UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
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Endangered Species Act (ESA) Section 7(a)(2) Biological Opinion and Conference Opinion

USCG Dock Construction, Seward and Sitka, Alaska

NMFS Consultation Number: AKRO-2024-00243

Action Agencies: **National Marine Fisheries Service (NMFS), Office of Protected Resources, Permits and Conservation Division (Permits Division); United States Coast Guard (USCG)**

Affected Species and Determinations:

ESA-Listed Species	Status	Is the Action Likely to Adversely Affect Species?	Is the Action Likely to Adversely Affect Critical Habitat?	Is the Action Likely to Jeopardize the Species?	Applicable Project Site
Steller Sea Lion, Western DPS (*Eumetopias jubatus*)	Endangered	Yes	No	No	Seward and Sitka
Humpback Whale, Mexico DPS (*Megaptera novaeangliae*)	Threatened	Yes	No	No	Seward and Sitka
Humpback Whale, Western North Pacific DPS (*Megaptera novaeangliae*)	Endangered	Yes	No	No	Seward
Fin Whale (*Balaenoptera physalus*)	Endangered	Yes	N/A	No	Seward and Sitka
North Pacific Right Whale (*Eubalaena japonica*)	Endangered	No	No	No	Seward and Sitka
Sperm Whale (*Physeter macrocephalus*)	Endangered	No	N/A	No	Seward and Sitka
Sunflower Sea Star (*Pycnopodia helianthoides*)	Proposed Threatened	Yes	N/A	No	Seward and Sitka

Consultation Conducted By: National Marine Fisheries Service, Alaska Region

Issued By:

Jonathan M. Kurland
Regional Administrator

Date: December 3, 2024

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TERMS AND ABBREVIATIONS

Abbreviations	**Terms**
Ac	Acre
AKR	Alaska Region
AUD INJ	Auditory Injury
BA	Biological Assessment
CFR	Code pf Federal Regulations
CSEL	Cumulative Sound Exposure Level
dB re 1µPa	Decibel referenced 1 microPascal
DPS	Distinct Population Segment
DTH	Down-the-hole (drilling)
ECO	Environmental Consultation Organizer
EEZ	Exclusive Economic Zone
ESA	Endangered Species Act
°F	Fahrenheit
FR	Federal Register
FRC	Fast Response Cutter
ft	Feet
Hz	Hertz
IHA	Incidental Harassment Authorization
IPCC	Intergovernmental Panel on Climate Change
ITS	Incidental Take Statement
IWC	International Whaling Commission
kHz	Kilohertz
km	Kilometers
kn	Knots
L	Liter
m	Meter
mi	Mile
m^2	Square meter
MLLW	Mean Lower Low Water

Abbreviations	**Terms**
MMPA	Marine Mammal Protection Act
μPa	Micro Pascal
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRC	National Research Council
Opinion	Biological Opinion
OSK	Offshore Systems Kenai
Pa	Pascals
PBF	Physical or Biological Features
RMS	Root Mean Square
RPA	Reasonable and Prudent Alternative
s	Second
SMIC	Seward Marine Industrial Center
SEL	Sound Exposure Level
SPL	Sound Pressure Level
SPLASH	Structure of Populations, Level of Abundance and Status of Humpback Whales
sf	Square feet
SSL	Steller Sea Lion
SSWS	Sea Star Wasting Syndrome
TTS	Temporary Threshold Shift
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Services
VMS	Vessel Monitoring System
WDPS	Western Distinct Population Segment
WSP	WSP USA Environment & Infrastructure Inc.
yds	Yards

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.

