying of FOC to provide high speed internet (broadband) to seven communities located on the south side of the Aleutian Islands, Alaska (Figure 1) with an expected start in June 2024.

The project would consist of several components completed over two phases with construction occurring from June 2024, to November 1, 2024, and then a final phase to complete the Chignik Lake site occurring in June 2025.

This opinion considers the effects of the following in-water activities on listed species likely to occur within the action area:

1. Laying FOC on the sea floor in areas more than 300 meters (m) (985 feet [ft]) offshore.

2. Connecting FOC to onshore stations via cables jetted into place within 300 m (985 ft) of the shoreline.

3. Operating the *IT Integrity* cable-laying ship for support and material supply vessel transit.

In addition, the action agency requested a conference on the proposed listing of the sunflower sea star (*Pycnopodia helianthoides*) (88 FR 16212, March 16, 2023) in the consultation, and requested concurrence with a likely to adversely affect determination. This opinion considers the effects of the project activities on the proposed threatened sunflower sea star. NMFS is not currently proposing designating critical habitat for the sunflower sea star.

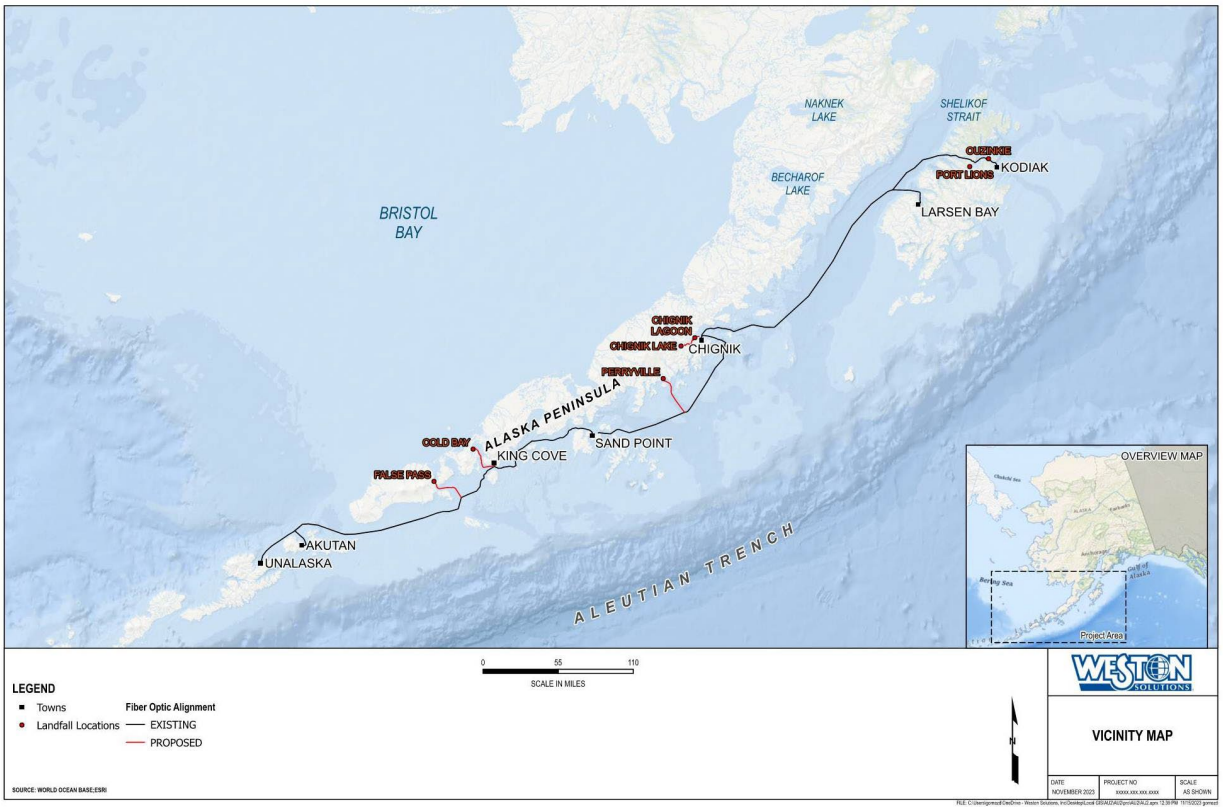

Figure 1. Vicinity map for the Aleutians II project showing the completed (blue) and proposed (red) segments of the fiber optic cable route (Weston 2024).

1.2 Consultation History

- August 22, 2019: NMFS issued a letter of concurrence on the Aleutians Fiber I Project (AKRO-2019-00892).
- November 2022: NMFS received a copy of the Protected Species Observer (PSO) Monitoring Report for the AKRO-2019-00892 project.
- December 21, 2023: NMFS received a request for reinitiation of consultation from NTIA and correspondence identifying Weston as NTIA's non-Federal representative for this project.
- December 21, 2023: Weston provided a BA for the proposed project.
- January 11, 2024: NMFS requested via email information about the project, including the aspects of the project that triggered NTIA to reinitiate consultation.
- January 19, 2024: Weston provided NMFS with information regarding the modified project components and the species that had changes to listing status or critical habitat, including the following:
    - change in lead Federal agency from U.S. Department of Agriculture Rural Utility Service to NTIA;
    - two new branch segments to the communities of Ouzinkie and Port Lions;
    - modified branch segments to Chignik Lagoon and Chignik Lake;
    - newly designated humpback whale critical habitat; and

    - the addition of sunflower sea stars, which were proposed for listing under the ESA in March 2023.
- January 25, 2024: NMFS requested revisions to add the transit routes to the action area.
- January 31, 2024: Weston provided an updated BA which included the requested changes.
- January 31, 2024: NMFS initiated informal consultation.
- February 16, 2024: Upon review of the potential for adverse effects to the sunflower sea star, NMFS informed the applicant that the project will require a formal conference opinion to assess the potential for proposed action to cause jeopardy for the species.
- February 23, 2024: NTIA's designee, Weston, submitted a request for a formal conference opinion and requested example mitigation language for the sunflower sea star.
- March 4, 2024: NMFS requested a breakdown of the FOC alignment in waters less than 120 m (394 ft) to allow a more accurate estimate of sunflower sea star impacts.
- March 4, 2024: NMFS provided the current sunflower sea star mitigation language for projects likely to encounter sea stars.
- March 11, 2024: Weston provided a breakdown of the FOC laying depths along the alignment and details on the dimensions and weight of the FOC.

2 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

2.1 Proposed Action

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the U.S. or upon the high seas. 50 C.F.R. § 402.02.

Unicom, Incorporated (Unicom), a wholly owned subsidiary of GCI Communication Corporation (GCI) is proposing to provide high speed internet (broadband) service to seven communities in Alaska by extending broadband service from the main cable to connect with onshore sites. The Aleutians II project will build upon work completed in 2021, which laid the main FOC line. Unicom is undertaking the project on behalf of the Native Village of Port Lions (NVPL) and with support from the NTIA Tribal Broadband Connectivity Program.

Construction is expected to occur over two summers spanning from May 1, 2024, through October 31, 2024, and from May 1, 2025, through October 31, 2025. However, the in-water work will not begin until June 1 each year, and in-water work the second season will focus on Chignik Lake and occur during June and July 2025.

2.1.1 Proposed Activities

The Aleutians II project is located along the south side of Aleutian Islands stretching from the west side of Kodiak Island to the community of False Pass (Figure 1). The Aleutians I (2021) project completed the baseline route beginning near Kodiak, continuing southwest down the Shelikof Strait, and then paralleling the Alaska Peninsula to the south until its final connection at Unalaska. The work for this portion of the project (Aleutians II) will stem off the baseline route with the final connection installed at False Pass.

Aleutians II will connect the FOC to the following communities:

- Ouzinkie
- Port Lions
- Chignik Lake
- Chignik Lagoon
- Perryville
- Cold Bay
- False Pass

The project will build upon the 2021 project (AKRO-2019-00892) which has completed approximately 1287.5 kilometers (km) (800 miles [mi]) of subsea FOC to extend broadband service to six remote communities for the Aleutians I project. The communities served by the 2021 project include:

- Larsen Bay
- Chignik Bay
- Sand Point
- King Cove
- Akutan
- Unalaska

The Aleutians II project will consist of approximately 176 km (109 mi) of submerged (laid on the sea floor) FOC. Detailed maps and photographs of each of the landing sites are provided in Figures 2 through 15 of the project BA (Weston 2024).

This project includes FOC installation by laying the cable on the sea floor, with the exception of nearshore areas within 298.8 m (980 ft) of mean low water (MLW) where the FOC is proposed to be encased in a sectioned, articulated pipe within the intertidal area at each of the seven landings by divers (Figure 2). The articulated pipe that will encase the cable is approximately 11.5 centimeters (cm) (4.5 inches (in.) in diameter. In the area within approximately 91m (300 ft) from MLW, the encased pipe will be buried by a diver using a hand-held water jet. In these nearshore areas where burial will occur, the burial depth will be no deeper than 0.9 m (3 ft) and there would be no resulting side cast. Once the encased FOC reaches the MLW line, it will be laid directly on the sea floor for up to 300 m (980 ft). The bare FOC has a diameter up to 2.6 cm (1.02 in)).

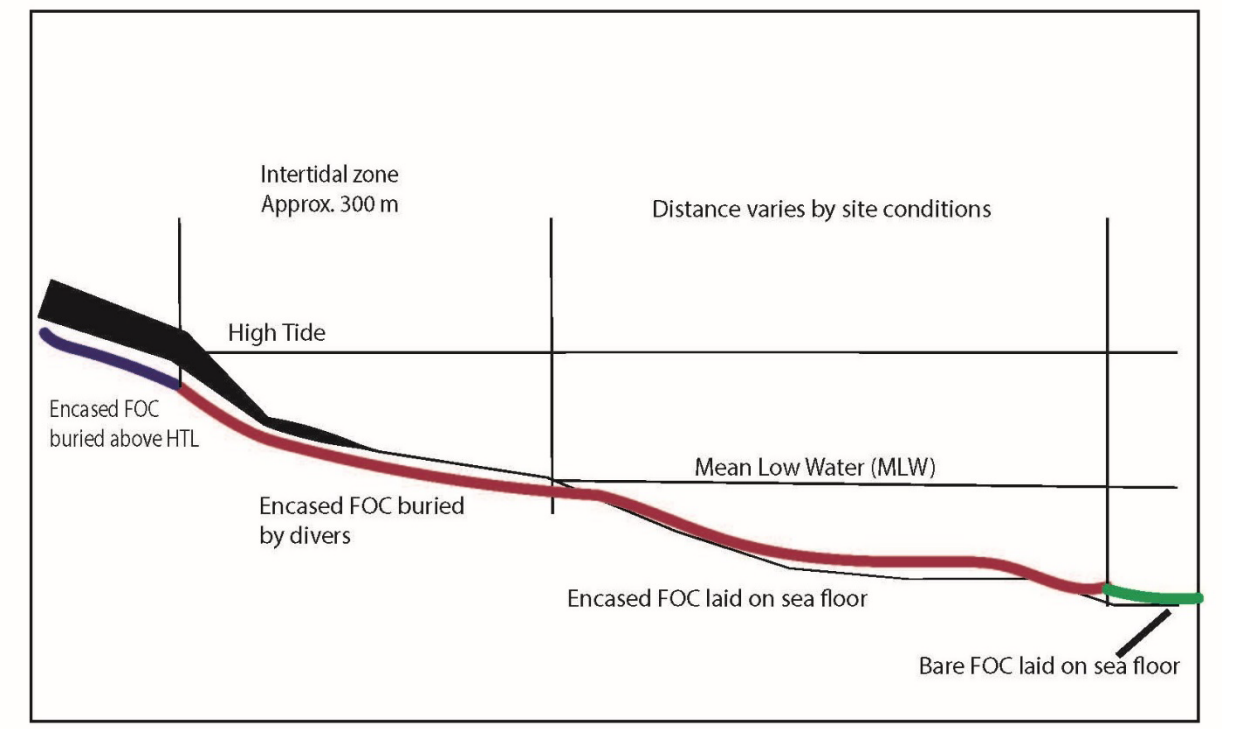

Figure 2. Illustration of the installation methods for sections of the fiber optic cable at nearshore sites for the Aleutians II project.

The project will begin work near Ouzinkie and progress along the Aleutians to the southwest, ending at False Pass. The intention in the project plan is to begin the subsea FOC laying in June 2024, and complete all sites by November 1, 2024, except for Chignik Lake which will be completed in June 2025. Cable-laying operations will occur 24 hours per day. The beach manhole (BMH) at Chignik Bay, installed in 2021, will be connected via intertidal FOC to the Chignik Lagoon landfall site near Packers Point as part of the 2024 work.

2.1.1.1 Offshore Cable Laying

Depending on bottom substrate, water depth, and distance from shore, the FOC will be laid on the sea floor. In offshore waters greater than 15 m (49 ft) deep, cable-lay operations will be conducted from a lay/burial cable ship (*IT Integrity*). The *IT Integrity* is 72 m (236 ft) in length and 16 m (52.5 ft) in breadth, with berths for a crew of 38. The ship is propelled by two 2,032-kilowatt (kW) (2,725-brake-horsepower [BHP]) main engines. A more detailed description of the ship can be found in Appendix A in the BA. Average speed for surface-laid cable is approximately 1.9 to 5.5 km/hour (1 to 3 kn. Dynamic positioning, maintained by two 750-kW gill thrusters, will be used only as needed for safety. The frequency would depend on weather and currents in the region. Support vessels may include a tug in the vicinity of the main lay/burial vessel. The FOC is approximately 2.6 cm (1.02 in) in diameter and weighs 1.5 kg/m (1.0 lb/linear foot (lin ft) in air.

2.1.1.2 Intertidal Cable Burial

The FOC will be laid from offshore to the BMH onshore to complete the cable installation.

Initially, the FOC will be spooled out along a preliminary alignment from the *IT Integrity* to shore. As the FOC is brought to shore for the preliminary placement, it will have floats attached at 10-m increments. The floats will be removed by divers sequentially, and the FOC will settle gradually to the sea floor rather than being dragged along the bottom.

After the FOC is resting on the bottom, FOC installation will proceed across three regions and levels of FOC protection. In the region that will be exposed during low tide (from Mean High Water [MHW] extending out to approximately 91 m [300 ft] from Mean Lower Low Water [MLLW]), the FOC will be encased in articulated split pipe and be trenched during low tide. Trenching will only occur along portions of the shoreline exposed during low tide, and jetting or trenching will not occur in water. In the region below MLLW out to a varying distance based on the sea floor slope and depth of waters offshore (Table 2-1), the FOC will be encased in articulated split pipe and laid directly on the sea floor. The split pipe weighs 57 kg/m (38.1 lbs/lin ft) in air. Beyond this region, the FOC will be laid directly on the sea floor with no additional armoring out to where it will be connected to the AU I cable already in place.

Table 2-1. Distances for Intertidal Installation Methods for each Fiber Optic Cable Landfall Site (Weston 2024)

Location	Distance (m) Articulated Encasement will be Trenched (MHW to MLLW, trenched at low tide)	Distance (m) Articulated Encasement will be Laid on Sea Floor (into open water from MLLW)	Total Intertidal Distance (m)
Ouzinkie	5	145	150
Port Lions	25	75	100
Chignik Bay[1]	135	65	200
Chignik Lagoon 1	25	0	25
Chignik Lagoon 2	75	0	75
Chignik Lake[2]	64*	36	100
Perryville	20	80	100
Cold Bay	15	85	100
False Pass	6	44	50

1. Chignik Bay was connected to the offshore FOC in 2021. In 2024 it will be connected to the Chignik Lagoon sites.
2. Includes 60 m of swampy area between the BMH and MHW.

For all intertidal areas, the following construction methods would apply:

- All trenching will have a maximum width of 0.9 m (3 ft) and depth of 0.9 m (3 ft).
- Any work below MHW will occur during low tide.
- Small utility boats (80-ft and 40-ft landing craft) will assist with pulling lines to the beach (3000-horsepowered engines).
- A small dive boat will carry the hand-jetting tools.

- Heavy equipment needing to operate in intertidal areas and wetlands will be placed on mats, with the exception of beaches with firm sediments, such as large cobble or boulders (e.g., Ouzinkie, False Pass).
- No excess material requiring disposal is expected to be produced.
- Alterations to shorelines would be temporary.
- Trenches would be constructed and backfilled to prevent them from acting as a drain.
- Hand jetting at each site will take approximately 1 day (12 hours).

2.1.2 Construction Sequence and Duration

The applicant expects to initiate terrestrial activities in May 2024, with the marine activities (cable laying) beginning by June 2024, and complete the final site for the project in Fall 2025. Intertidal cable activities are expected to occur for a total of approximately 12 hours over a single day at each site. The intertidal cable laying days will not necessarily be consecutive.

Uplands work will be completed independently of cable laying activities. The FOC will be linked to a new BMH at each landfall site. The BMH will be setback from MHW of the adjacent waterbody with a stub of conduit. Digging and sediment management will ensure that no aspect of the terrestrial construction has the potential to affect the in-water environment.

2.1.3 Mitigation Measures

For all reporting that results from implementation of these mitigation measures, NMFS will be contacted using the contact information specified in Table 2-3. In all cases, notification will reference the NMFS consultation tracking number AKRO-2023-03226.

The NTIA's representative, Weston, informed NMFS via the updated BA delivered via email on January 31, 2024, that the proposed action will incorporate the following mitigation measures:

2.1.3.1 General Mitigation Measures

1. The project proponent will inform NMFS of impending in-water activities a minimum of one week prior to the onset of those activities (email information to akr.prd.records@noaa.gov).

2. If construction activities will occur outside of the time window specified in this letter, the applicant will notify NMFS of the situation at least 60 days prior to the end of the specified time window to allow for reinitiation of consultation.

3. Nearshore in-water work will be conducted at the lowest points of the tidal cycle when feasible.

4. Consistent with AS 46.06.080, trash will be disposed of in accordance with state law. The project proponent will ensure that all closed loops (e.g., packing straps, rings, bands) will be cut prior to disposal. In addition, the project proponent will secure all ropes, nets, and other marine mammal entanglement hazards so they cannot enter marine waters.

2.1.3.2 PSO Requirements

5. At least one PSO will have either prior experience as a PSO in Alaska or will have completed a NMFS-approved PSO or marine mammal observer training course.

6. PSO training will include:

    a. field identification of marine mammals and marine mammal behavior;

    b. ecological information on marine mammals and specifics on the ecology and management concerns of those marine mammals;

    c. ESA and Marine Mammal Protection Act (MMPA) regulations;

    d. proper equipment use;

    e. methodologies in marine mammal observation and data recording and property reporting protocols; and

    f. an overview of PSO roles and responsibilities.

7. PSOs will be individuals independent from the project proponent and must have no other assigned tasks during monitoring periods.

8. The action agency or its designated non-Federal representative will provide resumes or qualifications of PSO candidates to the consultation biologist and akr.prd.records@noaa.gov for approval at least one week prior to in-water work. NMFS will provide a brief explanation of lack of approval in instances where an individual is not approved.

9. PSOs will:

    a. collectively be able to effectively observe the entirety of the shutdown zone;

    b. be able to identify marine mammals and accurately record the date, time, and species of all observed marine mammals in accordance with project protocols;

    c. be able to identify listed marine mammals that may occur in the action area at a distance equal to the outer edge of the applicable ensonified zone and determine marine mammal's location and distance from sound source;

    d. have the ability to effectively communicate orally, by radio or in person, with project personnel to provide real-time information on listed marine mammals;

    e. possess a copy of mitigation measures; and

    f. possess data forms.

10. PSOs will not scan for marine mammals for more than four hours without at least a one-

hour break from monitoring duties between shifts. PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.

2.1.3.3 Protected Species Observer Measures

11. PSOs will have the ability, authority, and obligation to order appropriate mitigation responses, including slowing the vessel and/or switching to neutral, to avoid takes of listed marine mammals.

12. One or more PSOs will perform PSO duties onsite throughout the duration of the authorized activity.

13. Where a team of three or more PSOs are required, a lead observer or monitoring coordinator will be designated.

14. For each in-water activity, PSOs will monitor all marine waters within the indicated ensonified zone radius for that activity (Table 2-2).

Table 2-2. Ensonified Zones for Each Activity

Activity	Zone Radius (m)
Offshore cable laying (*IT Integrity*)	1,800
Nearshore cable laying (divers/support vessel)	None

15. PSOs will be positioned such that they will collectively be able to monitor the entirety of each activity's ensonified zone.

16. Prior to commencing any activity listed in Table 2-2, PSOs will scan waters within the appropriate ensonified zone and confirm that no listed marine mammals are within the ensonified zone for at least 30 minutes immediately prior to initiation of the in-water activity. If one or more listed marine mammals are observed within the ensonified zone, the in-water activity will not begin until the listed marine mammals exit the ensonified zone of their own accord, or the ensonified zone has remained clear of listed marine mammals for 30 minutes immediately prior to the commencement of the activities listed in Table 2-2.

17. The on-duty PSOs will continuously monitor the ensonified zone and adjacent waters for the presence of listed marine mammals during daylight hours when any of the activities listed in Table 2-2 is ongoing.

18. The PSOs will order the vessel to reduce speed during activities listed in Table 2-2 if one or more listed marine mammals has entered, or appears likely to enter, the ensonified zone.

19. If a mitigative action (e.g., speed reduction or course alteration) is taken during any of the

activities listed in Table 2-2 for less than 30 minutes due to the presence of listed marine mammals in the ensonified zone, the activities may commence when the PSO provides assurance that listed marine mammals were observed exiting the ensonified zone. Otherwise, the activities may only commence after the PSO provides assurance that listed marine mammals have not been seen in the ensonified zone for 30 minutes (for cetaceans) or 15 minutes (for pinnipeds).

20. If a listed marine mammal is observed within an ensonified zone or is otherwise harassed, harmed, injured, or disturbed, the PSO will immediately report that occurrence to NMFS using the contact information specified in Table 2-3.

2.1.3.4 Vessels

21. Vessel operators will:

    a. During cable-laying operations, it is unsafe to stop activities; therefore, there are no shutdown procedures for this project. PSOs will observe a 1,500-m (4,921-ft) monitoring zone and report sightings to NMFS.

    b. maintain a watch for marine mammals at all times while underway;

    c. stay at least 91 m (100 yards [yds]) away from listed marine mammals but remain at least 460 m (500 yds) away from endangered North Pacific right whales;

    d. travel at less than 5 kn (9 km/hour) when within 274 m (300 yds) of a whale;

    e. avoid changes in direction and speed when within 274 m (300 yds) of a whale unless doing so is necessary for maritime safety;

    f. not position vessel(s) in the path of a whale and will not cut in front of a whale in a way or at a distance that causes the whale to change direction of travel or behavior (including breathing/surfacing pattern);

    g. check the waters immediately adjacent to the vessel(s) to ensure that no whales will be injured when the vessel gets underway; and

    h. reduce vessel speed to 10 kn or less when weather conditions reduce visibility to 1.6 km (1 mi) or less.

22. Vessel operators will adhere to the Alaska Humpback Whale Approach Regulations when vessels are transiting to and from the project site (see 50 CFR §§ 216.18, 223.214, and 224.103(b)). These regulations apply to all humpback whales. Specifically, the captain and crew will not:

    a. approach by any means, including by interception (i.e., placing a vessel in the path of an oncoming humpback whale), within 91 m (100 yds) of any humpback whale;

b. cause a vessel or other object to approach within 91 m (100 yds) of a humpback whale; or

c. disrupt the normal behavior or prior activity of a whale by any other act or omission.

d. If a whale's course and speed are such that it will likely cross in front of a vessel that is underway or approach within 91 m (100 yds) of the vessel and if maritime conditions safely allow, the engine will be put in neutral and the whale will be allowed to pass beyond the vessel, except that vessels will remain 460 m (500 yds) from North Pacific right whales.

23. Vessels will take reasonable steps to alert other vessels in the vicinity of whale(s).

24. Vessels will not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear. No materials capable of becoming entangled around marine mammals will be discarded into marine waters.

25. Project-specific vessels will travel at 12 kn or less.

Vessel Transit, Western Distinct Population Segment (DPS) Steller Sea Lions, and their Critical Habitat

26. Vessels will not approach within 5.5 km (3 nautical miles [nm]) of rookery sites listed in 50 CFR § 224.103(d).

27. Vessels will not approach within 914 m (3,000 ft) of any Steller sea lion haulout or rookery which is not listed in 50 CFR § 224.103(d).

28. If travel within 5.6 km (3 nm) of major rookeries or major haulouts is unavoidable, transiting vessels will reduce speed to 16.6 km/hour (9 kn) or less while within 5.6 km (3 nm) of those locations. Vessels laying cables are already operating at speeds less than 5.6 km/hour (3 kn).

29. Vessels will not allow tow lines to remain in the water, and no trash or other debris will be thrown overboard, thereby reducing the potential for marine mammal entanglement.

30. The transit route for the vessels will avoid known Steller sea lion Biologically Important Areas (BIAs) and designated critical habitat to the extent practicable.

31. Vessels may not be operated in such a way as to separate members of a group of marine mammals from other members of the group.

32. The ensonified zones (Table 2-2) Associated with each project activity will not extend into the area between the shoreline and the MLLW line.

2.1.3.5 Sunflower Sea Stars

The following mitigation measures would apply for all intertidal FOC placement activities:

33. Conduct a sunflower sea star survey prior to, but no more than 24 hours prior to, intertidal in-water work and jetting. These pre-work surveys will be conducted every day that work will be occurring within marine waters or exposed intertidal zones. Surveyors will systematically examine all substrate surfaces that will be affected by cable-laying work on that particular day. Survey transects should run roughly along isobaths, with 2-m separation between each transect line, until the area that will be jetted for FOC burial is surveyed. Surveys may be done on foot at low tide or by divers for areas where the substrate is not visible by foot during low tide.

34. Sunflower sea stars that are found will be gently moved into a container of water collected at the site and taken to a location away from the area to be jetted (or modified/disturbed) and gently released onto the substrate. Individuals will be held in a nylon net within the bucket of water for no more than 30 minutes. The number and approximate diameter of sunflower sea stars moved will be recorded and reported to NMFS. If it appears that a sunflower sea star has sea star wasting syndrome or if any dead sunflower sea stars are observed, take pictures of the individuals and count how many appear to be infected, but do not touch or move these individuals. Attachment A provides information on sunflower sea star identification, additional details on the survey design, sea star wasting syndrome, and templates for estimation of sunflower sea star size. Those individuals working with sunflower sea stars, such as divers and surveyors, will be trained on necessary information as included in Attachment A.

35. If a sunflower sea star is attached to a rock or structure being removed from the water, the sunflower sea star will be gently removed by the Lead PSO, or a crew delegate due to possible safety concerns, and immediately released into an intertidal location outside of the disturbed area where harm or injury cannot occur.

Reporting

36. If it appears that a sunflower sea star has sea star wasting syndrome or if any dead sunflower sea stars are observed, pictures of the individuals will be taken, and infected individuals will be counted. The infected sunflower sea stars will not be touched or moved. These and all sunflower sea star survey findings will be reported to NMFS, including latitude/longitude and transect line, at akr.prd.records@noaa.gov.

2.1.3.6 General Data Collection and Reporting

Data Collection

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

2. The action agency will ensure that PSO data will be submitted electronically in a format that can be queried such as a spreadsheet or database (i.e., digital images of data sheets

are not sufficient).

3. PSOs will record the following:

    a. the date, shift start time, shift stop time, and PSO identifier;

    b. date and time of each reportable event (e.g., a marine mammal observation, operation shutdown, reason for operation shutdown, change in weather);

    c. weather parameters (e.g., percent cloud cover, percent glare, visibility) and sea state where the Beaufort Wind Force Scale will be used to determine the sea state (https://www.weather.gov/mfl/beaufort);

    d. species, numbers, and, if possible, sex and age class of observed marine mammals and observation date, time, and location;

    e. the predominant anthropogenic sound-producing activities occurring during each marine mammal observation;

    f. observations of marine mammal behaviors and reactions to anthropogenic sounds and human presence;

    g. initial, closest, and last known location of marine mammals, including distance from observer to the marine mammal and minimum distance from the predominant sound-producing activity or activities to marine mammals;

    h. whether the presence of marine mammals necessitated the implementation of mitigation measures to avoid acoustic impact and the duration of time that normal operations were affected by the presence of marine mammals; and

    i. geographic coordinates for the observed animals (or location noted on a chart) with the position recorded using the most precise coordinates practicable (coordinates will be recorded in decimal degrees or similar standard and defined coordinate system).

Data Reporting

4. Observations of humpback whales will be transmitted to akr.prd.records@noaa.gov by the end of the calendar year and will include information specified in this General Data Collection and Reporting section and photographs and videos obtained of humpback whales, most notably those of the whale's flukes.

Unauthorized Take

5. If a listed marine mammal is determined by the PSO to have been disturbed, harassed, harmed, injured, or killed (e.g., a listed marine mammal is observed entering a shutdown zone before operations can be shut down or is injured or killed as a direct or indirect result of this action), the PSO will report the incident to NMFS

(akr.prd.records@noaa.gov) within one business day. The report will include:

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

b. the date, time, and location of each event (provide geographic coordinates);

c. description of the event;

d. number of individuals of each listed marine mammal species affected;

e. the time the animal(s) was first observed or entered the shutdown zone and, if known, the time the animal was last seen or exited the zone and the fate of the animal;

f. mitigation measures implemented prior to and after the animal was taken;

g. if a vessel struck a marine mammal, the contact information for the PSO on duty or the contact information for the individual piloting the vessel if there was no PSO on duty; and

h. photographs or video footage of the animal(s) (if available).

Stranded, Injured, Sick or Dead Marine Mammal (not associated with the project)

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

Illegal Activities

7. If PSOs observe marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS AKR Office of Law Enforcement at 1-800-853-1964 (Table 2-3).

8. Data submitted to NMFS will include date, time, location, description of the event, and any photos or videos taken.

North Pacific Right Whales

9. All observations of North Pacific right whales will be reported to NMFS within 24 hours via (akr.prd.records@noaa.gov). If possible, please include the location the right whale was seen and any video or photographs taken.

Monthly Report

10. Submit interim monthly PSO monitoring and sunflower sea star survey reports, including data sheets. These reports will include a summary of marine mammal species and behavioral observations, shutdowns or delays, and work completed.

11. Monthly reports will be submitted to akr.prd.records@noaa.gov by the 15th day of the month following the reporting period. For example, the report for activities conducted in June 2024, will be submitted by July 15, 2024.

Final Report

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

13. The final report will include:

    a. summaries of monitoring efforts, including dates and times of FOC laying, dates and times of monitoring, dates and times and duration of shutdowns due to marine mammal presence;

    b. date and time of marine mammal observations, geographic coordinates of marine mammals at their closest approach to the project site, marine mammal species, numbers, age/size/sex categories (if determinable), and group sizes;

    c. number of marine mammals observed (by species) during periods with and without project activities (and other variables that could affect detectability);

    d. observed marine mammal behaviors and movement types versus project activity at time of observation;

    e. numbers of marine mammal observations/individuals seen versus project activity at time of observation;

    f. distribution of marine mammals around the action area versus project activity at time of observation;

    g. number, size, and location of all sunflower sea stars encountered during intertidal surveys and activities, including how many were observed to have symptoms of sea star wasting disease; and

    h. digital, queryable documents containing PSO observations and records and

digital, queryable reports.

Table 2-3. Summary of Agency Contact Information

Reason for Contact	Contact Information
Consultation Questions & Unauthorized Take	mailto:AKR.prd.section7@noaa.gov and Leanne Roulson (leanne.roulson@noaa.gov)
Reports & Data Submittal	AKR.prd.records@noaa.gov (please include NMFS tracking number AKRO-2023-03226 in subject line)
Stranded, Injured, or Dead Marine Mammal (*not related to project activities*)	Stranding Hotline (24/7 coverage): 877-925-7773
Oil Spill & Hazardous Materials Response	U.S. Coast Guard National Response Center: 1-800-424-8802 & AKRNMFSSpillResponse@noaa.gov
Illegal Activities (*not related to project activities; e.g., feeding, unauthorized harassment, or disturbance to marine mammals*)	NMFS Office of Law Enforcement (Alaska Hotline): 1-800-853-1964
In the event that this contact information becomes obsolete	NMFS Anchorage Main Office: 907-271-5006 or NMFS Juneau Main Office: 907-586-7236

2.2 Action Area

"Action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR § 402.02). For this reason, the action area is typically larger than the project area and extends out to a point where no measurable effects from the proposed action occur.

NMFS defines the action area for this project as the area within which project-related noise levels are ≥120 decibel (dB) root-mean square (rms) as measured in water (dB rms re 1µPa) or approaching ambient noise levels (i.e., the point where project-related sound attenuates to levels below nonanthropogenic sound).[1] Ambient noise refers only to natural sounds like that produced by wind, waves, fish, and crustaceans. It does not include sounds from a busy port, frequent ship

[1] We express noise as the sound force per unit micropascals (µPa), where 1 pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of one square meter (m^2). Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1 µPa, and the units for underwater sound pressure levels are decibels (dB) expressed in root mean square (rms), which is the square root of the arithmetic average of the squared instantaneous pressure values.

traffic, or any other man-made sound. Received sound levels associated with vessel operation are expected to decline to 120 dBrms re 1µPa within 1.8 km (1.1 mi) on either side of the source. To define the action area, we considered the size and type of vessels being used, the speed and equipment being used to lay the cable, characteristics of the marine environment such as depth and bottom compositions, and empirical measurements of noise from similar projects (Illingworth and Rodkin 2016). The *IT Integrity* is smaller than the *Ile de Brehat*, the ship assessed in Illingworth and Rodkin (2016), and the cable-laying operations used a plow to bury the FOC. This project will not include the use of a plow to bury the FOC. The FOC will be laid on the sea floor or buried by a diver using a water jet in nearshore areas. Therefore, sound pressure levels produced by the *IT Integrity* are expected to be lower than those produced by the *Ile de Brehat*, and NMFS expects the use of this sound level to be a conservative proxy for the *IT Integrity*.

NMFS defines the action area for this project to include the vessel cable-laying routes (Figure 1), bounded by a buffer of 1.8 km (1.1 mi) on each side of the route for areas in which the cable-laying ship will be used based on the area of increased noise from vessel operations. The action area also includes the vessel transit route between branch segments plus a buffer of 8 m (26.25 ft) (a total width equal to the width of the *IT Integrity*) on each side of the transit route in areas where the *IT Integrity* is transiting between branch segment locations (i.e., not using dynamic positioning/laying FOC). The total action area encompasses approximately 673.27 square kilometers (km^2) (260 square miles [mi^2]) as summarized in Table 2-4.

Table 2-4. Action Area Dimensions and Total Area for the Cable-laying Operations and Transit between Sites for the Aleutian II Project

Description	Length of Route (km/mi)	Width of Route including Buffer (km/mi)	Total Area (km^2)	Total Area (mi^2)
Cable-laying ship operations (*IT Integrity*)	176.01/109.37	3.6/2.2	651.12[a]	251.4[a]
Vessel transit between segments	1,384.37/ 860.21	0.016/0.01	22.15	8.6
Totals	**1,560.38/ 969.58**		**673.27**	**260.0**

[a] The area presented is the total sum of ensonified areas along all branch segment routes. The maximum area ensonified to the 120-dB acoustic threshold at any given time would be 10.18 km^2 (3.93 mi^2).

3 RANGEWIDE STATUS OF THE SPECIES AND CRITICAL HABITAT

This opinion and concurrence consider the effects of the proposed action on the species and designated critical habitats specified in Table 3-1 and Table 3-2.

We have assessed the critical habitats and their overlap with the action area. There is no overlap with critical habitat for North Pacific right whale in the action area; therefore, NTIA concluded that there will be no effect to critical habitat due to the proposed action for this species and it is

not considered further in this opinion. The FOC alignment passes through Mexico DPS and WNP DPS humpback whale and Western DPS Steller sea lion designated critical habitat. Critical habitat has not been designated for the gray whale, fin whale, blue whale, sperm whale, or sunflower sea star.

Please note the following abbreviations are only used in Table 3-1 and Table 3-2 and are not, therefore, included in the list of acronyms: E = endangered; T = threatened; LAA = likely to adversely affect; NLAA = may affect, not likely to adversely affect, NE= no effect.

3.1 Effects Determinations for ESA-Listed Species and Critical Habitat

Table 3-1. ESA-listed Species in the Action Area and Effect Determinations

Species	Status	Listing	NMFS Effect Determination
Gray Whale, Western North Pacific (WNP) DPS (*Eschrichtius robustus*)	E	NMFS 1970, 35 FR 18319	NLAA
North Pacific Right Whale (*Eubalaena japonica*)	E	NMFS 2008, 73 FR 12024	NLAA
Fin Whale (*Balaenoptera physalus*)	E	NMFS 1970, 35 FR 18319	NLAA
Blue whale (*Balaenoptera musculus*)	E	NMFS 1970, 35 FR 18319	NLAA
Sperm Whale (*Physeter macrocephalus*)	E	NMFS 1970, 35 FR 18319	NLAA
Humpback Whale, Mexico DPS (*Megaptera novaeangliae*)	T	NMFS 2016, 81 FR 62260	NLAA
Humpback Whale, WNP DPS (*Megaptera novaeangliae*)	E	NMFS 2016, 81 FR 62260	NLAA
Steller Sea Lion, Western DPS (*Eumetopias jubatus*)	E	NMFS 1997, 62 FR 24345	NLAA
Sunflower Sea Star (*Pycnopodia helianthoides*)	Proposed	N/A	LAA

Table 3-2. Listed Species and Determinations of Effect to Their Critical Habitat from the Proposed Action

Species	Critical Habitat Overlap with the Action Area (km^2/mi^2)	Critical Habitat Rule/ Date	NMFS Effect Determination (Critical Habitat)
North Pacific Right Whale (*Eubalaena japonica*)	No overlap	NMFS 2008, 73 FR 19000	---
Humpback Whale, Mexico DPS (*Megaptera novaeangliae*)	992.5/ 383.11	NMFS 2021, 86 FR 21082	NLAA
Humpback Whale, Western North Pacific DPS (*Megaptera novaeangliae*)	992.5/ 383.11	NMFS 2021, 86 FR 21082	NLAA
Steller Sea Lion, Western DPS (*Eumetopias jubatus*)	1,261.9/ 487.1	NMFS 1993, 58 FR 45269	NLAA

3.2 Climate Change

Global climate change is a threat that affects all species. Because it is a shared threat, we present this narrative here rather than in each of the species-specific effect analyses that follow. A vast amount of literature is available on climate change and for more detailed information we refer the reader to these websites which provide the latest data and links to the current state of knowledge on the topic:

https://www.ipcc.ch/reports/

https://climate.nasa.gov/evidence/

http://nsidc.org/arcticseaicenews/

https://arctic.noaa.gov/Report-Card

The listed and proposed species we consider in this opinion live in the ocean and depend on the ocean for nearly every aspect of their life history. Factors which affect the ocean, like temperature and pH, can have direct and indirect impacts on listed and proposed species and the resources they depend upon. Global climate change may affect all the species we consider in this opinion, but it is expected to affect them differently. First, we provide background on the physical effects climate change has caused on a broad scale; then we focus on changes that have occurred in Alaska.