Updates to the regulations governing interagency consultation (50 CFR part 402) were effective on May 6, 2024 (89 FR 24268). We are applying the updated regulations to this consultation. The 2024 regulatory changes, like those from 2019, were intended to improve and clarify the consultation process, and, with one exception from 2024 (offsetting reasonable and prudent measures), were not intended to result in changes to the Services' existing practice in implementing section 7(a)(2) of the Act (89 FR at 24268; 84 FR 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 agencies are the U.S. Coast Guard (USCG) and the NMFS Office of Protected Resources, Permits and Conservation Division (hereafter referred to as Permits Division). The USCG proposes construction of docks in Seward and Sitka, Alaska, using pile driving and down-the-hole drilling (DTH). In addition, the NMFS Permits Division plans to issue two incidental harassment authorizations (IHA) pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act MMPA of 1972, as amended (MMPA; 16 U.S.C. § 1361 et seq.), to the USCG, the applicant, for harassment of marine mammals incidental to the proposed actions. NMFS recommended that the USCG batch the two projects to streamline efforts. USCG contracted with WSP USA Environment & Infrastructure Inc. (WSP) who prepared the biological assessment (BA) and IHA application for the USCG. NMFS Permits Division requested consultation on the proposed issuance of the IHAs under section 101(a)(5)(D) of the MMPA for the aforementioned activities. The consulting agency for this proposal is NMFS's Alaska Region (AKR) Protected Resources Division. This document represents NMFS's biological opinion (opinion) on the effects of this proposal on listed and proposed endangered and threatened species and designated critical habitat.

The opinion and ITS were prepared by 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 June 2024, BA submitted by WSP and the IHA Application and Proposed IHA (89 FR 60359, July 25, 2024). Other sources of information relied upon include consultation communications (emails and virtual meetings) with NMFS AKR, WSP, and NMFS Permits Division, recent consultations completed in the same region, previous monitoring reports in the region, scientific literature, and marine mammal surveys in Alaska. A complete record of this consultation is on file at NMFS's Anchorage, AKR Office.

The proposed action involves construction of new mooring structures and associated shore support infrastructure at two USCG facilities located in Seward and Sitka, Alaska (Figure 1 and Figure 2). Project construction is required to satisfy safe berthing requirements for the future homeporting of one Sentinel-class Fast Response Cutter (FRC) at each facility. The need for the berthing facilities arises from the lack of adequate landside and in-water features at the two existing USCG facilities to safely accommodate the FRCs. Adding two FRCs in Alaska would support the USGC's mission under the Ports and Waterways Safety Act to provide port safety and security, protect the marine environment, maintain commercial and recreational safety, enforce laws and treaties, and perform search and rescue operations. Project activities would include in-water construction of a new FRC floating dock at the proposed USCG Seward Moorings facility within the Seward Marine Industrial Center (SMIC) and a new Seagoing Buoy Tender (WLB) pier with an attached FRC floating dock at the existing USCG Sitka Moorings facility. In-water construction will include removal of piles using vibratory pile driving, and installation of permanent piles using down-the-hole drilling (DTH). In-water work at Moorings Sitka is expected for a one-year period beginning September 2026 to September 2027. In-water work at Moorings Seward is expected for a one-year period beginning March 2027 to March 2028. An evaluation of the general Pacific-wide homeporting and operational deployment of new USCG FRCs[1] occurred under a previously submitted Programmatic Environmental Impact Statement.

[1] U.S. Coast Guard Record of Decision and Programmatic Environmental Impact Statement and Overseas Environmental Impact Statement for the Offshore Patrol Cutter Acquisition Program
Offshore Patrol Cutter Acquisition Program (CG-9322). Published: June 23, 2022.

Figure 1. Location of the USCG Moorings Seward, in Seward, Alaska (WSP 2024)

Figure 2. Location of the USCG Moorings Sitka, in Sitka, Alaska (WSP 2024)

This opinion considers the effects of dock construction and replacement through pile driving and DTH, and the associated proposed issuance of an IHA, on the endangered Western DPS (WDPS) Steller sea lion (*Eumetopias jubatus*) and its critical habitat, threatened Mexico distinct population segment (DPS) humpback whale and its critical habitat, endangered Western North Pacific DPS humpback whale (*Megaptera novaeangliae*), endangered fin whale (*Balaenoptera physalus*), endangered North Pacific right whale (*Eubalaena japonica*), and endangered sperm whale (*Physeter macrocephalus*). The action agency also requested a formal 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. The action agency requested a not likely to adversely affect determination for sperm whale and the North Pacific right whale. There is no overlap with critical habitat for North Pacific right whale or Western North Pacific DPS humpback whale, therefore, we conclude there will be no adverse effects to those critical habitats due to the proposed action. However, there is overlap with critical habitat for the Mexico DPS humpback whale and the Steller sea lion. Critical habitat has not been designated for the fin whale, sperm whale, or sunflower sea star.