3.3 Species and Critical Habitat Not Likely to be Adversely Affected by the Proposed Action

NMFS uses two criteria to identify those endangered or threatened species that are likely to be adversely affected. The first criterion is exposure or some reasonable expectation of a co-

occurrence between one or more potential stressors associated with the proposed activities and a listed species or designated critical habitat. The second criterion is the probability of a response given exposure. The applicable standard to find that a proposed action is "not likely to adversely affect" listed species or critical habitat is that all of the effects of the action are expected to be insignificant, discountable, or wholly beneficial. Insignificant effects relate to the size of the impact and would not be able to be meaningfully measured or detected and should never reach the scale where take occurs. Discountable effects are those that are extremely unlikely to occur. Beneficial effects are contemporaneous positive effects without any adverse effects to the species.

3.3.1 Project Stressors Evaluated

The potential effects of the proposed action on listed species and critical habitat include vessel strikes and disturbance from noise generated by vessels during the cable-laying process.

3.3.1.1 Vessel Strike Risk

Ship strikes can cause major wounds or death to marine mammals. An animal at the surface could be struck directly by a vessel, a surfacing animal could hit the bottom of a vessel, or a vessel propeller could injure or kill an animal below the water's surface. From 1978 to 2011, there were at least 108 recorded whale-vessel collisions in Alaska, with the majority occurring in Southeast Alaska between May and September (Neilson et al. 2012). Small recreational vessels traveling at speeds over 13 kn (24 km/hour [hr]) were most commonly involved in ship strike encounters; however, all types and sizes of vessels were reported (Neilson et al. 2012).

The majority of vessel strikes involved humpback whales (86 percent), and the number of humpback strikes increased annually by 5.8 percent from 1978 to 2011. Fin whales accounted for 2.8 percent of reported collisions, while gray whales were 0.9 percent, and sperm whales were 0.9 percent.

The probability of strike depends on the frequency, speed, and route of the marine vessels, as well as the distribution and density of marine mammals in the area. Vanderlaan and Taggart (2007) used observations to develop a model of the probability of lethal injury based on vessel speed. They projected that the chance of lethal injury to a whale struck by a vessel travelling at speeds over 15 kn (27.78 km/hr) is approximately 80 percent, while for vessels travelling between 8.6 and 15 kn (15.92 km/hr), the probability of lethal injury drops to about 20 percent. The *IT Integrity* cable-laying vessel will be travelling at much slower speeds (typically 0.5-2.0 kn [1-4 km/hr]), essentially eliminating the possibility of vessel strike.

Although risk of ship strike has not been identified as a significant concern for Steller sea lions (Loughlin and York 2000), the recovery plan for this species (NMFS 2008) states that Steller sea lions may be more susceptible to ship strike mortality or injury in harbors or near rookeries or haulouts where animals are concentrated. To minimize this risk, project vessels will avoid travelling within 3 nm (5.6 km) of major Steller sea lion haulouts or rookeries. Even if project vessels encounter Steller sea lions, collisions are extremely unlikely due to sea lions' speed and maneuverability and the slow velocity of project vessels.

Project vessels will not enter North Pacific right whale designated critical habitat. Project vessels will also adhere to National Oceanic and Atmospheric Administration (NOAA)/NMFS marine mammal viewing guidelines (NOAA 2017). Given the expected effectiveness of these measures, the low density of listed cetaceans along the cable-laying route, and the ability of listed pinnipeds to avoid vessels due to their maneuverability, the probability of a vessel striking a listed marine mammal is very small, and thus adverse effects to these species are extremely unlikely to occur. Therefore, we conclude that adverse effects to marine mammals from vessel strikes related to the Aleutians II FOC project are discountable.

3.3.1.2 Disturbance Due to Vessel Presence

Auditory or visual disturbance to listed marine mammals could potentially occur along the FOC-laying route. The primary underwater noise associated with the proposed vessel operation is the continuous noise produced from propellers, including propeller harmonics (Gray and Greeley 1980) and cavitation. When calculating the action area, the NTIA (in their BA) determined a disturbance radius (to the 120 dB isopleth) of 1.8 km (1.1 mi) for the cable-laying ship.

Marine mammals' reactions to vessel disturbance may include approach or deflection from the noise source, low level avoidance or short-term vigilance behavior, or short-term masking of echolocation or acoustic communication among individuals. Behavioral reactions to vessels can vary depending on the type and speed of the vessel, the spatial relationship between the animal and the vessel, the species, and the behavior of the animal prior exposure. Response also varies between individuals of the same species exposed to the same sound, depending on age and individual whales' past experiences. Vessels moving at slow speeds and avoiding rapid changes in direction or engine speed may be tolerated by some whales. Other individuals may deflect around vessels and continue on their migratory path; these behaviors are not likely to result in significant disruption of normal behavioral patterns. Whales have been known to tolerate slow-moving vessels within several hundred meters, especially when the vessel is not directed toward the animal and when there are no sudden changes in direction or engine speed (Wartzok et al. 1989, Richardson et al. 1995, Heide-Jørgensen et al. 2003).

Although some listed marine mammals could receive sound levels in exceedance of the acoustic threshold of 120 dB from the vessels during this proposed project, take is unlikely to occur. Vessel transit for this proposed project is not likely to acoustically harass listed species, per the steps to assess harassment in the Interim Guidance on the ESA Term "Harass" (Wieting 2016). While listed marine mammals will likely be exposed to vessel noise from this proposed project, the noise will be low-frequency, with much of the acoustic energy occurring below frequencies associated with best hearing for the marine mammals expected to occur in the area. The duration of the exposure will be temporary (a few minutes) because the vessel will be in transit. Project vessels are travelling at very low speeds, and the noise from the vessels will be continuous, alerting marine mammals of their presence before the received level of sound exceeds 120 dB. Therefore, a startle response is not expected. Rather, deflection and avoidance are expected to be common responses in those instances where there is any response at all. The implementation of mitigation measures is expected to further reduce the probability of marine mammals reacting to transiting vessels.

The lack of adverse effects to marine mammals from cable-laying vessels is supported by recent

marine mammal observations in the Arctic and the PSO report from the 2022 Aleutians I FOC project (Smultea Sciences 2022). In 2016, NMFS conducted a formal consultation for Quintillion Subsea Operations, a similar cable-laying project in the Arctic. Final marine mammal PSO reports (2016 and 2017) for the Quintillion project (Blees et al. 2017; Green et al. 2018) provided the following information.

- In 2016 and 2017, reactionary behaviors were documented during only 2 to 3 percent of all cetacean observations. Reactions included change of direction, avoidance, and swimming speed increase.
- None of the remaining 299 groups or 669 cetacean individuals encountered over the two years of monitoring exhibited a reaction to the presence of the cable ship.
- A majority of pinniped groups and individuals in 2016 and 2017, respectively, did not react to vessel activities. The most commonly observed reaction was "look", meaning the animal acknowledged the presence of the vessel. Other reactions included diving, increased swimming speed, or clearly changing travel direction. No reactions were indications of the animals exhibiting threat or flee responses but were rather more curiosity or avoidance behaviors.
- The 2022 PSO report from the Aleutians I FOC project recorded similar results. Out of 196 observations comprising 378 marine mammals, only 1.5 percent of individuals were observed to react to the presence of the FOC vessel. All reactions recorded were incidences of Steller sea lions (3) or sea otters (2) orienting to look at the vessel.

The information from the Quintillion and Aleutians I reports provides substantiation that marine mammal response, if any, to these cable-laying vessels is not expected to rise to the level of harassment or take of ESA-listed species.

With implementation of the mitigation measures incorporated into the project design, vessel transit is not expected to significantly disrupt normal marine mammal behavioral patterns (breeding, feeding, sheltering, resting, migrating, etc.), making harassment of listed marine mammals very unlikely. Therefore, disturbance from the *IT Intrepid* FOC-laying vessel is extremely unlikely to harass listed marine mammals, and such effects are discountable.

3.3.1.3 Project Stressors Summary

We applied these criteria to the species listed in Table 3-1 and determined that the proposed project **may affect and is not likely to adversely affect** the WNP DPS gray whale, North Pacific right whale, fin whale, blue whale, sperm whale, humpback whale, and Western DPS Steller sea lion due to the noise and vessel operation associated with the FOC installation activity. NMFS determined that noise associated with the installation will not result in behavioral effects that will have biologically significant impacts. Further, these cetacean species are primarily associated with deeper waters in the Gulf of Alaska, and several are extremely unlikely to occur in the action area where they would be affected by the vessel operation. The applicant has agreed to implement the Alaska Standard Mitigation Measures (See Section 2.1.3) throughout the duration of the project to reduce exposure to noise and risk from ship strikes associated with the activity. Mitigation measures include vessel-based monitoring and speed or course alteration when a marine mammal is sighted. We provide species-specific assessments of each stressor in the following sections.

The 2022 PSO report from the Aleutians I project was used as a data source to evaluate the likelihood of listed species along the alignment (Smultea Sciences 2022). Throughout the Aleutians I project, PSOs recorded a total of 196 protected species detections composed of an estimated 378 individuals, all of which were marine mammals. Of these detections, 143 were identified as listed species, including 26 fin whale (38 individuals), 103 humpback whale (171 individuals), and 14 Steller sea lion (22 individuals). The cable-laying vessel implemented mitigation measures and reduced vessel speed each of the four times that a marine mammal was observed in the prescribed detection zone (1.8 km [1.12 mi]).

3.3.2 Western North Pacific DPS Gray Whale

The gray whale (*Eschrichtius robustus*) was originally listed as endangered in 1970 (35 FR 8491, June 2, 1970 [baleen whales listing]; 35 FR 18319, December 2, 1970 [gray whale listing]). The Eastern North Pacific DPS stock was delisted on June 16, 1994 (59 FR 31094), when it reached pre-exploitation numbers. The WNP population of gray whales remains listed as endangered. Critical habitat has not been designated for this DPS. The WNP DPS gray whales are considered to be gray whales that spend all or part of their lives in the western North Pacific waters off Vietnam, China, Japan, Korea (Republic of Korea and/or Democratic People's Republic of Korea), or the Russian Far East, including southern and southeastern Kamchatka but not necessarily areas north of 55°N in eastern Kamchatka (NMFS 2023). Some WNP DPS gray whales spend part of their time in U.S. waters. The population size of the WNP DPS gray whales was estimated from photo-identification data for Sakhalin and Kamchatka at 290 non-calf whales in 2016 (90 percentile intervals = 271-311; Cooke et al. 2017; Cooke 2018). The non-ESA-listed Eastern North Pacific DPS gray whale population is estimated at approximately 14,526 individuals (Eguchi et al. 2023).

The specific migration route and timing of the WNP DPS gray whales are unknown, making it very difficult to predict when and where they might pass through the Aleutian Island chain or along the coast of Alaska.

It is expected that approximately 0.4 to 1.6 percent of the gray whales found in the eastern North Pacific Ocean wintering areas (Mexico) and migratory corridor (U.S. West Coast [Alaska, Washington, Oregon, and California], Canada, and Mexico) are from the WNP DPS (Damon-Randall 2023). Therefore, there is a low likelihood that a gray whale from the WNP DPS will be encountered in Alaskan waters along the Aleutian Islands, Gulf of Alaska, and Southeast Alaska.

More information can be found at:

Gray Whale Species Description

Marine Mammal Stock Assessment Report: Cetaceans-Large Whales

2023 WNP DPS Gray Whale Status Review

3.3.2.1 Western North Pacific Gray Whales in the Action Area

The FOC alignment is within WNP DPS gray whale habitat. However, as stated above, there is a low likelihood that a gray whale from the WNP DPS will be encountered in Alaskan waters

along the Aleutian Islands, Gulf of Alaska, and Southeast Alaska. The 2022 PSO report did not include any sightings of gray whales but did include 67 unidentified whale individuals from July 27, to September 29, 2022 (Smultea Sciences 2022).

Though we do not expect WNP DPS gray whales to occur in the action area where FOC-laying activities will occur, it is possible these species may be encountered during transit from site to site. Therefore, it is possible the species will be at risk for vessel strike. However, it is extremely unlikely that vessels will strike WNP DPS gray whales for the following reasons.

- Few, if any, WNP DPS gray whales are likely to be encountered because they make up a very small percentage of the gray whales in Alaskan waters and are generally found in deeper waters than those in which the transit route will occur.
- Although the project duration will encompass the summer season for two years, transits between sites will take one day or less per transit.
- All FOC laying will be completed by a single vessel, travelling at slow speeds (typically 1-4 km/hr [0.5-2.0 kn]), essentially eliminating the possibility of lethal vessel strike.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yds of marine mammals.

For these reasons, we conclude the majority of stressors associated with the proposed action would have no adverse effects on WNP DPS gray whales because they are not expected to overlap in time and space, and the effects of ship strike are discountable because they are extremely unlikely to occur. Therefore, WNP DPS gray whales are not likely to be adversely affected by this action.

3.3.3 North Pacific Right Whale

The right whale (*Eubalaena* spp.) was listed as an endangered species under the ESA in 1970 (35 FR 8491, June 2, 1970 [baleen whales listing]; 35 FR 18319, December 2, 1970 [right whales listing]), and continued to be listed as endangered following passage of the ESA. NMFS later divided northern right whales into two separate endangered species: North Pacific right whales (*E. japonica*) and North Atlantic right whales (*E. glacialis*) (73 FR 12024, March 6, 2008). There are likely fewer than 500 North Pacific right whales remaining. Only about 26 individuals are estimated to remain of the Eastern stock that visits Alaskan waters (Muto et al. 2022).

Information on biology and habitat of the North Pacific right whale is available at:

North Pacific Right Whale Species Description

2017 Status Review

Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales

North Pacific Right Whale Critical Habitat

3.3.3.1 North Pacific Right Whales in the Gulf of Alaska

Recent detections of right whales have been very rare in the Gulf of Alaska even though large

numbers of whales were caught there in the 1800s. From 2004 to 2006, four sightings occurred in the Barnabas Trough region on Albatross Bank, southeast of Kodiak Island. This area represents important habitat for the relic population of North Pacific right whales, and a portion of this area was included in the critical habitat designation (50 CFR § 226.215). There have been a handful of sightings in more recent years with one spotted in the northeast Gulf of Alaska in 2018, two in Barnabas Trough and two in the Trinity Islands of western Kodiak Island in 2021, and two near Unimak Island in 2022. Acoustic monitoring from August through September 2023, at sites in the Gulf of Alaska detected right whale calls and visually identified four individual whales southeast of the Aleutian peninsula (NOAA 2023).

3.3.3.2 North Pacific Right Whales in the Action Area

Overlap of North Pacific right whale individuals with project activities could occur during the transit route for the *IT Integrity* as it moves from site to site. It is possible that the vessel would pass through areas occupied by North Pacific right whales. The rarity of the whales and the plan for limited project-specific trips make the likelihood of encounters extremely rare. The 2022 PSO report did not include any sightings of right whales but did include 67 unidentified whale individuals from July 27 to September 29, 2022 (Smultea Sciences 2022).

Though we do not expect North Pacific right whales to occur in the action area where FOC-laying activities will occur, it is possible these species may be encountered during transit from site to site. Therefore, it is possible the species will be at risk for vessel strike. However, it is extremely unlikely that vessels will strike North Pacific right whales for the following reasons.

- Few, if any, right whales are likely to be encountered because they are generally found in deeper waters than those in which the transit route will occur.
- Although the project duration will encompass the summer season for two years, transits between sites will take one day or less per transit.
- All FOC laying will be completed by a single vessel, travelling at slow speeds (typically 1-4 km/hr [0.5-2.0 kn), essentially eliminating the possibility of lethal vessel strike.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yds of marine mammals.

For these reasons, we conclude the majority of stressors associated with the proposed action would have no adverse effects on North Pacific right whales because they are not expected to overlap in time and space, and the effects of ship strike are discountable because they are extremely unlikely to occur. Therefore, North Pacific right whales are not likely to be adversely affected by this action.

3.3.4 Fin Whales

The fin whale (*Balaenoptera physalus*) was decimated by commercial whaling in the 1800s and early 1900s. It was listed as an endangered species under the ESCA in 1970 (35 FR 8491, June 2, 1970 [baleen whales listing]; 35 FR 18319, December 2, 1970 [fin whale listing]), and continued to be listed as endangered following passage of the ESA. Critical habitat has not been designated for fin whales. The best provisional abundance estimate for the Northeast Pacific stock, which occurs in Alaskan waters, is 3,168; however, this is an underestimate because it is based on

surveys which covered only a small portion of the stock's range (Muto et al. 2022).

Additional information on fin whale biology and habitat is available at:

Fin Whale Species Description

Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales

2019 Status Review

3.3.4.1 Fin Whales in the Action Area

Fin whales are typically found outside of coastal areas (Matsuoka et al. 2013; Rone et al. 2017) away from the immediate coast (Clarke et al. 2020). Consequently, it is unlikely that they would overlap with effects from the nearshore cable-laying activities. However, the *IT Integrity* could pass through waters occupied by fin whales. The 2022 PSO report included 28 sightings of fin whales, totaling 38 individuals from July 27 to September 29, 2022 (Smultea Sciences 2022) (Figure 3). In two instances, the cable-laying vessel reduced speed due to the presence of a fin whale in the prescribed detection zone (1.8 km [1.12 mi]) (Smultea Sciences 2022).

The 2022 PSO report documented fin whales in the action area where FOC-laying activities will occur, and it is possible this species may be encountered during transit from site to site in this phase of the project. Therefore, it is possible the species will be at risk for vessel strike. However, it is extremely unlikely that vessels will strike fin whales for the following reasons.

- Few fin whales are likely to be encountered because they are generally found outside of coastal waters in deeper waters than those in which the transit route will occur.
- Although the project duration will encompass the summer season for two years, transits between sites will take one day or less per transit.
- All FOC laying will be completed by a single vessel, travelling at slow speeds (typically 1-4 km/hr [0.5-2.0 kn]), essentially eliminating the possibility of lethal vessel strike.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yds of marine mammals.
- The operator has successfully implemented mitigation actions to avoid interactions with the individuals when marine mammals were sighted.

For these reasons, we conclude the majority of stressors associated with the proposed action would be unlikely to have adverse effects on fin whales because although they may overlap in time and space, the effects of ship strike are discountable because the slow speeds and mitigative actions taken in previous years demonstrate that they are extremely unlikely to occur. Therefore, fin whales are not likely to be adversely affected by this action.

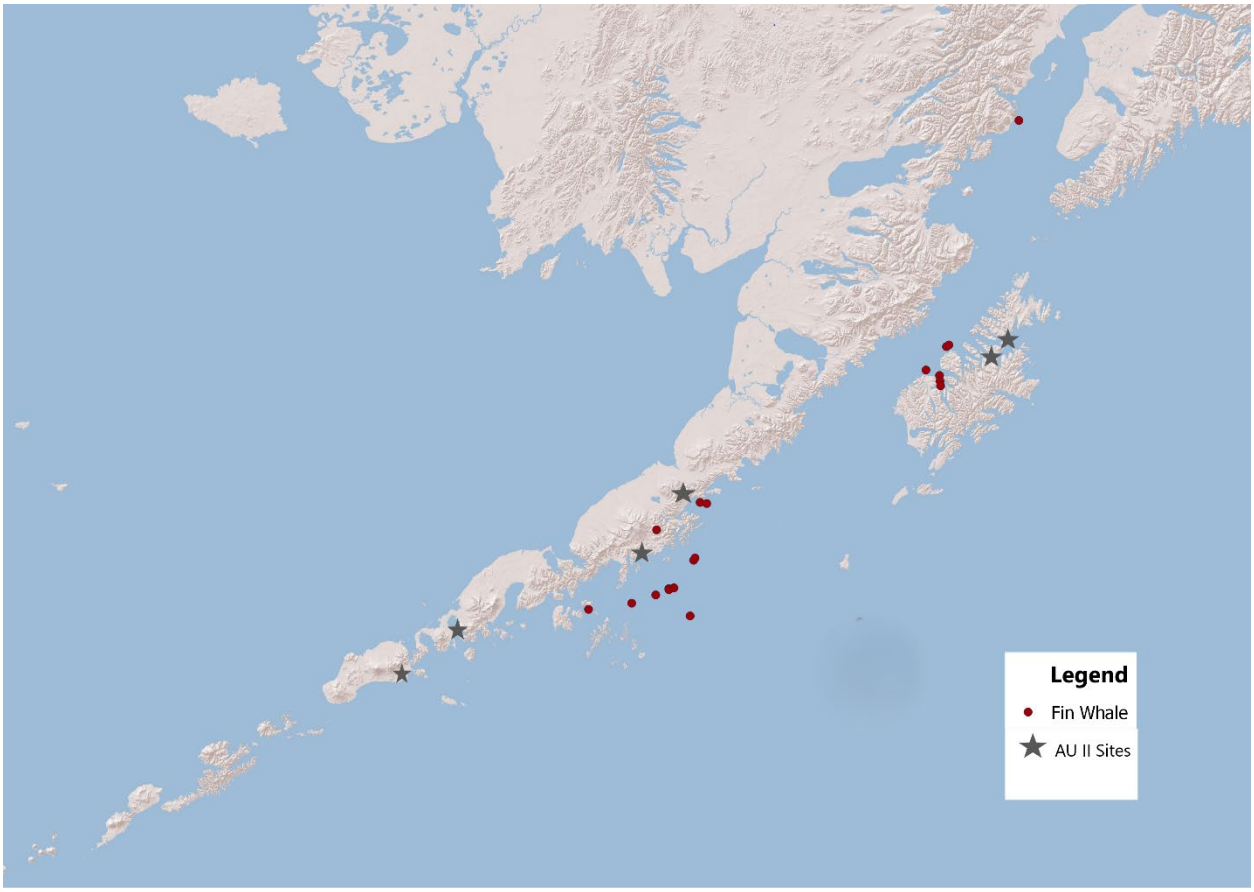

Figure 3. Map of fin whale sightings recorded during the Aleutians I project (created from PSO data in Smultea Sciences 2022) and location of sites for the Aleutians II project.

3.3.5 Blue Whales

The blue whale (*Balaenoptera musculus*) was listed as an endangered species under the ESCA in 1970 (35 FR 8491, June 2, 1970 [baleen whales listing]; 35 FR 18319, December 2, 1970 [blue whale listing]), and continued to be listed as endangered following the passage of the ESA. Although blue whales have been divided into stocks for management purposes under the MMPA, DPSs have not been adopted under the ESA. Blue whales from both the Northeast Pacific and Central/Western Pacific populations are found in Alaska (Rice et al. 2020). A recovery plan was published in 1998 (NMFS 1998), but critical habitat has not been designated. Ship strike and entanglement with commercial fishing gear are two current sources of mortality (Carretta et al. 2020).

More information on blue whale biology and habitat is available at:

Blue Whale Species Description

Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales

2020 Status Review

3.3.5.1 Blue Whales in the Action Area

The blue whale is primarily a deep-water species (Matsuoka et al. 2013; Rone et al. 2017) and not expected to overlap with effects of intertidal and nearshore cable-laying activities. However, the *IT Integrity* could pass through habitat occupied by blue whales. The 2022 PSO report did not include any sightings of blue whales but did record 67 unidentified whale individuals from July 27 to September 29, 2022 (Smultea Sciences 2022). However, it is extremely unlikely that vessels will strike blue whales for the following reasons.

- Few, if any, blue whales are likely to be encountered because they are generally found in deeper waters than those in which the transit route will occur.
- Although the project duration will encompass the summer season for two years, transits between sites will take one day or less per transit.
- All FOC laying will be completed by a single vessel, travelling at slow speeds (typically 1-4 km/hr [0.5-2.0 kn), essentially eliminating the possibility of lethal vessel strike.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yds of marine mammals.
- The operator has successfully implemented mitigation actions when marine mammals were sighted to avoid interactions with the individuals.

For these reasons, we conclude the majority of stressors associated with the proposed action would have no adverse effects on blue whales because they are not expected to overlap in time and space, and the effects of ship strike are discountable because they are extremely unlikely to occur. Therefore, blue whales are not likely to be adversely affected by this action.

3.3.6 Sperm Whale

The sperm whale (*Physeter macrocephalus*) was listed as an endangered species under the ESCA in 1970 (35 FR 8491, June 2, 1970; 35 FR 18319, December 2, 1970), and continued to be listed as endangered following passage of the ESA. Critical habitat has not been designated for sperm whales.

Sperm whales are primarily found in deep, offshore waters except in cases where the shelf break or submarine canyons occur close to land (Mizroch and Rice 2013). They feed primarily on medium-sized to large-sized squids but also take substantial quantities of large demersal and mesopelagic sharks, skates, and fishes (Rice 1989). The northern extent of their known range is 62°N, where Soviet catches of females occurred in Olyutorsky Bay (Muto et al. 2018). During summer, males are found in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands (Mizroch and Rice 2013). There are no recent and reliable estimates for population size or trend for sperm whales off Alaska (i.e., the North Pacific Stock).

Additional information on sperm whale biology and habitat is available at:

Sperm Whale Species Description

2015 Status Review

Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales

Critical habitat has not been designated for the sperm whale.

3.3.6.1 Sperm Whales in the Bering Sea/Aleutian Islands

Sperm whales have been frequently documented in the western Aleutian Islands, from Unalaska to the east out to the far islands. During 12 cetacean surveys in the summers of 2001 through 2007 and 2009 through 2010, 393 sightings of adult male sperm whales were made (Fearnbach et al. 2012). They were considered the most frequently sighted large cetacean in coastal waters around the central and western Aleutian Islands (Allen and Angliss 2011). In February 2008, a group of approximately 50 female and immature sperm whales were seen near Koniuji Island in the central Aleutian Islands (Fearnbach et al. 2012). This was the first time such a large aggregation of females and juveniles were seen so far north since whaling ended.

3.3.6.2 Sperm Whales in the Gulf of Alaska

Results from acoustic surveys indicate that sperm whales are present in the Gulf of Alaska year-round where they are most common in the summer months along the continental shelf waters (Mellinger et al. 2004a; Straley et al. 2014; Diogou et al. 2019). They have been documented interacting with demersal longline fisheries in the Gulf of Alaska since the 1970s (Straley et al. 2014; Wild et al. 2017; Hanselman et al. 2018). In July of 2021, a sperm whale became entangled in gear used by the Alaska Fisheries Science Center's Alaska Longline Survey. The interaction resulted in a live release; the whale swam away with no visible gear wrapped around it and is assumed to have survived with no major effects (Eco49 2022).

3.3.6.3 Sperm Whales in the Action Area

Because sperm whales occur in coastal waters of the central Aleutian Islands, there is the possibility that they might be near the action area during the project. Near Kodiak and the Gulf of Alaska, they are typically found in deep water (Matsuoka et al. 2013; Rone et al. 2017); therefore, it is less likely that individual whales would overlap with the effects of the nearshore cable laying in these areas. However, the *IT Integrity* could pass through habitat occupied by sperm whales. The 2022 PSO report did not include any sightings of sperm whales but did include 67 unidentified whale individuals from July 27 to September 29, 2022 (Smultea Sciences 2022). However, it is extremely unlikely that vessels will strike sperm whales for the following reasons.

- Few sperm whales are likely to be encountered because they are generally found in deeper waters than those in which the transit route will occur.
- Although the project duration will encompass the summer season for two years, transits between sites will take one day or less per transit.
- All FOC laying will be completed by a single vessel, travelling at slow speeds (typically 1-4 km/hr [0.5-2.0 kn), essentially eliminating the possibility of lethal vessel strike.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yds of marine mammals.
- The operator has successfully implemented mitigation actions when marine mammals

were sighted to avoid interactions with the individuals.

For these reasons, we conclude the majority of stressors associated with the proposed action would have no adverse effects on sperm whales because they are not expected to overlap in time and space, and the effects of ship strike are discountable because they are extremely unlikely to occur. Therefore, sperm whales are not likely to be adversely affected by this action.

3.3.7 Humpback Whales

The humpback whale (*Megaptera novaeangliae*) was listed as endangered under the ESCA in 1970 (35 FR 8491, June 2, 1970 [baleen whales listing]; 35 FR 18319, December 2, 1970 [humpback whale listing]). Congress replaced the ESCA with the ESA in 1973, and humpback whales continued to be listed as endangered. NMFS conducted a global status review that led to changing the status of humpback whales under the ESA and dividing the species into 14 DPSs (81 FR 62259, September 8, 2016). Of these 14 DPSs, NMFS listed four as endangered, listed one as threatened, and delisted the remaining nine. Three DPSs occur in Alaskan waters: the WNP DPS is listed as endangered, the Mexico DPS is listed as threatened, and the Hawaii DPS is not listed (81 FR 62259, September 8, 2016).

The Hawaii DPS population is estimated to be 11,540 animals (Coefficient of Variation [CV]=0.04) with an annual growth rate between 5.5 and 6.0 percent. The Mexico DPS comprises approximately 2,913 animals (CV=0.7; Wade 2021) with an unknown, but likely declining, population trend (81 FR 62259; September 8, 2016). Approximately 1,084 animals (CV=0.09) comprise the WNP DPS (Wade 2021). Humpback whales in the WNP remain rare in some parts of their former range, such as the coastal waters of Korea, and have shown little sign of recovery in those locations.

Whales from these three DPSs overlap on feeding grounds off Alaska and are visually indistinguishable unless individuals have been photo-identified on breeding grounds and again on feeding grounds. All waters off the coast of Alaska may contain ESA-listed humpbacks.

3.3.7.1 Humpback Whales in the Bering Sea/Aleutian Islands/Chukchi and Beaufort Seas

Recent abundance estimates from the 2023 Marine Mammal Stock Assessment Report for humpback whales are 7,758 for the Bering Sea and Aleutian Islands (CV=0.20), 2,129 for the Gulf of Alaska (including the Shumagin Islands, CV=0.081), and 5,890 (CV=0.075) for Southeast Alaska and northern British Columbia (Wade 2021; Young et al. 2023). In all of those areas, the abundance estimates represent a mixture of whales from up to three winter areas, the western North Pacific (Asia), Hawaii, and Mexico and so cannot represent the abundance of just the Mexico-North Pacific stock in its summer areas. To determine the number of animals in these feeding areas belonging to the Mexico-North Pacific stock, the abundance estimate for each feeding area was multiplied by the probability of movement between that feeding area and the Mexican wintering area, as estimated by Wade (2021), and then added together. This resulted in an estimate of 918 animals (CV=0.217). Humpback whales have increasingly been recorded during surveys in the eastern Chukchi Sea (67°–72°N, 157°–169°W) from July to October primarily over the continental shelf (Brower et al. 2018). During similar aerial surveys in 1982 through 1991, there was a complete lack of sightings of these whales (Brower et al. 2018). It is

unknown if this is an indicator of population recovery, climate change, or increased survey effort (Brower et al. 2018).

3.3.7.2 Humpback Whales in the Gulf of Alaska

The abundance estimate for humpback whales in the Gulf of Alaska is 2,129 (CV=0.08) animals, which includes whales from the unlisted Hawaii DPS (89 percent), threatened Mexico DPS (11 percent), and endangered WNP DPS (1 percent;) (Wade 2021) (Table 3-3). Humpback whales occur throughout the central and western Gulf of Alaska from Prince William Sound to the Shumagin Islands. Seasonal concentrations are found in coastal waters of Prince William Sound, Barren Islands, Kodiak Archipelago, Shumagin Islands, and south of the Alaska Peninsula. Large numbers of humpbacks have also been reported in waters over the continental shelf, extending up to 185 km (100 nautical miles [nm]) offshore in the western Gulf of Alaska (Rone et al. 2017; Wade 2021).

Table 3-3. Percent Probability of Encountering Humpback Whales from each DPS in the North Pacific Ocean in Summer Feeding Areas (Wade 2021)

Summer Feeding Areas	North Pacific DPSs (percent)			
	WNP (endangered)	Hawaii (not listed)	Mexico (threatened)	Central America (endangered)
Kamchatka	91	9	0	0
Aleutian Islands/Bering and Chukchi Seas	2	91	7	0
Gulf of Alaska	1	89	11	0
Southeast Alaska/Northern British Columbia	0	98	2	0
Southern British Columbia/Washington	0	69	25	6
Oregon/California	0	0	58	42
Note that in the past iteration of this guidance, upper confidence intervals were used for endangered DPSs. However, the revised estimates do not have associated CVs to cite. Therefore, the point estimate is being used for each probability of occurrence.				

Additional information on humpback whale biology and natural history is available at:

Humpback Whale Species Description

Marine Mammal Stock Assessment Reports: Cetaceans-Large Whales

Humpback Whale Critical Habitat

Occurrence of Listed Humpback Whales off Alaska

3.3.7.3 Humpback Whales in the Action Area

The area around the Aleutian Islands from Umnak Island northeastward along the Alaska Peninsula has been identified as a BIA for humpback whales (Brower et al. 2022). Telemetry data from Kennedy et al. (2014) supported findings of historical data showing that humpback whales congregate in the shallow, highly productive coastal waters north of the eastern Aleutian Islands, between Unimak and Samalga Passes. The extremely high proportion of foraging within the narrow band 200 km (124.3 mi) east and west of Unalaska Bay further emphasizes the importance of the waters off the eastern Aleutian Islands for humpback whales (Kennedy et al. 2014). Annual vessel-based, photo-identification surveys in the Shumagin Islands from 1999 to 2015 identified 654 unique individual humpback whales between June and September (Witteveen and Wynne 2017).

Because of their size and preference for deeper waters, it is unlikely that humpback whales would overlap with effects from the nearshore cable-laying activities. However, the *IT Integrity* could pass through waters occupied by humpback whales. The 2022 PSO report included 103 sightings of humpback whales, totaling 171 individuals from July 27 to September 29, 2022 (Smultea Sciences 2022) (Figure 4). In 2022, there were no instances when the cable-laying vessel needed to reduce speed or change course due to the presence of a humpback whale in the prescribed detection zone (1.8 km [1.12 mi]) (Smultea Sciences 2022).

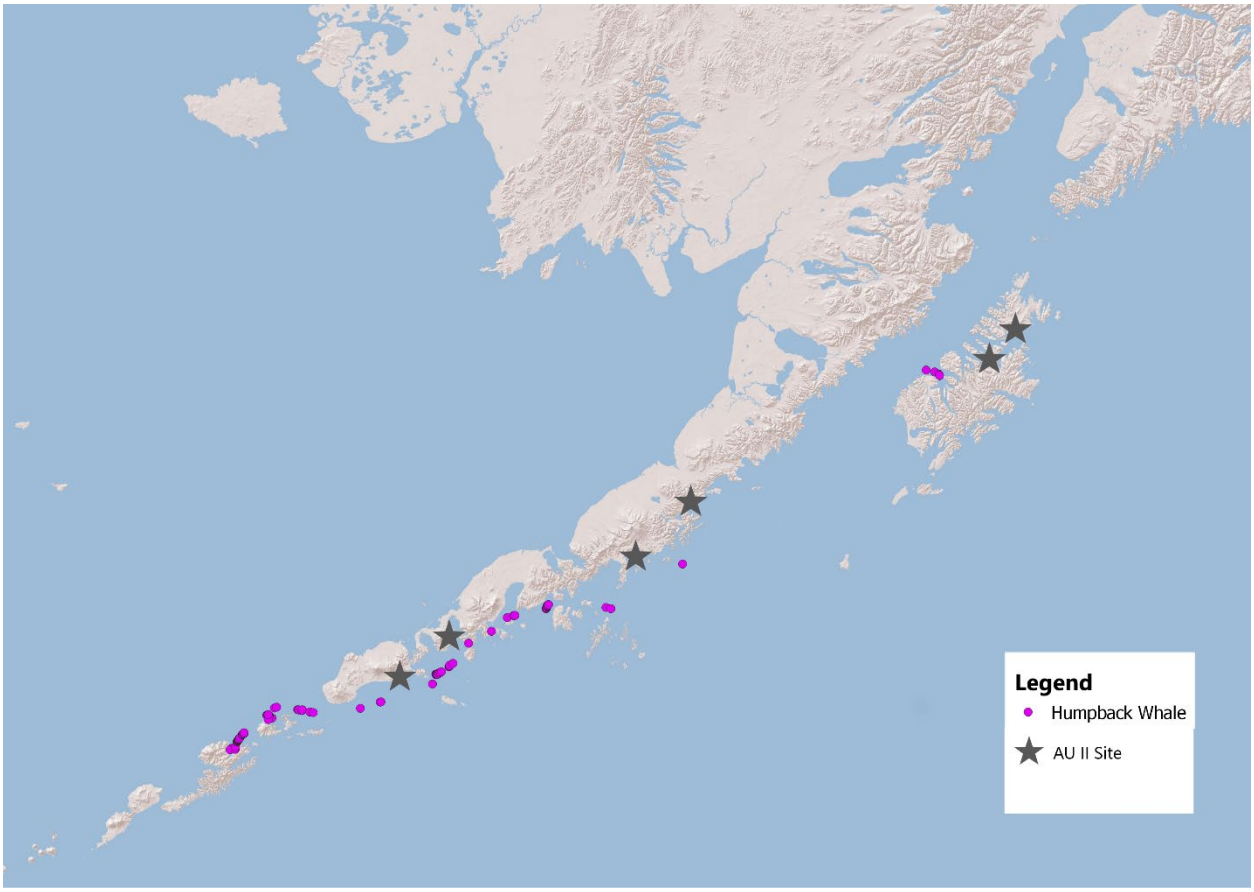

Figure 4. Map of humpback whale sightings recorded during the Aleutians I project (created from PSO data in Smultea Sciences 2022) and location of sites for the Aleutians II project.

The 2022 PSO report documented humpback whales in the action area where 2024 FOC laying activities will occur, and it is possible these species may be encountered during transit from site to site in this phase of the project. Therefore, it is possible the species will be at risk for vessel strike. However, it is extremely unlikely that vessels will strike humpback whales for the following reasons.

- Although the project duration will encompass the summer season for two years, transit between sites will take one day or less per transit.
- All FOC laying will be completed by a single vessel, travelling at slow speeds (typically 1-4 km/hr [0.5-2.0 kn), essentially eliminating the possibility of vessel strike.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yds of marine mammals.
- The operator has successfully implemented mitigation actions when marine mammals were sighted to avoid interactions with the individuals.

For these reasons, we conclude the majority of stressors associated with the proposed action would have no adverse effects on humpback whales because they are not expected to overlap in time and space, and the effects of ship strike are discountable because they are extremely

unlikely to occur. Therefore, humpback whales are not likely to be adversely affected by this action.

3.3.7.4 Humpback Whale Critical Habitat

Critical habitat for the Mexico and WNP DPS humpback whale was designated effective May 21, 2021 (86 FR 21082, April 21, 2021). Critical habitat for the WNP DPS includes areas in the eastern Aleutian Islands, the Shumagin Islands, and around Kodiak Island. Critical habitat for the Mexico DPS includes those same areas plus the Prince William Sound area (50 CFR 226.227) (Figure 5).

For the Mexico DPS, the physical and biological features associated with critical habitat include prey species, primarily euphausiids (*Thysanoessa, Euphausia, Nyctiphanes,* and *Nematosce*lis) and small pelagic schooling fishes, such as Pacific sardine (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), and Pacific herring (*Clupea pallasii*), of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth.

For the WNP DPS, the physical and biological features associated with critical habitat include prey species, primarily euphausiids (*Thysanoessa* and *Euphuasia*) and small pelagic schooling fishes, such as Pacific herring (*Clupea pallasii*), capelin (*Mallotus villosus*), juvenile walleye pollock (*Gadus chalcogrammus*), and Pacific sand lance (*Ammodytes personatus*), of sufficient quality, abundance, and accessibility within humpback whale feeding areas to support feeding and population growth.