1.2 Consultation History

Our communication with NMFS Permits Division, USCG, and WSP regarding this consultation is summarized as follows:

- January 19, 2024: NMFS AKR received a draft Biological Assessment (BA) for the USCG Seward and Sitka docks from WSP
- January 29, 2024: NMFS Permits Division received an Incidental Harassment Authorization (IHA) application for the USCG Seward and Sitka Docks project from WSP.
- April 3, 2024: WSP submitted revisions to IHA application.
- April 26, 2024: NMFS AKR contacted WSP about the status of a revised BA
- May 2, 2024: The Early Review Team (ERT), which involves participants from NMFS AKR and Permits Division, met to discuss the project and provide WSP with comments on the IHA application and BA
- May 14, 2024, NMFS AKR provided initial comments on BA to WSP
- May 17, 2024: NMFS sent revision requests to WSP for the IHA application and BA.
- June 6, 2024: WSP submitted a revised IHA application.
- June 7, 2024: NMFS AKR received a revised BA from WSP
- June 11, 2024: WSP submitted additional revisions to IHA application and NMFS Permit Division deemed the application was complete.
- July 25, 2024: NMFS AKR concluded that the revised BA was sufficient and initiated section 7 consultation
- July 25, 2024: The proposed rule for the requested IHA was published in the Federal Register Vol. 89, No. 60359.
- August 1, 2024: NMFS Permits Division requested initiation of section 7 consultation with NMFS AKR and we initiated consultation on the same day.
- August 22, 2024: NMFS received an email from WSP indicating the new start dates of September 2026 for Moorings Sitka and March 2027 for Moorings Seward
- August 26, 2024: The public comment period on the IHA closed
- September 23, 2024: WSP informed NMFS AKR that the construction materials would most likely need to be sourced from Seattle, Washington, and that the vessels carrying the materials to the project sites would need to transit through designated critical habitat for the Steller sea lion and Mexico DPS humpback whale.
- September 24, 2024: USCG confirmed (by email) the designation of WSP as their non-federal representative for this ESA consultation.

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 United States or upon the high seas. 50 C.F.R. § 402.02.

This opinion considers the effects on ESA listed and proposed listed species and critical habitats from the proposed construction of docks at two USCG mooring facilities in Seward and Sitka, Alaska, and of NMFS Permits Division's issuance of two IHAs to take listed marine mammals by harassment under the MMPA incidental to the USCG's construction activities. The proposed actions will take place along the eastern shore of Resurrection Bay in Seward, Alaska, at Latitude 57.049753°N, Longitude -135.346164°W and in Sitka, Alaska, on the northeast shore of Japonski Island in Sitka Sound within the Sitka Channel at Latitude 60.084911°N, Longitude -149.352928°W.

2.1.1 Proposed Activities

Project USCG Moorings Seward

The project in-water activities at Seward (Figure 3**)** would include the construction of a new 200-linear-foot FRC floating dock placed at the southern end of the City of Seward's existing North Dock at the Seward Marine Industrial Center (SMIC). To accommodate the new FRC dock, and to minimize the loss of dock space required by the City of Seward on a transient basis, the existing floating dock would be reconfigured by removing approximately 1,440 square feet (sf) of floating dock from the southern end (approximately 96 ft by 15 ft) and relocating it perpendicular to the northern end. Reconfiguration of the existing floating dock is expected to require the removal of ten existing 14-inch steel guide piles either by vibratory extraction or cutting at the mud line with a pile clipper or diamond saw. Five piles would be removed per day. To support the reconfigured floating dock, up to ten new concrete guide piles approximately 30 inches in diameter will be installed at two piles per day.

Installation of the new 200 ft by 35 ft dock at the southern end would include up to 20 concrete guide piles no greater than 30 inches in diameter. A new ramp would provide access to the floating dock and would be constructed from the upland without a water component. Pile installation would require drilling of rock sockets or DTH drilling and would be accomplished in a three-part sequence beginning with three hours of DTH, followed by ten minutes of vibratory driving with five strikes from an impact driver to ensure that the pile is fully embedded. Up to two piles would be installed per day, weather permitting. Extraction and installation of the piles is estimated to require up to 22 days total that would include five additional days for weather delays.