The proposed action will transit humpback critical habitat (Figure 5). However, a single ship transiting the area is unlikely to affect the quality, abundance, or accessibility of prey species for humpback whales. The presence of the *IT* Integrity will not represent a measurable increase in overall vessel traffic along the south side of the Aleutian Islands and near Kodiak Island. The FOC installation activity in the deeper areas where humpback whales would be more likely to occur will be transitory and localized and will not measurably impact the prey species important to the physical and biological features associated with the critical habitat designation. Therefore, we conclude that any effects to humpback whale critical habitat would be insignificant.

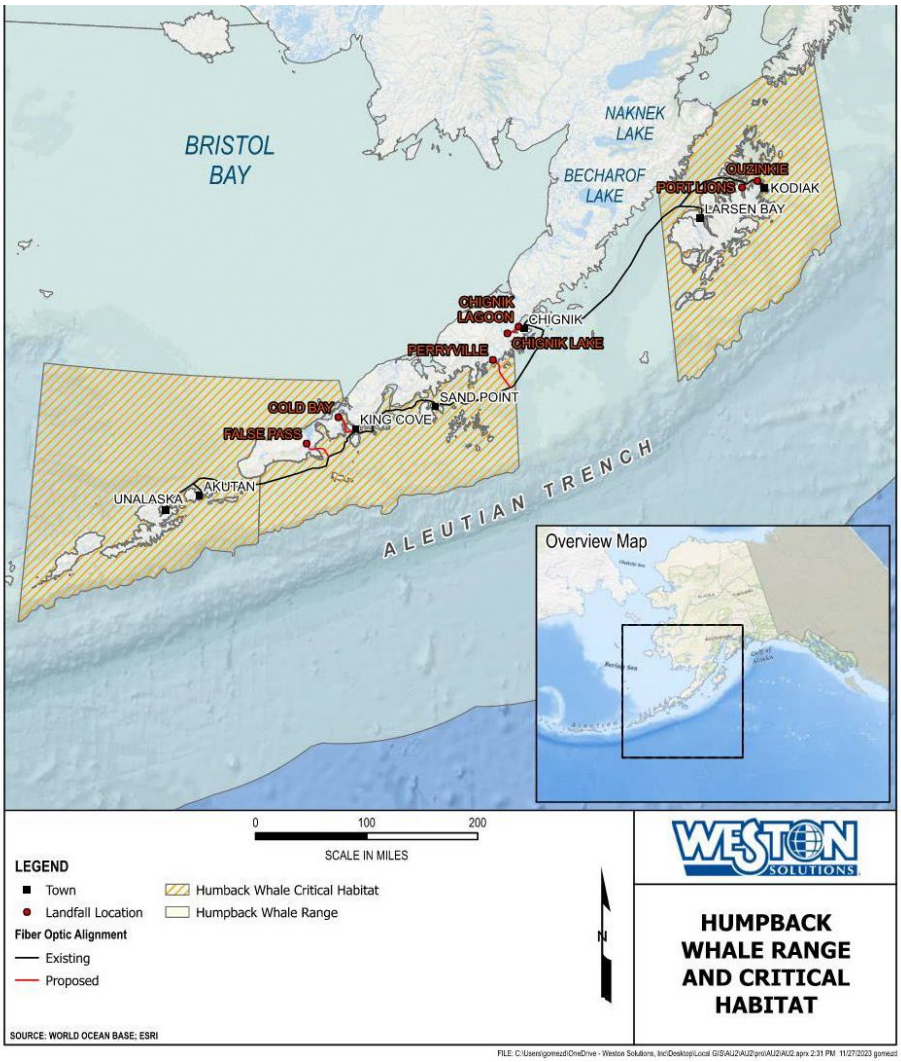

Figure 5. Critical habitat for Mexico DPS and Western North Pacific DPS humpback whales in Alaskan waters in and around the proposed action area (Weston 2023).

3.3.8 Western DPS Steller Sea Lion

More detailed background information on the status of Western DPS Steller sea lions can be found in the latest stock assessment report (Muto et al. 2019) and the recovery plan for Steller sea lions (NMFS 2008). Information on Steller sea lion biology, threats, and habitat (including critical habitat) is available online at: https://www.fisheries.noaa.gov/species/steller-sea-lion.

On November 26, 1990, NMFS issued the final rule to list the Steller sea lion as a threatened species under the ESA (55 FR 49204). In 1997, NMFS reclassified Steller sea lions as two DPSs based on genetic studies and other information (62 FR 24345; May 5, 1997) (Figure 6). At that time, the eastern DPS was listed as threatened, and the western DPS was listed as endangered. On November 4, 2013, the eastern DPS was removed from the endangered species list (78 FR 66140).

Data from 1978-2017 suggest the Western DPS Steller sea lions were at their lowest levels in 2002, but they have shown an increasing trend in abundance in much of their range since then although strong regional differences exist. While most regions show positive trends, regions of the Aleutian Islands exhibit generally negative trends (Muto et al. 2019). Contrary to the general population increase since 2002, pup counts in the eastern (-33%) and central (-18%) Gulf of Alaska declined sharply between 2015 and 2017. The most recent surveys of Western DPS Steller sea lions in Alaska suggest a minimum population estimate of 54,267 individuals; estimates for Western DPS in Russia suggest there may be approximately 23,000 animals, which is less than the 1960 levels but more than the low in 2005 (Muto et al. 2019). Overall, the Western DPS Steller sea lion population in Alaska (non-pups only) was estimated to be increasing at about 2.14 percent per year between 2002 and 2017 (Muto et al. 2019).

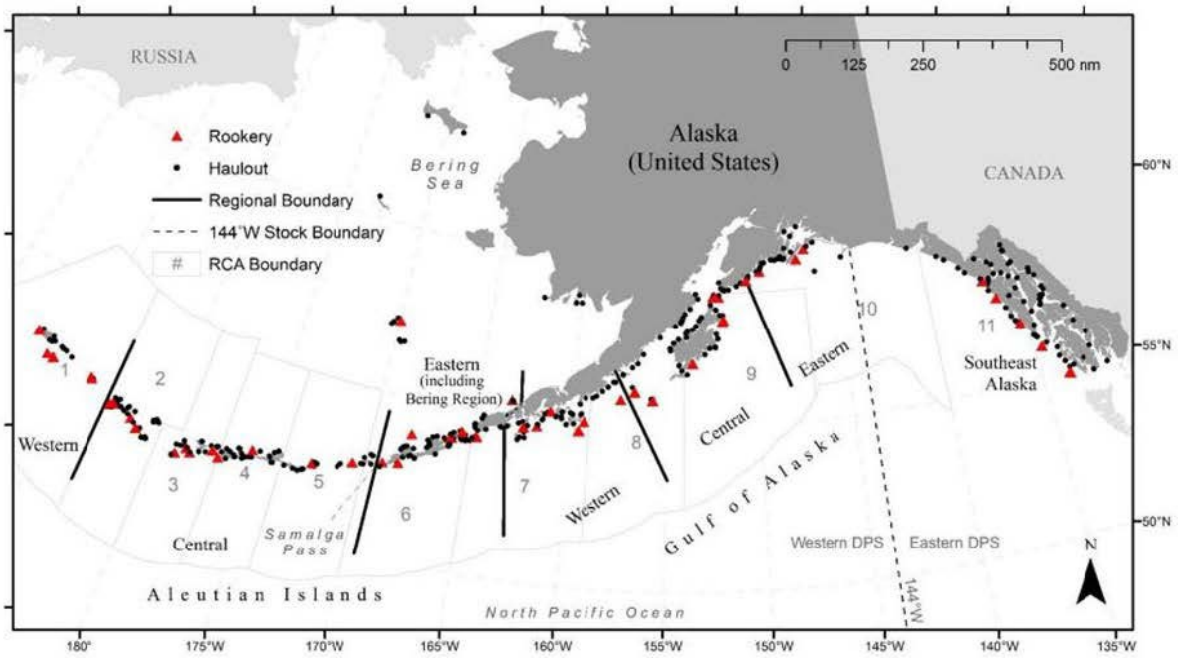

Figure 6. Steller sea lion survey regions, rookeries, and haulouts and a line at 144°W depicting the separation of eastern and western distinct population segments (Fritz et al. 2016).

The Western DPS of Steller sea lions includes animals west of Cape Suckling, Alaska (144°W; 62 FR 24345). However, individuals move between rookeries and haulout sites regularly, even over long distances between eastern and western DPS locations (Calkins and Pitcher 1982a, Raum-Suryan et al. 2002, Raum-Suryan et al. 2004). Most adult Steller sea lions occupy rookeries during the summer pupping and breeding season and exhibit a high level of site fidelity. During the breeding season, some juveniles and non-breeding adults occur at or near the rookeries, but most are on haulouts (sites that provide regular retreat from the water on exposed rocky shoreline, gravel beaches, and wave-cut platforms or ice) (Rice 1998a, Ban 2005, Call and Loughlin 2005). Adult males may disperse widely after the breeding season. Males that breed in California move north after the breeding season and are rarely seen in California or Oregon except from May through August (Mate 1973). During fall and winter many sea lions disperse from rookeries and increase use of haulouts, particularly on terrestrial sites but also on sea ice in the Bering Sea.

3.3.8.1 Steller Sea Lions in the Action Area

Because the action area is fully west of the 144°W latitude line, Steller sea lions are expected to be predominantly from the Western DPS, but a small number of Eastern DPS Steller sea lions may occur (Fritz et al. 2016). Based on surveys and genetic analysis conducted by Hastings et al. (2020), Steller sea lions in the vicinity of the project are presumed to be Western DPS Steller sea lions. Therefore, for the purposes of this opinion, NMFS considers that Steller sea lions in the action area are from the endangered Western DPS, and very few would be likely to originate from the delisted Eastern DPS.

Steller sea lions do not migrate, but they often disperse widely outside of the breeding season. An area of high occurrence extends from the shore to water depths of 1,638 ft (500 m). In the Gulf of Alaska, foraging habitat is primarily shallow, nearshore, and continental shelf waters 4.3 to 13 nm offshore with a secondary occurrence inshore of the 3,280-ft (1,000-m) isobath, and a rare occurrence seaward of the 3,280-ft (1,000-m) isobath.

Steller sea lions occur year round in the action area. Because of the proximity of the FOC alignment to known Steller sea lion habitat, it is likely that Steller sea lions may be near areas where the nearshore cable-laying activities will occur. The *IT Integrity* could also pass through waters occupied by Steller sea lions. The 2022 PSO report included 14 sightings of Steller sea lions totaling 22 individuals from July 27 to September 29, 2022, and clustered in four main areas (Smultea Sciences 2022) (Figure 7). In 2022, there was one instance when the cable-laying vessel needed to reduce speed or change course due to the presence of a Steller sea lion in the prescribed detection zone (1.8 km [1.12 mi]) (Smultea Sciences 2022).

Figure 7. Map of Steller sea lion sightings recorded during the Aleutians I project (created from PSO data in Smultea Sciences 2022) and location of sites for the Aleutians II project.

The 2022 PSO report documented Steller sea lions in the action area where 2024 FOC-laying activities will occur, and it is possible this species may be encountered during transit from site to site and at the nearshore cable laying sites in this phase of the project. Therefore, it is possible the species will be at risk for vessel strike. However, it is extremely unlikely that vessels will strike or adversely affect Steller sea lions for the following reasons.

- Steller sea lions are highly mobile and agile and would be able to avoid the slower moving cable-laying vessel.
- Vessels will not enter the 5.6-km (3-nm) area surrounding major rookeries.
- Although the project duration will encompass the summer season for two years, transits between sites will take one day or less per transit.
- All FOC laying will be completed by a single vessel, travelling at slow speeds (typically 1-4 km/hr [0.5-2.0 kn), essentially eliminating the possibility of lethal vessel strike.
- NMFS's guidelines for approaching marine mammals discourage vessels approaching within 100 yds of marine mammals.
- The operator has successfully implemented mitigation actions when marine mammals were sighted to avoid interactions with the individuals.

For these reasons, we conclude the majority of stressors associated with the proposed action

would have minimal potential for adverse effects on Steller sea lions because although they may overlap in time and space with the project, the effects of ship strike are discountable because they are extremely unlikely to occur. Therefore, Steller sea lions are not likely to be adversely affected by this action.

3.3.8.2 Steller Sea Lion Critical Habitat

NMFS designated critical habitat for the Steller sea lion on August 27, 1993 (58 FR 45269). Steller sea lion critical habitat includes a terrestrial zone that extends 0.9 km (3,000 ft) landward from each major rookery and major haulout and an air zone that extends 0.9 km (3,000 ft) above the terrestrial zone of each major rookery and major haulout. For each major rookery and major haulout located west of 144°W, critical habitat includes an aquatic zone (or buffer) that extends 37 km (20 nm) seaward in all directions. Critical habitat also includes three large offshore foraging areas: the Shelikof Strait area, the Bogoslof area, and the Seguam Pass area (58 FR 45269). NMFS has prohibited vessel entry within 5.6 km (3 nm) of all Steller sea lion rookeries west of 150°W. The designation was based on terrestrial access (haulouts, rookery areas) and aquatic needs for foraging, refuge, and other seasonal needs.

The cable-laying route, as well as several landfall locations, are within the designated critical habitat. The FOC would be laid within the 37 km (20 nm) aquatic zones of several major haulouts and rookeries. Landfall locations, with the exception of Chignik Lagoon and Chignik Lake, have nearshore waters that are covered by the designated aquatic zones of several major haulouts and rookeries. Project vessels, however, will not enter the 5.6-km (3-nm) area surrounding major rookeries. It is expected that the presence of Steller sea lions would be high in the action area, and animals may be attracted to the vessels during cable installation. However, there are no major rookeries or haulouts in close proximity to the planned landfall locations or cable-laying route.

The total action area within Steller sea lion critical habitat encompasses approximately 1,261.9 km^2 (487.09 mi^2). Figure 8 displays the landing sites and proposed cable routes in relation to Steller sea lion critical habitat. However, a single ship transiting the areas is unlikely to affect the quality or accessibility of haulouts, rookeries, or foraging areas for Steller sea lions. The presence of the *IT Integrity* will not represent a measurable increase in overall vessel traffic along the south side of the Aleutian Islands and near Kodiak Island. The mitigation measures are designed to limit the ship's proximity to haulouts and rookeries and, thereby, limit the potential for affecting the physical and biological features associated with the critical habitat designation such that any impacts would not be measurable or detectable. Therefore, we conclude that any effects to Steller sea lion critical habitat would be insignificant.

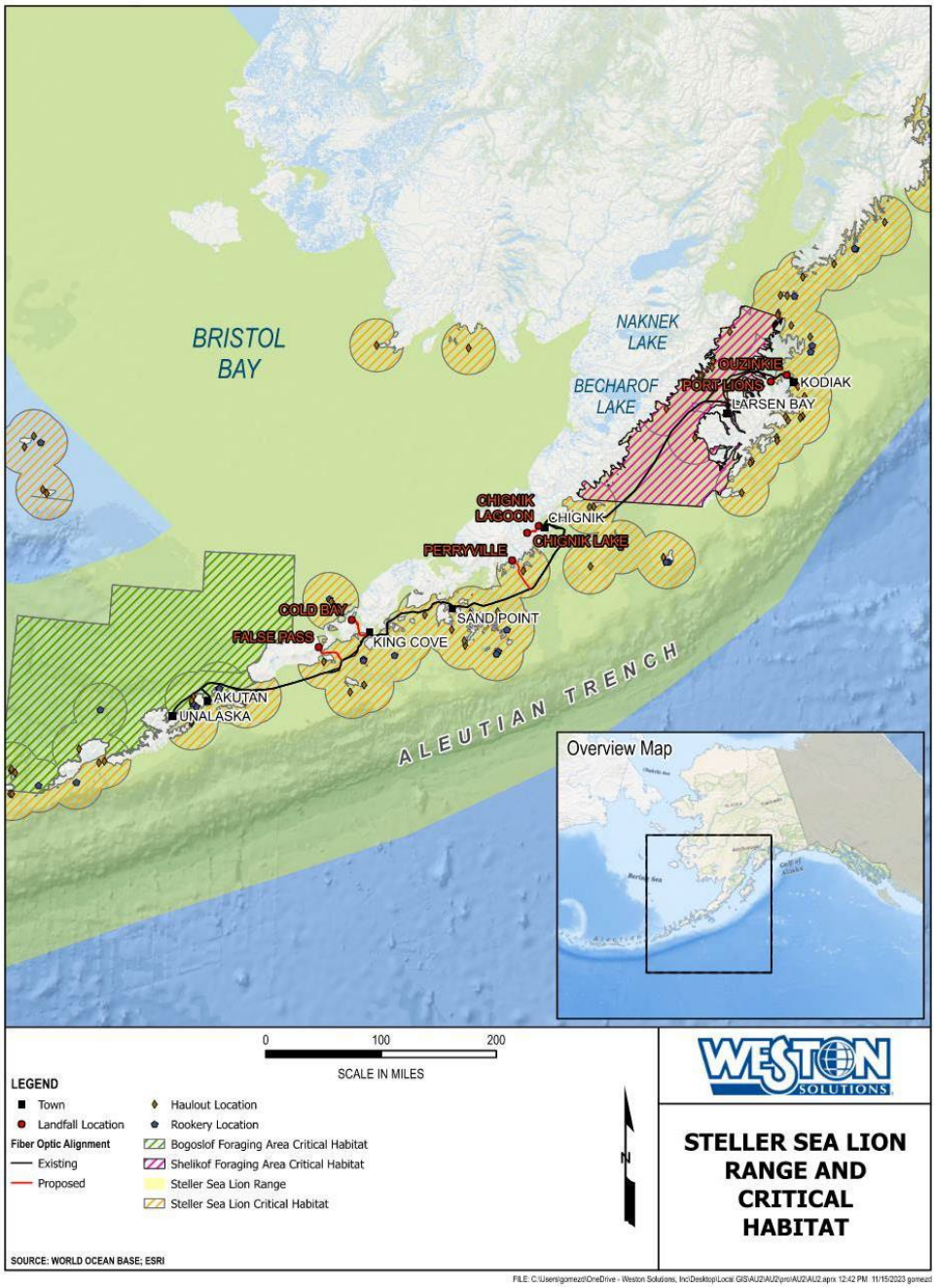

Figure 8. Steller sea lion range and designated critical habitat in and around the proposed action area (Weston 2024).

3.4 Status of Listed Species Likely to be Adversely Affected by the Action

This opinion examines the status of each species that is likely to be adversely affected by the proposed action. Species status is determined by the level of extinction risk that the listed species face, based on parameters considered in documents such as recovery plans, status reviews, and listing decisions. This informs the description of the species' likelihood of both survival and recovery. The species status section also helps to inform the description of the

species' current "reproduction, numbers, or distribution" as described in 50 CFR § 402.02. The opinion also examines the condition of critical habitat throughout the designated area, and discusses the current function of the essential PBFs that help to form that conservation value.

For each species, we present a summary of information on the population structure and distribution of the species to provide a foundation for the exposure analyses that appear later in this opinion. Then we summarize information on the threats to the species and the species' status given those threats to provide points of reference for the jeopardy determinations we make later in this opinion. That is, we rely on a species' status and trend to determine whether an action's effects are likely to increase the species' probability of becoming extinct.

This opinion examines the status of the proposed threatened sunflower sea star, which is likely to be adversely affected by the proposed action.

3.4.1 Sunflower Sea Star

On August 18, 2021, the Center for Biological Diversity petitioned NMFS to list the sunflower sea star (*Pycnopodia helianthoides*) under the ESA. NMFS determined that the proposed action may be warranted (86 FR 73230, December 27, 2021) and began a full status review to evaluate overall extinction risk for the species. NMFS issued a proposed rule to list the species as threatened on March 16, 2023 (88 FR 16212). NMFS has not proposed to designate critical habitat at this time.

Prior to 2013, the global abundance of sunflower sea star was estimated at several billion animals, but from 2013 to 2017, sea star wasting syndrome (SSWS) reached pandemic levels killing an estimated 90 percent or more of the population (Lowry 2022). Sunflower sea stars are currently estimated to number approximately 600 million (Lowry 2022). Declines in the northern portion of its range (i.e., Alaska and British Columbia) were less pronounced than in the southern portion, but still exceeded 60 percent. Species-level impacts from SSWS, both during the pandemic and on an ongoing basis, have been identified as the major threat affecting the long-term persistence of the sunflower sea star (Lowry 2022).

Recent counts in areas of Alaska near Cook Inlet, Prince William Sounds, and the Kenai Fjords showed large increases in sunflower sea star abundance in 2022, compared to previous years (Coletti et al. 2023).

3.4.1.1 Distribution and Habitat Use

The sunflower sea star is a large (up to one meter in diameter), fast-moving (up to 160 cm/minute), many-armed (up to 24) echinoderm native to the west coast of North America (Lowry et al. 2022). Sunflower sea stars occur in a wide range of intertidal and subtidal habitats from northern Baja California, Mexico, to the central Aleutian Islands, Alaska (Jewett et al. 2015; Gravem et al. 2021; Lowry 2022). They occupy waters from the intertidal to at least 435 m deep but are most common at depths less than 25 m and rare in waters deeper than 120 m (Lambert 2000; Hemery et al. 2016; Gravem et al. 2021). Sunflower sea stars occur over a broad array of soft, mixed, and hard bottom habitats and are most abundant in Alaska and British Columbia (Gravem et al. 2021).

They are found along the outer coasts and inside waters, which have complex geophysical features including glacial fjords, sounds, embayments, and tidewater glaciers. Preferring temperate waters, they inhabit kelp forests and rocky intertidal shoals (Shivji et al. 1983; Lowry 2022) and are also regularly found in eelgrass meadows (Dean and Jewett 2001; Gravem et al. 2021).

3.4.1.2 Sunflower Sea Star Presence in the Action Area

No recent surveys have been conducted at the landing sites along the FOC route. The citizen science site iNaturalist (https://www.inaturalist.org) has 38 sunflower sea stars records on Kodiak Island and along the FOC route. Each sighting has accompanying photos for verification (https://www.inaturalist.org/observations?place_id=any&subview=map&taxon_id=47673). Therefore, it is reasonable to assume that there may be sunflower sea stars present in the action area.

3.4.1.3 Reproduction and Growth

The species has separate sexes and is a broadcast spawner with a planktonic larval stage (Lundquist and Botsford 2011). Females can release a million eggs or more (Strathmann 1987; Chia and Walker 1991; Byrne 2013). Reproduction also occurs via larval cloning, enhancing potential reproductive output beyond female fecundity (Bosch et al. 1989; Balser 2004). Sea stars also have the ability to regenerate lost rays/arms and parts of the central disc (Chia and Walker 1991). Rays may detach when a sea star is injured or as a defense reaction when attacked by a predator. The longevity of *P. helianthoides* in the wild is unknown, as is the age at first reproduction and the period over which a mature individual is capable of reproducing (Lowry et al. 2022).

3.4.1.4 Feeding and Prey Selection

The sunflower sea star hunts a range of bivalves, gastropods, crustaceans, and other invertebrates using chemosensory stimuli and will dig for preferred prey in soft sediment (Mauzey et al. 1968; Paul and Feder 1975; Herrlinger 1983). It preys on sea urchins and plays an important role in controlling sea urchin numbers in kelp forests (Lowry et al. 2022). While generally solitary, they are also known to seasonally aggregate, perhaps for spawning purposes.

3.4.1.5 Threats to the Species

Brief descriptions of threats to sunflower sea stars follow. More detailed information can be found in the draft ESA Status Review report for the species (Lowry et al. 2022).

As mentioned previously, species-level impacts from SSWS, both during the pandemic (2013 to 2017) and on an ongoing basis, have been identified as the major threat affecting the long-term persistence of the sunflower sea star (Lowry et al. 2022). The causative agent of SSWS is currently unknown and various hypotheses regarding transmission dynamics and the lethality of SSWS under diverse physiochemical conditions exist. A number of factors ranging from environmental stressors to the microbiome in sea stars may play a role (Lloyd and Pespeni 2018; Konar et al. 2019; Aquino et al. 2021). Ocean warming has also been linked to SSWS outbreaks, hastening disease progression and severity (Harvell et al. 2019; Aalto et al. 2020).

4 ENVIRONMENTAL BASELINE

The "environmental baseline" in this instance refers to the condition of the proposed listed species in the action area without the consequences to the proposed listed species caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the expected impacts of all proposed Federal projects in the action areas that have already undergone formal or early Section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation process. The consequences to listed or proposed listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline (50 CFR § 402.02).

The project is located in the Gulf of Alaska, south of the Aleutian Islands (Figure 1). FOC routes would connect two communities on Kodiak Island and five communities along the Alaska Peninsula. The routes would pass through three Alaskan boroughs including the Kodiak Island Borough, Lake and Peninsula Borough, and the Aleutians East Borough. The Alaska Marine Highway system serves the Aleutian Islands and has ports at several of the FOC landing sites, but service beyond Kodiak Island is only available in the summer months. There are small, sheltered bays along the island chain, but the chain is open to the Pacific Ocean west of Kodiak Island. Several commercial fisheries occur in the western Gulf of Alaska that have the potential to compete with marine mammals and seabirds for resources. Subsistence and personal use fishing are only permitted for Alaskan residents, and recreational fishing is open to residents and nonresidents. The action area crosses within the Western Region fisheries unit, which is managed by the Alaska Department of Fish and Game (ADF&G) Division of Commercial Fisheries. Within the Western Region, the project route spans three fishery management areas; Kodiak Management Area (KMA), Chignik Management Area (CMA), and Alaska Peninsula and Aleutian Islands Management Area (Area M). Numerous shore-based and floating processors operate within these areas and employ both residents and nonresidents during peak fishing seasons. All of these areas have strong subsistence fishing traditions.

The 2023 U.S. Census lists the total resident population in the boroughs along the FOC alignment at approximately 20,000 people, but populations are concentrated at Kodiak Island and Unalaska. The communities that will be served along the alignment have populations ranging from tens to hundreds of people. The action area is large, but the station at Sand Point provides a representative picture of the semidiurnal tides with a mean range of tide of 1.58 m (5.19 ft), a diurnal tide level of 1.10 m (3.62 ft), and an extreme range of 2.20 m (7.23 ft) (data for Station 9459450, NOAA 2024). The bathymetry of the south side of the Alaska Peninsula and Aleutian Islands is variable depending on location and proximity to shore, islands, or rocks. Depths along the FOC alignment are predominantly less than 120 m (394 ft) (Weston 2024).

4.1 Sea Star Wasting Syndrome

SSWS is the primary threat and stressor to sunflower sea stars across their range. SSWS is thought to be exacerbated by warming ocean temperatures and other climate-change-related characteristics. Other potential stressors in the action area include pollution, bycatch/overexploitation, and coastal development activities.

A SSWS pandemic occurred across the range of the sunflower sea star from 2013 to 2017. SSWS is known to occur in sunflower sea stars and other species at smaller geographic and temporal scales and is expected to occur in the future. But the magnitude of future outbreaks is unknown. The pathogen that caused the 2013-2017 pandemic is unknown. As stated above, the 2022 Status Review report for this species identified SSWS as the factor of greatest concern for the species throughout its range, which includes the action area.

4.2 Climate Change

Climate change is expected to lead to warming ocean temperatures, more extreme fluctuations in ocean temperatures, and more storm events. These characteristics may exacerbate SSWS events in sunflower sea stars or result in marine habitat or ecological shifts that negatively affect the species (Lowry 2022). Warming ocean temperatures, extreme fluctuations in ocean temperature, harmful algal blooms, ocean acidification, and low dissolved oxygen events, which are all byproducts of anthropogenic climate change, could impose direct and indirect stress on *P. helianthoides* and increase their vulnerability over the coming decades. There is uncertainty regarding causal links between climate change and impacts to *P. helianthoides* and the scale over which these potential impacts are taking place. For example, local temperature-related stress, low dissolved oxygen events, and harmful algal blooms may be buffered by the refuge that a broad geographic and depth range provides to this species.

4.3 Pollution

Pollution into the marine environment from runoff, spills, or outfall pipes may compromise the microbiome of sunflower sea stars leading to death or making them vulnerable to other stressors (Aquino et al. 2021; McCracken et al. 2023). Relative to SSWS, this is minor threat that is limited in spatial and temporal scope. There is no direct evidence that this stressor is directly impacting sunflower sea stars in the action area.

4.4 Bycatch/Overexploitation

Sunflower sea stars may be caught as bycatch in pot gear in the action area. Most of these are likely returned to the marine environment without serious injury. Handling stress in sea stars is not well understood, but it is not likely to be significantly impacting the species in the action area. We note that the Alaska Sealife Center successfully keeps sunflower sea stars in their touch tank exhibit. Some sunflower sea stars may be collected by the public, but these numbers are expected to be small and may not result in significant stress if the animals are quickly returned to the marine environment.

4.5 Coastal Development

The Alaska Peninsula, Kodiak Island, and Aleutian Islands are not accessible to the rest of the state by road. The existing road network is discontinuous and limited to the areas surrounding a few communities; therefore, water and air are the primary modes of inter-community transportation. The primary economic activity in the project region is commercial fishing for salmon, Pacific halibut, crab, and Pacific cod. Salmon and Pacific cod processing occurs at Peter Pan Seafoods (King Cove), Trident Seafoods (Sand Point and Akutan), and Bering Pacific (False

Pass). Tourism is also a major source of economic development. However, the limited and high cost of access as well as a relatively short season restricts growth of the industry. There are a few harbor, power, and road projects proposed or in process at some of the landing sites communities (see Section 5.2 of the NTIA's BA), but none of these is likely to substantially increase the population or use of these more remote villages. Much of the vessel traffic is freight, fishing, and general transportation, including interstate commerce and seasonal tourism. The expected levels of vessel activity and coastal development are not likely to result in changes to sunflower sea star habitats.

4.6 Prior Section 7 Consultations

Based on a search of the Environmental Consultation Organizer (ECO), there have been 16 Section 7 consultations conducted for projects along the Aleutian Islands and in the Kodiak Island area since 2017, including this project. There are two informal Section 7 consultations in process at Sand Point, one of the sites completed under the Aleutians I FOC project in 2022 (Table 4-1) (AKRO-2023-03225 and AKRO-2024-00553). The main stressor being assessed in these concurrent consultations is acoustic disturbance.

Table 4-1. Recent and Ongoing Section 7 Consultations along the Alignment of the Aleutians II Fiber Optic Cable Project

Project ID	Project Title	Consultation Category
AKRO-2017-00580	Women's Bay Cargo Wharf and Fuel Pier Repair LOC	Informal
AKRO-2017-00602	F/V Elizabeth Taylor Grounding, Women's Bay, Kodiak	Informal
AKRO-2017-00612	F/V Predator Oil Spill Response	Informal
AKRO-2017-00639	Reinitiation of Jewel Beach Storm Drainage Outfall	Informal
AKRO-2019-00892	GCI AU-Aleutian Fiber Optic Cable	Informal
AKRO-2020-00963	Women's Bay Reinitiation	Informal
AKRO-2020-01266	Aquatic Farmsite Lease Application for ADL 233403 Myrick and Monson dba Alaskan Sea Greens	Informal
AKRO-2020-01861	November 2019 Kitoi Bay Hatchery Oil Spill: USCG Authorized Emergency Response	Informal
AKRO-2021-00184	FV Pacific Knight Scuttle	Informal
AKRO-2021-00318	USCG Kodiak Cargo Pier Pile Replacement eLOC	Informal, expedited
AKRO-2021-01340	Tigalda Island FUDS CON/HTRW Removal Action at Formerly Used Defense Site F10AK0376-01	Informal
AKRO-2021-01392	F/V Seabrook Emergency Spill Response	Informal
AKRO-2021-03122	St. Paul Harbor Dock Replacement, City of Kodiak	Informal
AKRO-2023-03225	Humboldt Harbor ADA Float Access	Informal, expedited
AKRO-2023-03226	AU-Aleutian II Fiber Project	Formal
AKRO-2024-00553	Trident Fuel Dock Repairs, Sandpoint	Informal

The records are linked in the ECO at
https://appscloud.fisheries.noaa.gov/suite/sites/eco/page/home

5 EFFECTS OF THE ACTION

"Effects of the action" are all consequences to listed or proposed listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action (50 CFR § 402.02).

This conference opinion relies on the best scientific and commercial information available. We try to note areas of uncertainty or situations where data are not available. In analyzing the effects of the action, NMFS aims to minimize the likelihood of false negative conclusions (i.e., concluding that adverse effects are not likely when such effects are, in fact, likely to occur).

We organize our effects analysis using a stressor identification – exposure – response – risk assessment framework for the proposed activities.

We conclude this section with an *Integration and Synthesis of Effects* section that integrates information presented in the *Status of the Species* and *Environmental Baseline* sections of this opinion with the results of our exposure and response analyses to estimate the probable risks the proposed action poses to endangered and threatened species.

NMFS identified and addressed all potential stressors and considered all consequences of the proposed action, individually and cumulatively, in developing the analysis and conclusions in this opinion regarding the effects of the proposed action on ESA-listed species and designated critical habitat.

5.1 Project Stressors

Stressors are any physical, chemical or biological phenomena that can induce an adverse response. This effects section starts with identification of the stressors produced by the constituent parts of the proposed action.

Based on our review of the data available, the proposed FOC laying and nearshore installation activities may cause the following primary stressors:

1. injury to sunflower sea stars due to removal/relocation during the intertidal installation;

2. stress and disturbance due to being handled and relocated to an alternative site;

3. injury to a sunflower sea star due to unintentional contact from workers moving in the exposed intertidal areas during pre-work surveys or from divers during the laying of the articulated pipe segments;

4. increased risk of predation due to relocation;
5. temporary loss of habitat and prey sources due to intertidal area disturbance;
6. injury to a sunflower sea star due to impacts from the FOC landing on a sea star; and
7. pollution from unauthorized spills.

5.1.1 Minor Stressors on the proposed Sunflower Sea Star

Based on a review of available information, we determined the following stressors are either unlikely to occur or likely to have minimal impacts on sunflower sea stars:

1. injury to a sunflower sea star due to impacts from the FOC landing on a sea star; and
2. pollution from unauthorized spills.

The potential for sea stars to be hit by the descending, unencased FOC does exist as the cable comes to rest on the sea floor, but given the size and low weight of the bare cable (approximately 2.6 cm [1.02 in] in diameter and weight of 1.5kg/m [1.0 lbs/lin ft] in air), we expect that a sea star could move out from under the cable without injury.

The applicant has agreed to implement the Alaska Standard Mitigations (see Section 2.1.3), including several specific to the sunflower sea star. The project work that would require handling fuel or other potential pollutants will all take place on land rather than on the ship or near the water. These factors limit the risk of a sea star being hit or interacting with the FOC in offshore waters where sea stars are more likely to occur in depths less than 120 m (394 ft) or being affected by inadvertent spills; therefore, we conclude that such interactions are extremely unlikely to occur.

5.1.2 Major Stressors on Sunflower Sea Stars

The primary stressor for sunflower sea stars will be removal and relocation from the substrate during the FOC laying and installation process. In addition, workers walking in the exposed intertidal areas or divers wading in shallow waters may inadvertently step on or touch a sea star during the pre-work surveys or during the FOC cable laying.

Activities impacting the benthic environment due to the pre-work surveys, FOC laying, jetting, and FOC encasement in the heavy articulated pipe may interact with sunflower sea stars on the sea floor or on intertidal rocky substrate. These activities have the potential to directly impact (e.g., harm, wound, kill, collect) sunflower sea stars, as well as impacting sunflower sea star habitat. Sunflower sea stars could be injured or stressed when they are removed from the substrate. A sea star may be more likely to be preyed upon after being released during the relocation process before it is able to attach to the substrate or find shelter. Although the intertidal zone areas are likely to continue to support attached benthic organisms and provide habitat for sea stars after the project is completed, the sea stars and other attached organisms will lose access to this habitat until they are able to recolonize the areas subject to jetting. The narrow width of the jetting area (0.9 m [3 ft]) will likely recover relatively quickly depending on the

substrate type (e.g., rocky areas, soft sediments).

Sunflower sea stars may be affected if they are temporarily unable to use the site for forage or refuge habitat due to FOC-laying activities and physical relocation. Although sea stars and their prey will be temporarily unable to access the narrow alignment subject to jetting, these effects will be insignificant given the project's limited footprint and availability of similar habitat nearby (intertidal habitat and similar rocky areas). Any disturbances to sea stars or their prey would be temporary, limited to one to two days of in-water work at each site, after which animals will be able to return to the site.

Because there is similar available habitat nearby where sea stars will be relocated and the applicant has agreed to implement mitigation measures for sunflower sea stars (See Section 2.1.3) that will ensure that individual sea stars will be relocated quickly, we do not expect relocation to cause long-term stress or reduction in fitness for sunflower sea stars.

5.2 Exposure Analysis for the Sunflower Sea Star

Exposure analyses are designed to identify the listed or proposed species that are likely to co-occur with the stressors in space and time and the nature of that co-occurrence. In this step of our analysis, we estimate the number of individuals that are likely to be exposed to an action's effects and the populations or subpopulations those individuals represent.

As discussed in Section 2.1.3, NTIA proposed mitigation measures that should avoid or minimize exposure of listed species to one or more stressors from the proposed action.

5.2.1 Sunflower Sea Star Occurrence and Exposure Estimates

Prior to the SSWS pandemic, abundance varied geographically in Alaska. They were reported as quite common in western Prince William Sound (average 0.233/m^2) (Konar et al.2019). Post-pandemic densities are much lower and range from 0 to 0.04/m^2 at the sites that once had the highest density (western Prince William Sound) (Traiger et al. 2022).

No recent surveys have been conducted along the Aleutian Islands or Kodiak Island. The citizen science site iNaturalist (https://www.inaturalist.org) has 38 records (many from 2023) of sunflower sea stars at sites in the Aleutian Islands and Kodiak Island. Therefore, it is reasonable to assume that there may be sunflower sea stars present in the action area.

The proposed project would install the 2.6-cm (1.02-in) diameter cable from the onshore structures out to where the cable will connect with the main FOC alignment installed in 2022. The total nearshore distance for each landing site was estimated at 298.8 m (980 ft). Weston (NTIA's consultant) provided detailed estimates for each landing site broken out into lengths (1) where the FOC will be encased in a heavy articulated pipe and buried in a trench using a water jet from the MHW to the MLLW and (2) where the articulated encased FOC will be laid directly on the sea floor from the MLLW out to open water (Table 5-1).

Table 5-1. Lengths of Fiber Optic Cable and Installation Methods for each of the Seven Landfall Sites for the Aleutians II Fiber Optic Cable Project (Weston 2024)

Location	Distance (m) Articulated Encasement will be Trenched (MHW to MLLW, trenched at low tide)	Distance (m) Articulated Encasement will be Laid on Seafloor (into open water from MLLW)	Total Intertidal Distance (m)
Ouzinkie	5	145	150
Port Lions	25	75	100
Chignik Bay[1]	135	65	200
Chignik Lagoon 1	25	0	25
Chignik Lagoon 2	75	0	75
Chignik Lake	64	36	100
Perryville	20	80	100
Cold Bay	15	85	100
False Pass	6	44	50
Totals	**370**	**530**	**900**

1. Chignik Bay was connected to the offshore FOC in 2021. In 2024 it will be connected to the Chignik Lagoon sites.

Each section of trenched FOC would be approximately 0.9 m (3 ft) wide. The total length of encased FOC across all seven sites is 900 m (2,9552.76 ft). This portion of the FOC will disturb approximately 810 m^2 (8,718.77 ft^2) of intertidal area. Based on the pre-pandemic estimated density of sunflower sea stars present and the estimated decline in the population, the expected density in the action area would be 0.04/m^2, and approximately 32.4 sea stars would be likely to be encountered/impacted in the 810-m^2 area affected by the FOC installation.