Following installation of piles, each pile would be grouted in place using tremied concrete. In-water construction of the components of the floating dock are anticipated to take no longer than one month to complete and would require the use of no more than two construction barges, two tugboats, and one skiff. The materials needed for the construction will be sourced from Seattle, Washington, and brought to the Moorings Seward project site via barge and tug. The route from Seattle to the project site will transit through designated critical habitat for the WDPS of Steller sea lion and the Mexico DPS of humpback whale.

Figure 3. Proposed construction at USCG Moorings Seward (WSP 2024)

Project USCG Moorings Sitka

Project activities at Moorings Sitka (Figure 4) would include the construction of a new 175-ft by 50-ft approach pier, a new 270-ft by 65-ft terminal pier with a new attached FRC floating dock and new mooring dolphin. The in-water work at Sitka would include removal of the existing mooring dolphin at the west end of the existing pier. This will require removing up to four 24-

inch concrete piles by vibratory extraction and removal of the city-owned float including up to six existing 14-inch timber guide piles. Reconstruction of the city-owned float would include installation of six new 14-inch untreated timber guide piles elsewhere in the Sitka harbor area using an impact hammer. The timber piles may be coated with a polymer sealant or may be switched for composite plastic pilings, depending on cost and material availability. Removal of the existing dolphin is anticipated to take no longer than two days to complete. Removal and relocation of the 1800-sf float is anticipated to take no longer than five to six days to complete.

The entire pier structure would be approximately 26,300 sf supported by 105 piles most likely to be composed of concrete with steel reinforcement or steel pipe approximately 30 inches in diameter and 54 new 13-inch plastic fender piles that would be attached to the channel side of the pier. Additional work includes installation of a new approximately 3,600 sf FRC floating dock to include ten concrete guide piles up to 30 inches in diameter and installation of a new mooring dolphin supported by three 30-inch concrete piles. Concrete pile installation would require drilling rock sockets (by DTH) and would be accomplished in a three-part sequence beginning with three hours of DTH, followed by ten minutes of vibratory driving with five strikes from an impact driver to ensure that the pile is fully embedded. Following installation of piles into the socket, piles would be grouted into place using tremied concrete. It is anticipated that two piles would be installed per day for a maximum of 59 days of pile installation with an additional 25 days as a buffer in case of weather delays or other delays where less than two piles can be installed per day. This gives a total of 84 days of DTH installation for the pier and new mooring dolphin. The plastic fender piles would be installed using an impact hammer and would require approximately 27 days to install at two piles per day. In-water work is anticipated to take no longer than 117 days to complete and would require the use of no more than two construction barges, two tugboats, and one skiff. The materials for the construction will be brought from Seattle, Washington, and will be transported to the Moorings Sitka project site via barge and tug. The vessels will transit through designated critical habitat for the Mexico DPS of humpback whales as they leave Seattle and may also come close to a Steller sea lion haulout within Sitka Sound that has been designated as critical habitat.