As noted earlier, the offshore portions of the FOC laying are unlikely to result in injury of sea stars due to the small size and low density of the FOC cable. However, it is likely that a sunflower sea star would be startled or move in response (behavioral response) to the FOC landing on them as it settles to the sea floor. Therefore, we calculate the likelihood of this occurring by assessing the portions of the FOC alignment in waters less than 120 m (394 ft) deep where sunflower sea stars are more likely to be encountered (Lambert 2000; Hemery et al. 2016; Gravem et al. 2021). Weston provided a bathymetric breakdown of the Aleutians II FOC alignment. Approximately 134,046 m (83.29 mi) of the 176,000 m (109 mi) of FOC will be laid in waters less than 120 m deep. Since the FOC will be laid directly on the sea floor without any encasement in these areas, the total width is much narrower at 2.6 cm (1.02 in). This portion of the FOC will disturb approximately 3,485.20 m^2 (37,514.34 ft^2) of sea floor area. Using the same expected sunflower sea star density of 0.04/m^2, approximately 139.41 sea stars would be likely to be encountered/impacted in the 3,485.20-m^2 area affected by the FOC cable laying in offshore areas. We believe this estimate is conservative since portions of the cable will be laid in depths greater than 25 m where sunflower sea stars are less common.

5.3 Response Analysis

Response analyses determine how listed species or proposed listed species and/or critical habitats are likely to respond after being exposed to an action's effects on the environment or directly on listed species themselves. Our assessments try to detect the probability of lethal responses, physical damage, physiological responses (particular stress responses), behavioral responses, and social responses that might result in reducing the fitness of listed individuals. Ideally, our response analyses consider and weigh evidence of adverse consequences, beneficial consequences, or the absence of such consequences.

As described in the *Exposure Analysis* section, sunflower sea stars are expected to occur in the action area and are expected to overlap with disturbance and possible relocations associated with FOC placement, jetting, and articulated pipe installation activities. We assume that some individuals are likely to be exposed and respond to these disturbances. The mitigations provide for greater care in removal of any sunflower sea stars encountered, which will reduce the likelihood of injury or mortality due to being relocated. In addition, sea stars can regenerate tube feet and arms if injured during removal or relocation, which may reduce potential for long-term effects. Sunflower sea stars that are alive and not exhibiting SSWS will be relocated quickly and placed in areas of similar or better quality habitat. Relocation will introduce some stress for sea stars and, as noted previously, may expose them to greater predation risk as they move to find shelter and attach to the substrate. Because each landing site installation is expected to take a single day of work, we expect most relocated animals will not return to the area until after FOC-laying activities are completed.

Although we do not have specific research on sea star response to being handled as part of a relocation it is reasonable to conclude that gentle removal and relocation is less likely to incur injury than leaving the sea stars where they would be subject to possible injury from the jetting or being crushed by the heavy pipe or people working in the area at low tide. There are large sea stars held at the Alaska Sea Life Center where they are touched and handled gently without apparent behavioral or survival effects.

Some sea stars are also expected to encounter the FOC as it settles to the sea floor in offshore areas where the cable will not be encased. However, the cable is small and light enough that we expect a sea star could move out from under it without injury and, therefore, would only result in short-term behavioral responses.

The individual and cumulative energy costs of the behavioral responses we have discussed are not likely to increase the energy budgets of sunflower sea star individuals, and their probable exposure to these stressors are not likely to reduce their fitness.

6 CUMULATIVE EFFECTS

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area (50 CFR § 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA.

We searched for information on non-Federal actions reasonably certain to occur in the action area. We did not find any information about non-Federal actions other than what has already been described in the Environmental Baseline (Section 4 of this opinion). Some continuing non-Federal activities are reasonably certain to contribute to climate change within the action area. However, it is difficult if not impossible to distinguish between the action area's future environmental conditions caused by global climate change that are properly part of the environmental baseline versus cumulative effects. Therefore, all relevant future climate-related environmental conditions in the action area are described in the Environmental Baseline (Section 4).

7 INTEGRATION AND SYNTHESIS

The Integration and Synthesis section is the final step of NMFS's assessment of the risk posed to listed species and critical habitat as a result of implementing the proposed action. In this section, we add the Effects of the Action (Section 5) to the Environmental Baseline (Section 4) and the Cumulative Effects (Section 6) to formulate the agency's conference opinion as to whether the proposed action is likely to: (1) result in appreciable reductions in the likelihood of both the survival or recovery of the species in the wild by reducing its numbers, reproduction, or distribution or (2) result in the adverse modification or destruction of critical habitat as measured through direct or indirect alterations that appreciably diminish the value of designated critical habitat as a whole for the conservation of the species. These assessments are made in full consideration of the Status of the Species (Section 3).

The risk analysis begins by asking whether the probable physical, physiological, behavioral, or social responses of endangered or threatened species are likely to reduce the fitness of endangered or threatened individuals or the growth, annual survival or reproductive success, or lifetime reproductive success of those individuals.

As part of our risk analyses, we identified and addressed all potential stressors and considered all consequences of exposing the proposed sunflower sea star, individually and cumulatively, to all the stressors associated with the proposed action given that the individuals in the action area for this consultation are also exposed to other stressors in the action area and elsewhere in their geographic range.

7.1 Sunflower Sea Star Risk Analysis

Our consideration of probable exposures and responses of proposed threatened sunflower sea stars to cable-laying activities associated with the proposed action is designed to help us assess whether those activities are likely to increase the extinction risk or jeopardize the continued existence of the species. Assuming a density of 0.04 sea stars/m^2 (Lowry 2023), we estimate that a maximum of ~32.4 sea stars could be impacted by direct human contact during the proposed activities. We also calculated that a maximum of ~139.4 sea stars could be impacted by contact with the FOC during offshore cable-laying operations and experience non-injurious stress and behavioral impacts.

Sea stars may also be impacted by direct human contact during relocation prior to FOC-laying

activities or crushed inadvertently by workers or equipment when the intertidal areas are exposed. If a sea star is found in the vicinity of an area where materials will be staged or during the pre-work surveys, it will be moved out of the work area. As discussed in Section 5, the major stressors are the relocation, potential injury during removal, injury due to unintentional contact from workers, the exposure to increased predation after relocation, and the potential exclusion from previously occupied habitat until recolonization can occur. Compared to the amount of habitat the species can occupy throughout Alaska and other parts of its range (e.g., low intertidal and subtidal zones down to 435 m, but most common above 25 m), and the expected non-lethal impacts of direct human contact and other project activities due to mitigation measures in place, the proposed action is not expected to decrease the likelihood of survival or recovery of the sunflower sea star.

Despite spanning over 100 mi, the geographic scope of this project is small relative to the entire range of the species. Habitat and prey impacts for the sunflower sea star are expected to be extremely small. The number of individuals that will be affected is very small relative to the estimated population of sunflower sea stars (over 600 million) (Lowry 2022). Based on some evidence of recent recruitment and localized abundance increases, the current coastal construction regime in Alaska does not appear to be limiting sunflower sea star recovery.

The primary threat to sunflower sea stars identified in the Status Review report (Lowry 2022) and proposed rule to list the sunflower sea star as threatened (88 FR 16212; March 16, 2023) is SSWS. Based on our analysis and the limited geographic and temporal scope of the project, no aspect of the proposed action is expected to increase the prevalence of SSWS in sunflower sea stars. Other threats include pollution and by-catch/overexploitation. These risk factors are in addition to those operating on a larger scale, such as climate change. Sunflower sea stars may be affected by multiple threats at any given time, compounding the impacts of the individual threats. All of these activities are expected to continue to occur into the foreseeable future.

8 CONCLUSION

After reviewing the current status of the proposed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS's conference opinion that the proposed action is not likely to jeopardize the continued existence of sunflower sea star. No critical habitat has been designated or proposed for this species; therefore, none will be affected. Further, it is NMFS's opinion that the proposed action is not likely to adversely affect endangered Western North Pacific DPS gray whale, endangered North Pacific right whale, threatened Mexico DPS humpback whale, endangered Western North Pacific DPS humpback whale, endangered blue whale, endangered fin whale, endangered sperm whale, and endangered Western DPS Steller sea lion. The proposed action is also not likely to adversely affect designated critical habitat for Mexico DPS humpback whale, Western North Pacific DPS humpback whale, or Steller sea lion. No critical habitat has been designated for Western North Pacific DPS gray whale, blue, fin, or sperm whales, and none is currently proposed for sunflower sea stars, therefore none will be affected.

This concludes the conference for the Aleutians II Fiber Optic Cable Project. You may ask NMFS to confirm the conference opinion as a biological opinion issued through formal

consultation if the species is listed. The request must be in writing. If NMFS reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, NMFS will confirm the conference opinion as the biological opinion on the project and no further Section 7 consultation will be necessary.

9 INCIDENTAL TAKE STATEMENT

Section 9 of the ESA prohibits the take of endangered species unless there is a special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct (16 U.S.C. § 1532(19)). "Incidental take" is defined as take that results from, but is not the purpose of, the carrying out of an otherwise lawful activity conducted by the action agency or applicant (50 CFR § 402.02). Based on NMFS guidance, the term "harass" under the ESA means to: "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering" (Wieting 2016).

The ESA does not prohibit the take of proposed or threatened species unless special regulations have been promulgated, pursuant to ESA Section 4(d), to promote the conservation of the species. ESA Section 4(d) rules have not been promulgated for sunflower sea star; therefore, ESA Section 9 take prohibitions do not apply to this species. This ITS includes numeric limits on the take of sunflower sea star because specific amounts of take were analyzed in our jeopardy analysis. These numeric limits provide guidance to the action agency on its requirement to re-initiate consultation if the amount of take estimated in the jeopardy analysis of this opinion is exceeded. This ITS includes reasonable and prudent measures and terms and conditions designed to minimize and monitor take of these threatened species.

In order to monitor the impact of incidental take, NTIA or its designated representative, Unicom or its contractors, must monitor and report on the progress of the action and its impact on the species as specified in the ITS (50 CFR § 402.14(i)(3)).

9.1 Amount or Extent of Take

Section 7 regulations require NMFS to estimate the number of individuals that may be taken by proposed actions or utilize a surrogate (e.g., other species, habitat, or ecological conditions) if we cannot assign numerical limits for animals that could be incidentally taken during the course of an action (50 CFR § 402.14(i)(1); see also 80 FR 26832; May 11, 2015).

For this consultation, the NTIA anticipates that take is reasonably certain to occur. The primary source of take will be due to handling; however, injury or mortality are possible as sea stars may be injured during the removal and relocation process or suffer predation shortly after relocation.

Individual sunflower sea stars may be encountered in the intertidal area during pre-work surveys or during the encased FOC installation process. Seas stars are likely to be adults or subadults. Incidental take would occur when these individuals are removed from the substrate and relocated to a suitable site away from the active action area.

The intertidal portions of the FOC at the seven landing sites will disturb approximately 810 m^2

(8,718.77 ft^2) of intertidal area. Based on the pre-pandemic estimated density of sunflower sea stars present and the estimated decline in the population, the expected density in the action area would be 0.04-sunflower sea star per m^2, and approximately ~32.4 sea stars would be likely to be encountered/impacted in the 810-m^2 area affected by the FOC installation.

The offshore portion of the FOC in waters less than 120 m deep will disturb approximately 3,485.20 m^2 (37,514.34 ft^2) of sea floor area. Using the same expected density of 0.04-sunflower sea star per m^2, approximately 139.41 sea stars would be likely to be encountered/impacted in the 3,485.20-m^2 area affected by the FOC cable-laying operations in offshore areas.

Based on the estimated density of sunflower sea stars in the action area and calculations of the areas to be affected by FOC installation, we expect that less than 172 sunflower sea stars in total will be taken due to FOC installation and relocation of the sea stars encountered (e.g., harm, wound, kill, collect) (see Section 5.2.1).

Table 9-1. Summary of Expected Incidental Take of Species Proposed for ESA Listing

Species	Activity	Expected Number of Takes	Anticipated Temporal Extent of Take
Sunflower sea star (*Pycnopodia helianthroides*)	Intertidal cable laying	32	May 1, 2024, through October 15, 2024, and June 1, 2025, to July 1, 2025 (Chignik Lake only)
Sunflower sea star (*Pycnopodia helianthroides*)	Offshore cable laying	139	May 1, 2024, through October 15, 2024, and June 1, 2025, to July 1, 2025 (Chignik Lake only)

9.2 Effect of the Take

In Section 8 of this opinion, NMFS determined that the level of anticipated take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species. We estimate that the proposed activities could affect ~32 sunflower sea stars as they are removed from the FOC alignment in the intertidal zone prior to in-water work at each site, inadvertently injured by workers or equipment, or subjected to predation after relocation. We estimate that the proposed activities could affect ~139 sunflower sea stars if they come into contact with the FOC in deeper waters and are disturbed by or move away from the cable. The current range-wide (*i.e.,* global) population estimate for the sunflower sea star is nearly 600 million individuals, based on a compilation of the best available science and information (Gravem et al. 2021). The proposed activities will impact, at most, 0.0000003 percent of the population. Therefore, we do not expect the project to affect the viability of the population, or the species' survival or recovery.

9.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" (RPMs) are measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take (50 CFR 402.02).

RPMs are distinct from the mitigation measures that are included in the proposed action (described in Section 2.1.3). We presume that the mitigation measures will be implemented as described in this conference opinion. The failure to do so will constitute a change to the action that may require reinitiation of consultation pursuant to 50 CFR § 402.16.

The RPMs included below, along with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. NMFS concludes that the following RPM is necessary and appropriate to minimize or to monitor the incidental take of sunflower sea stars resulting from the proposed action.

1. NTIA must implement, or require Unicom and its contractors to implement, a monitoring program that reports the total amount of take so that NMFS AKR can evaluate the exposure estimates contained in this conference opinion and that underlie this ITS.

9.4 Terms and Conditions

"Terms and conditions" implement the reasonable and prudent measures (50 § 402.14(i)(2)).

These terms and conditions are in addition to the mitigation measures included in the proposed action, as set forth in Section 2.1.3 of this opinion. NTIA or Unicom has a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR § 402.14(i)(3)).

These terms and conditions constitute no more than a minor change to the proposed action because they are consistent with the basic design of the proposed action.

To carry out RPM #1, NTIA must undertake (or require their lessees or permittees to undertake) the following:

a) The individuals completing the FOC installation in the intertidal areas must be able to accurately identify sunflower sea stars in order to document observed incidents of harassment as described in the mitigation measures associated with this action; and

b) If take of any sunflower sea stars totals 80 percent of take for either intertidal activity (26) or offshore (111) individuals) takes authorized in the ITS, NTIA will notify NMFS by email (attention: leanne.roulson@noaa.gov and cc sierra.franks@noaa.gov) to discuss if there is a need for reinitiation of consultation.

10 CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR § 402.02).

1. NTIA or its representatives should ensure that the entities responsible for conducting the sunflower sea star surveys have practice and expertise with the methodology they use to conduct the survey prior to conducting the actual surveys. In addition, NTIA or its representatives should invite NMFS biologists to the site when a sunflower sea star survey is being conducted or the equipment to do the survey is being tested to enable NMFS to better understand the efficacy of the selected methods and equipment.

In order to keep NMFS's Protected Resources Division informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the NTIA should notify NMFS of any conservation recommendations they implement in their final action.

11 REINITIATION OF CONSULTATION

As provided in 50 CFR § 402.16, reinitiation of consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and if (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action on listed species or designated critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect on the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount of incidental take is exceeded, Section 7 consultation must be reinitiated immediately (50 CFR § 402.14(i)(4)).

12 DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act (DQA)) specifies three components contributing to the quality of a document: utility, integrity, and objectivity. This section of the opinion addresses these DQA components, documents compliance with the DQA, and certifies that this opinion has undergone pre-dissemination review.

12.1 Utility

This document records the results of an interagency consultation. The information presented in this document is useful to NTIA, NMFS and the general public. These consultations help to fulfill multiple legal obligations of the named agencies. The information is also useful and of interest to the general public as it describes the manner in which public trust resources are being managed and conserved. The information presented in these documents and used in the

underlying consultations represents the best available scientific and commercial information and has been improved through interaction with the consulting agency.

This consultation will be posted on the NMFS AKR website http://alaskafisheries.noaa.gov/pr/biological-opinions/. The format and name adhere to conventional standards for style.

12.2 Integrity

This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III 'Security of Automated Information Resources' Office of Management and Budget Circular A-130, the Computer Security Act, and the Government Information Security Reform Act.

12.3 Objectivity

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased. They were developed using commonly accepted scientific research methods. They adhere to published standards including the ESA Consultation Handbook, ESA Regulations, 50 CFR § 402.01 et seq.

Best Available Information: This consultation and supporting documents use the best available information as cited in the References section. The analyses in this opinion contain more background on information sources and quality.

Referencing: All supporting materials, information, data, and analyses are properly referenced and consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA implementation and reviewed in accordance with AKR ESA quality control and assurance processes.

13 REFERENCES

Aalto, E., K. D. Lafferty, S. Sokolow, R. Grewelle, T. Ben-Horin, C. Boch, P. Raimondi, S. Bograd, E. Hazen, and M. Jacox. 2020. Models with environmental drivers offer a plausible mechanism for the rapid spread of infectious disease outbreaks in marine organisms. Scientific Reports 10(1):5975.

Allen, B. M., and R. P. Angliss. 2011. Alaska marine mammal stock assessments, 2010. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, WA, May 2011. NOAA Technical Memorandum NMFS-AFSC-223, 292 p.

Aquino, C. A., R. M. Besemer, C. M. DeRito, J. Kocian, I. R. Porter, P. T. Raimondi, J. E. Rede, L. M. Schiebelhut, J. P. Sparks, and J. P. Wares. 2021. Evidence that microorganisms at the animal-water interface drive sea star wasting disease. Frontiers in Microbiology 11:3278.

Au, W. W. L. 2000. Hearing in whales and dolphins: An overview. Pages 1-42 *in* W. W. L. Au, A. N. Popper, and R. R. Fay, editors. Hearing by Whales and Dolphins. Springer-Verlag, New York.

Au, W. W. L., A. A. Pack, M. O. Lammers, L. M. Herman, M. H. Deakos, and K. Andrews. 2006. Acoustic properties of humpback whale songs. Journal of the Acoustical Society of America 120(2):1103-1110.

Balser, E. J. 2004. And then there were more: cloning by larvae of echinoderms. Pages 3–9 *in* T. Heinzeller, and J. H. Nebelsick, editors. Echinoderms: München. A. A. Balkema Publishers, Leiden, London, New York, Philadelphia, Singapore.

Barlow, J., and P. J. Clapham. 1997. A new birth-interval approach to estimating demographic parameters of humpback whales. Ecology 78(2):535-546.

Bosch, I., R. B. Rivkin, and S. P. Alexander. 1989. Asexual reproduction by oceanic planktotrophic echinoderm larvae. Nature 337:169–170.

Brower, A., A. Willoughby, and M. Ferguson. 2022. Distribution and relative abundance of bowhead whales and other marine mammals in the western Beaufort Sea, 2020. U.S. Dept. of Commerce, National Oceanic and Oceanic Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, WA, July 2022. NOAA Technical Memorandum NMFS-AFSC-439, 155 p.

Brower, A. A., J. T. Clarke, and M. C. Ferguson. 2018. Increased sightings of subArctic cetaceans in the eastern Chukchi Sea, 2008–2016: population recovery, response to climate change, or increased survey effort? Polar Biology 41(5):1033-1039.

Byrne, M. 2013. Chapter 5: Asteroid evolutionary developmental biology and ecology. Pages 51-58 *in* J. M. Lawrence, editor. Starfish: biology and ecology of the Asteroidea. The Johns Hopkins University Press, Baltimore, MD.

Carretta, J. V., K. A. Forney, E. M. Oleson, D. W. Weller, A. R. Lang, J. Baker, M. M. Muto, B. Hanson, A. J. Orr, H. Huber, M. S. Lowry, J. Barlow, J. E. Moore, D. Lynch, L. Carswell, and R. L. B. Jr. 2020. U.S. Pacific marine mammal stock assessments: 2019. U.S. Dep. Commer., NOAA, NMFS, Southwest Fisheries Science Center, August 2020. NOAA Technical Memorandum NMFS-SWFSC-629.

Chia, F. S., and C. W. Walker. 1991. Ch. 5. Echinodermata: Asteroidea. Pages pp. 301–353 *in* A. C. Giese, J. S. Pearse, and V. B. Pearse, editors. Reproduction of Marine Invertebrates Vol. VI-Echinoderms and Lophophorates. Boxwood Press.

Clapham, P. J. 1992. Age at attainment of sexual maturity in humpback whales, *Megaptera novaeangliae*. Canadian Journal of Zoology 70(7):1470-1472.

Clapham, P. J. 1993. Social organization of humpback whales on a North Atlantic feeding ground. Pages 131-145 *in*.

Clarke, J., A. Brower, M. Ferguson, A. Willoughby, and A. Rotrock. 2020. Distribution and relative abundance of marine mammals in the eastern Chukchi Sea, eastern and western Beaufort Sea, and Amundsen Gulf, 2019 annual report. U.S. Dept. of Interior, Bureau of Ocean Energy Management (BOEM), Alaska OCS Region, Anchorage, AK, June 2020. OCS Study BOEM 2020-027 prepared under Interagency Agreement M17PG00031 by the NOAA, Alaska Fisheries Science Center, Marine Mammal Laboratory.

Cooke, J. G. 2018. Abundance estimates for western North Pacific gray whales for use with stock structure hypotheses of the range-wide review of the population structure and status of North Pacific gray whales. IWC SC/67b/ASI, 15 p.

Cooke, J. G., D. W. Weller, A. L. Bradford, O. Sychenko, A. M. Burdin, A. R. Lang, and R. L. Brownell Jr. 2017. Population assessment update for Sakhalin gray whale, with reference to stock identity, 15-17 November 2017.

D'Vincent, C. G., R. M. Nilson, and R. E. Hanna. 1985. Vocalization and coordinated feeding behavior of the humpback whale in southeastern Alaska. Scientific Reports of the Whales Research Institute 36:41–47.

Damon-Randall, K. 2023. Occurrence and Distribution of Eastern North Pacific and Western North Pacific Populations of Gray Whales in the North Pacific Ocean. Office of Protected Resources.

Dean, T. A., and S. C. Jewett. 2001. Habitat-specific recovery of shallow subtidal communities following the Exxon Valdez oil spill. Ecological Applications 11(5):1456-1471.

Diogou, N., D. M. Palacios, J. A. Nystuen, E. Papathanassiou, S. Katsanevakis, and H. Klinck. 2019. Sperm whale (*Physeter macrocephalus*) acoustic ecology at Ocean Station PAPA in the Gulf of Alaska–Part 2: oceanographic drivers of interannual variability. Deep Sea Research Part I: Oceanographic Research Papers 150:103044.

Eco49. 2022. ESA Section 7 Biological Assessment for fisheries research conducted and funded

by the Alaska Fisheries Science Center and the International Halibut Commission. Eco49 Consulting, Contract analysis prepared for the National Marine Fisheries Service, Bend, OR, June 2022, 127 p.

Eguchi, T., A. R. Lang, and D. W. Weller. 2023. Abundance of eastern North Pacific gray whales 2022/2023. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southwest Fisheries Science Center, Marine Mammal and Turtle Division, La Jolla, CA, June 2023. NOAA Technical Memorandum NMFS-SWFSC-680.

Erbe, C. 2002. Hearing abilities of baleen whales. Defense Research and Development Canada, Ottawa, Ontario, October 2002. DRDC Atlantic CR 2002-065.

Fearnbach, H., J. W. Durban, S. A. Mizroch, S. Barbeaux, and P. R. Wade. 2012. Winter observations of a group of female and immature sperm whales in the high-latitude waters near the Aleutian Islands, Alaska. Marine Biodiversity Records 5:e13.

Goldbogen, J. A., J. Calambokidis, D. A. Croll, J. T. Harvey, K. M. Newton, E. M. Oleson, G. Schorr, and R. E. Shadwick. 2008. Foraging behavior of humpback whales: kinematic and respiratory patterns suggest a high cost for a lunge. Journal of Experimental Biology 211(23):3712-3719.

Gravem, S., W. Heady, V. Saccomanno, K. Alvstad, A. Gehman, T. Frierson, and S. Hamilton. 2021. IUCN Red List Assessment: Sunflower sea star *(Pycnopodia helianthoides)*. IUCN Red List of Threatened Species 2021 20.

Hanselman, D. H., B. J. Pyper, and M. J. Peterson. 2018. Sperm whale depredation on longline surveys and implications for the assessment of Alaska sablefish. Fisheries Research 200:75-83.

Harvell, C., D. Montecino-Latorre, J. Caldwell, J. Burt, K. Bosley, A. Keller, S. Heron, A. Salomon, L. Lee, and O. Pontier. 2019. Disease epidemic and a marine heat wave are associated with the continental-scale collapse of a pivotal predator (*Pycnopodia helianthoides*). Science advances 5(1):eaau7042.

Heather Coletti, N. P. S., U. S. G. S. Dan Esler, Alaska Science Center, U. o. A. F. Katrin Iken, U. o. A. F. Brenda Konar, U. S. G. S. E. Brenda Ballachey, Alaska Science Center, U. S. G. S. E. James Bodkin, Alaska Science Center, U. S. G. S. George Esslinger, Alaska Science Center, U. S. G. S. Kim Kloecker, Alaska Science Center, N. O. a. A. A. Mandy Lindeberg, U. S. G. S. Dan Monson, Alaska Science Center, U. S. G. S. Brian Robinson, Alaska Science Center, U. S. G. S. Sarah Traiger, Alaska Science Center, and U. S. F. a. W. S. Benjamin Weitzman, Marine Mammal Management. 2023. Exxon Valdez Oil Spill Trustee Council

Long-Term Research and Monitoring, Mariculture, Education and Outreach

Annual Project Reporting Form.

Hemery, L. G., S. R. Marion, C. G. Romsos, A. L. Kurapov, and S. K. Henkel. 2016. Ecological niche and species distribution modelling of sea stars along the Pacific Northwest continental shelf. Diversity and Distributions 22(12):1314-1327.

Herrlinger, T. J. 1983. The diet and predator-prey relationships of the sea star *Pycnopodia helianthoides* (Brandt) from a central California kelp forest. Master's thesis. San Jose State University, Moss Landing Marine Laboratories, San Jose, CA, 57 p.

Jewett, S. C., R. N. Clark, H. Chenelot, S. Harper, and M. K. Hoberg. 2015. Field guide to sea stars of the Aleutian Islands. Alaska Sea Grant, University of Alaska Fairbanks. Vol. SG-ED-79.

Johnson, J. H., and A. A. Wolman. 1984. The Humpback Whale, *Megaptera novaeangliae*. Marine Fisheries Review 46(4):300-337.

Kennedy, A. S., A. N. Zerbini, B. K. Rone, and P. J. Clapham. 2014. Individual variation in movements of satellite-tracked humpback whales Megaptera novaeangliae in the eastern Aleutian Islands and Bering Sea. Endangered Species Research 23(2):187-195.

Ketten, D. R. 1997. Structure and function in whale ears. Bioacoustics 8:103-135.

Konar, B., T. J. Mitchell, K. Iken, H. Coletti, T. Dean, D. Esler, M. Lindeberg, B. Pister, and B. Weitzman. 2019. Wasting disease and static environmental variables drive sea star assemblages in the Northern Gulf of Alaska. Journal of Experimental Marine Biology and Ecology 520:151209.

Lambert, P. 2000. Sea Stars of British Columbia, Southeast Alaska, and Puget Sound. Royal British Columbia Museum Handbook. University of British Columbia Press, Vancouver, British Columbia.

Lloyd, M. M., and M. H. Pespeni. 2018. Microbiome shifts with onset and progression of Sea Star Wasting Disease revealed through time course sampling. Scientific Reports 8(1):16476.

Lowry, D., S. Wright, M. Neuman, D. Stevenson, J. Hyde, M. R. Lindeberg, N. Tolimieri, S. Lonhart, S. B. Traiger, and R. G. Gustafson. 2022. Draft Endangered Species Act status review report: sunflower sea star (*Pycnopodia helianthoides*). U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle, WA, October 2022. Report to NMFS Office of Protected Resources, 89 p. + appendices.

Lowry, D., Wright, S., Neuman, M., Stevenson, D., Hyde, J., Lindeberg, M., Tolimieri, N., Lonhart, S., Traiger, S., Gustafson, R. 2022. Draft Endangered Species Act status review report: sunflower sea star (*Pynopodia helianthoides*). Final Report to the National Marine Fisheries Service, Office of Protected Resources. October 2022. 89 pp. +App.

Lundquist, C. J., and L. W. Botsford. 2011. Estimating larval production of a broadcast spawner: the influence of density, aggregation, and the fertilization Allee effect. Canadian Journal

of Fisheries and Aquatic Sciences 68:30-42.

Matsuoka, K., S. A. Mizroch, and H. Komiya. 2013. Cruise report of the 2012 IWC-Pacific Ocean Whale and Ecosystem Research (IWC-POWER). International Whaling Commission, Cambridge, 43 p.

Mauzey, K. P., C. Birkeland, and P. K. Dayton. 1968. Feeding behavior of asteroids and escape responses of their prey in the Puget Sound region. Ecology 49(4):603-619.

McCracken, A. R., B. M. Christensen, D. Munteanu, B. Case, M. Lloyd, K. P. Herbert, and M. H. Pespeni. 2023. Microbial dysbiosis precedes signs of sea star wasting disease in wild populations of Pycnopodia helianthoides. Frontiers in Marine Science 10:1130912.

Mellinger, D. K., K. M. Stafford, and C. G. Fox. 2004a. Seasonal occurrence of sperm whale (*Physeter macrocephalus*) sounds in the Gulf of Alaska, 1999–2001. Marine Mammal Science 20(1):48-62.

Mellinger, D. K., K. M. Stafford, S. E. Moore, U. Munger, and C. G. Fox. 2004b. Detection of North Pacific right whale (*Eubalaena japonica*) calls in the Gulf of Alaska. Marine Mammal Science 20(4):872-879.

Mizroch, S., and D. Rice. 2013. Ocean nomads: Distribution and movements of sperm whales in the North Pacific shown by whaling data and Discovery marks. Marine Mammal Science 29:E136-E165.

Muto, M. M., V. T. Helker, R. P. Angliss, B. A. Allen, P. L. Boveng, J. M. Breiwick, M. F. Cameron, P. J. Clapham, S. P. Dahle, M. E. Dahlheim, B. S. Fadely, M. C. Ferguson, L. W. Fritz, R. C. Hobbs, Y. V. Ivashchenko, A. S. Kennedy, J. M. London, S. A. Mizroch, R. R. Ream, E. L. Richmond, K. E. W. Shelden, R. G. Towell, P. R. Wade, J. M. Waite, and A. N. Zerbini. 2018. Alaska marine mammal stock assessments, 2017. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, WA, June 2018. NOAA Technical Memorandum NMFS-AFSC-378, 382 p.

Muto, M. M., V. T. Helker, B. J. Delean, N. C. Young, J. C. Freed, R. P. Angliss, N. A. Friday, P. L. Boveng, J. M. Breiwick, B. M. Brost, M. F. Cameron, P. J. Clapham, J. L. Crance, S. P. Dahle, M. E. Dahlheim, B. S. Fadely, M. C. Ferguson, L. W. Fritz, K. T. Goetz, R. C. Hobbs, Y. V. Ivashchenko, A. S. Kennedy, J. M. London, S. A. Mizroch, R. R. Ream, E. L. Richmond, K. E. W. Shelden, K. L. Sweeney, R. G. Towell, P. R. Wade, J. M. Waite, and A. N. Zerbini. 2022. Alaska marine mammal stock assessments, 2021. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, WA, August 2022. NOAA Technical Memorandum NMFS-AFSC-441, 398 p.

Neilson, J. L., C. M. Gabriele, A. S. Jensen, K. Jackson, and J. M. Straley. 2012. Summary of reported whale-vessel collisions in Alaskan waters. Journal of Marine Biology 2012:106282.

NMFS. 1998. Recovery plan for the blue whale (*Balaenoptera musculus*). National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Silver Spring, MD, 42 p.

NMFS. 2018. Revision to technical guidance for assessing the effects of anthropogenic sound on marine mammal hearing (Version 2.0): underwater acoustic thresholds for onset of permanent and temporary threshold shifts. U.S. Dept. of Commerce, National Oceanic and Atmospherica Administraiton, National Marine Fisheries Service, Office of Protected Resources, Silver Spring, MD. NOAA Tech. Memo. NMFS-OPR-55, 178 p.

NMFS. 2023. Gray whale, Western North Pacific Distinct Population Segment (*Eschrichtius robustus*) 5-year review: summary and evaluation. U.S. Department of Commerce, National Oceanic and Atmospheric Administraiton, National Marine Fisheries Service, Office of Protected Resources, Silver Spring, MD, 42 p.

Paul, A. J., and H. M. Feder. 1975. The food of the sea star *Pycnopodia helianthoides* (Brandt) in Prince William Sound, Alaska. Ophelia 14:15-22.

Payne, R. S. 1970. Songs of the humpback whale. Capitol Records, Hollywood, CA.

Perry, S. L., D. P. DeMaster, and G. K. Silber. 1999. The Great Whales: History and Status of Six Species Listed as Endangered Under the U.S. Endangered Species Act of 1973: a special issue of the Marine Fisheries Review. Marine Fisheries Review 61(1):1-74.

Rice, A. C., N. Posdaljian, M. A. Rafter, J. S. Trickey, S. M. Wiggins, S. Baumann-Pickering, and J. A. Hildebrand. 2020. Passive acoustic monitoring for marine mammals in the Gulf of Alaska Temporary Maritime Activities Area September 2017 to September 2019. Marine Physical Laboratory, Scripps Institution of Oceanography, University of California San Diego, La Jolla, CA. Technical Memorandum #646 under Cooperative Ecosystems Study Unit Cooperative Agreement N62473-18-2-0016 for U.S. Navy, U.S. Pacific Fleet, Pearl Harbor, HI.

Rice, D. W. 1989. Sperm whale *Physeter macrocephalus* Linnaeus, 1758. Pages 177-233 *in* S. Ridgway, and R. Harrison, editors. Handbook of marine mammals, 4. Academic Press, New York, New York.

Richardson, W. J., C. R. Greene Jr, C. I. Malme, and D. H. Thomson. 1995. Marine mammals and noise. Academic Press, Inc., San Diego, CA.

Rone, B. K., A. N. Zerbini, A. B. Douglas, D. W. Weller, and P. J. Clapham. 2017. Abundance and distribution of cetaceans in the Gulf of Alaska. Marine Biology 164(23).

Sharpe, F. A., and L. M. Dill. 1997. The behavior of Pacific herring schools in response to artificial humpback whale bubbles. Canadian Journal of Zoology-Revue Canadienne De Zoologie 75(5):725-730.

Shivji, M., D. Parker, B. Hartwick, M. Smith, and N. Sloan. 1983. Feeding and distribution study of the sunflower sea star *Pycnopodia helianthoides* (Brandt, 1835). Pacific Science

37(2):133-140.

Silber, G. K. 1986. The relationship of social vocalizations to surface behavior and aggression in the Hawaiian humpback whale (*Megaptera novaeangliae*). Canadian Journal of Zoology 64(10):2075-2080.

Simon, M., M. Johnson, and P. T. Madsen. 2012. Keeping momentum with a mouthful of water: behavior and kinematics of humpback whale lunge feeding. Journal of Experimental Biology 215(21):3786-3798.

Smultea Environmental Sciences (Smultea Sciences). 2022. Intrepid Protected Species Observer Report for GCI during the AU-Aleutians Fiber Cable Installation Project 2022. Prepared by M.A. Smultea, R. Wachtendonk, B. Snyder, and V. Schaefer. Prepared for General Communication Inc. 2550 Denali St # 1000, Anchorage, AK, 99503.

Straley, J. M., J. R. Moran, K. M. Boswell, J. J. Vollenweider, R. A. Heintz, T. J. Quinn Ii, B. H. Witteveen, and S. D. Rice. 2018. Seasonal presence and potential influence of humpback whales on wintering Pacific herring populations in the Gulf of Alaska. Deep Sea Research Part II: Topical Studies in Oceanography 147:173-186.

Straley, J. M., G. Schorr, A. Thode, J. Calambokidis, C. Lunsford, E. M. Chenoweth, V. O. Connell, and R. Andrews. 2014. Depredating sperm whales in the Gulf of Alaska: local habitat use and long distance movements across putative population boundaries. Endangered Species Research 24(2):125-135.

Strathmann, M. F. 1987. Chapter 26. Phylum Echinodermata. Class Asteroidea. Pages 535-555 *in* M. F. Strathmann, editor. Reproduction and development of marine invertebrates of the northern Pacific Coast. Univ. of Washington Press, Seattle, WA.

Thompson, P. O., W. C. Cummings, and S. J. Ha. 1986. Sounds, source levels, and associated behavior of humpback whales, Southeast Alaska. Journal of the Acoustical Society of America 80(3):735-740.

Thompson, T. J., H. E. Winn, and P. J. Perkins. 1979. Mysticete sounds. Pages 403-431 *in* H. E. Winn, and B. L. Olla, editors. Behavior of Marine Animals: Current Perspectives in Research Vol. 3: Cetaceans. Plenum Press, New York, NY.

Tomilin, A. 1967. Mammals of the USSR and adjacent countries. Cetacea 9:666-696.

Tyack, P., and H. Whitehead. 1983. Male competition in large groups of wintering humpback whales. Behaviour 83(1/2):132-154.

Tyack, P. L. 1981. Interactions between singing Hawaiian humpback whales and conspecifics nearby. Behavioral Ecology and Sociobiology 8:105-116.

Vu, E. T., D. Risch, C. W. Clark, S. Gaylord, L. T. Hatch, M. A. Thompson, D. N. Wiley, and S. M. Van Parijs. 2012. Humpback whale song occurs extensively on feeding grounds in the western North Atlantic Ocean. Aquatic Biology 14(2):175-183.

Wade, P. R. 2021. Estimates of abundance and migratory destination for North Pacific humpback whales in both summer feeding areas and winter mating and calving areas. National Marine Fisheries Service, Alaska Fisheries Science Center, Seattle, WA. Paper submitted to the International Whaling Commission SC/68C/IA/03.

Weston Solutions, Inc. 2024. National Marine Fisheries Service Biological Assessment for the AU-Aleutians II Fiber Project, Bering Sea, Alaska. Revision 1. Prepared for Unicom, Anchorage, Alaska. 114 p.

Wild, L., A. Thode, J. Straley, S. Rhoads, D. Falvey, and J. Liddle. 2017. Field trials of an acoustic decoy to attract sperm whales away from commercial longline fishing vessels in western Gulf of Alaska. Fisheries Research 196:141-150.

Winn, H. E., P. J. Perkins, and T. C. Poulter. 1970. Sounds of the humpback whale. Pages 39-52 *in* 7th Annual Conference on Biological Sonar and Diving Mammals, Stanford Research Institute, Menlo Park.

Witteveen, B. H., and K. M. Wynne. 2017. Site fidelity and movement of humpback whales (*Megaptera novaeangliae*) in the western Gulf of Alaska as revealed by photo-identification. Canadian Journal of Zoology 95(3):169-175.