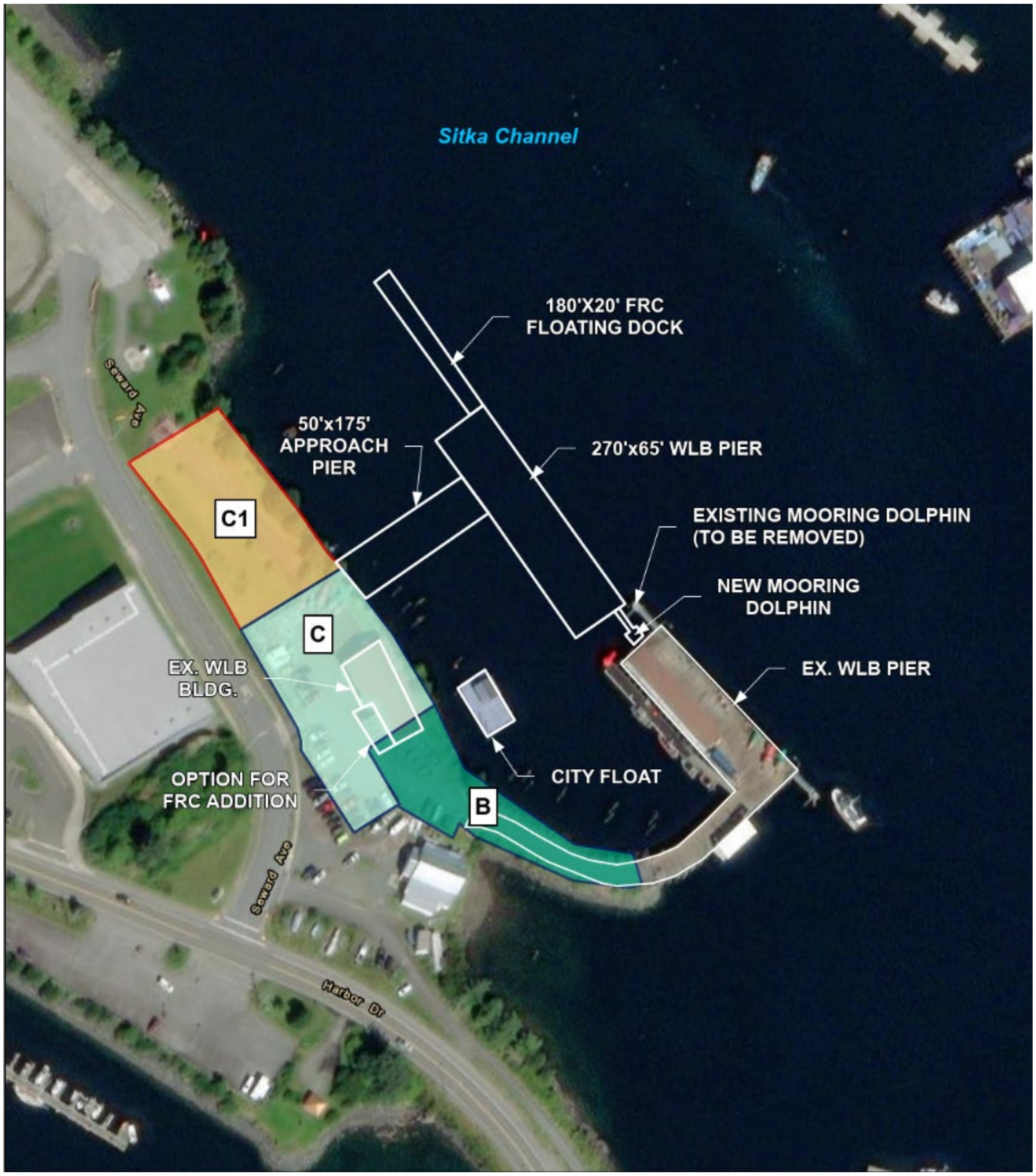

Figure 4. Proposed construction at USCG Moorings Sitka (WSP 2024)

The pile types, sizes, and installation methods are summarized in Table 1.

Table 1. Summary of piles to be installed or removed at Moorings Seward and Moorings Sitka.

Number of Piles	Diameter (in)	Type	Method
Moorings Seward			
10	14	Steel	Vibratory removal
30	30	concrete	DTH install
Moorings Sitka			
4	24	Concrete	Vibratory removal
6	14	Timber	Vibratory removal
6	14	timber	Impact install

Number of Piles	Diameter (in)	Type	Method
105	30	concrete	DTH install
54	13	plastic	Impact install
10	30	concrete	DTH install
3	30	concrete	DTH

2.1.2 Best Management Practices (BMPs)

For protection of marine mammals, including ESA-listed species and critical habitats, the USCG agrees to implement the following measures during vessel transport, construction and pile driving activities. To reduce project impacts, the design is such that dredging or blasting is not required and the diameter, number, and footprint of piles in minimized to the extent practicable. The projects will include continued observational monitoring of marine mammal occurrences within established shutdown zones.

The following BMPs have been proposed by the USCG in addition to NMFS AKR standard mitigations which are listed in the next section.

1. No in-water work at the Seward project area would occur between May 1 and June 30 in order to minimize impacts to pink salmon and coho salmon smolts. No in-water construction would take place in Sitka Sound between March 1 and June 1 to minimize impacts to marine mammals that congregate during the spring months to feed on spawning herring.

2. The use of a vibratory hammer for pile driving would be used to the extent possible.

3. Marine mammal monitoring would be conducted during pile removal and installation activities to ensure that marine mammals would not be subjected to injury noise levels that could cause physical damage (Level A). Site specific shutdown and monitoring areas are described in Table 2, below. Monitoring for marine mammals would include an initial 30-m shutdown zone and buffered exclusion zones in accordance with marine mammal monitoring plans. Because a single marine mammal monitor may be unable to monitor a specific Level A shutdown zone due to its size, additional monitors may be employed to ensure full coverage of the activity-specific Level A shutdown zone. Additionally, sound transmission at Moorings Seward will be constrained within the SMIC basin as shielded by a rip-rap seawall and at Moorings Sitka by the limited width of the Sitka Channel and will permit pre-activity monitoring of the Level A shutdown zone and will allow the monitor to "clear" the area and then serve as a "gatekeeper" during noise-generating activities to provide early warning and shutdown notifications should a noise-sensitive marine mammal approach the shutdown zone.

4. Vessel operators and crews shall maintain a vigilant watch for marine mammals to avoid striking sighted protected species.

5. To the extent possible, vessel hulls would be inspected prior to mobilizing to ensure they do not pose a risk of introducing new invasive species into the action areas and would not

increase the abundance of invasive species already present.

6. Where practicable, in-water work would be conducted at low or slack tide. As practicable, in-water and over-water work would be conducted during calm sea conditions. Work stoppages would occur during high surf, winds, and currents. In the event of approaching foul weather (e.g., coastal storms), equipment would either be removed from the proposed project sites or adequately secured.

7. To the maximum extent practicable, equipment and material would be lowered to the sea bottom in a controlled manner using cranes, winches, or other equipment to direct the placement and rate of descent.

8. Pre-drilling would be performed to the extent possible and would be discontinued when the pile tip is approximately five ft above the required pile tip elevation. Pre-drilling is a method that starts the “hole” for the new pile; the pile is inserted after the hole has been pre-drilled which creates less friction and overall noise and turbidity during installation. Pre-drilling also is beneficial for overall pile stability as it reduces the stress and chance of breakage or damage to the pile during installation.

9. During proofing or driving of pilings with an impact pile driver, a “soft-start” procedure would be applied prior to beginning activities each day or when hammers have been idle for more than 30 minutes, A “soft-start” technique is intended to allow marine species the ability to vacate the area before the pile driver reaches full power.

10. Noise reduction methods such as bubble curtains or cushion blocks may be installed as required by NMFS. If existing conditions at a site include sloped topography and riprap, care would be taken when placing equipment such as a bubble curtain to ensure a good seal is formed.

11. Pile driving would only be conducted during normal business hours (i.e., 8:00 a.m. to 5:00 p.m.) and when no marine mammals have been observed in the areas of impact.

12. To grout the pilings in place, uncured concrete would be poured into water-tight forms and measures would be implemented to ensure over-topping does not occur (e.g., hose with shut off valves, close monitoring).

13. Secondary containment would be placed beneath all above water active work areas.

14. Vessel operators would follow designated speed limits to and from the proposed project sites.

15. Vessel crews would either use a reference guide that helps identify protected species that might be encountered and/or be trained by a qualified biologist to recognize species. Additional training may be provided regarding information and resources available regarding federal laws and regulations for protected species, ship strike information, migratory routes and seasonal abundance, and recent sightings of protected species.

16. Vessels would adhere to the NMFS guidelines for approaching marine mammals, which discourage vessels from approaching within 100 yds (91.4 m) of whale species within the action areas.

17. If mother/calf pairs, groups, or large assemblages of marine mammals are observed near an underway vessel, speeds would be reduced to ten knots or less when safety permits. The vessel shall attempt to route around the animals, maintaining a minimum distance of 100 yds (91.4 m) whenever possible.

18. If a marine mammal surfaces in a vessel's path, or in close proximity to a moving vessel, and when safety permits, speeds would be reduced and the engine would be shifted into neutral. The engine would not be engaged until the animal(s) are clear of the area.

2.1.3 AKR Standard Mitigation Measures

For all reporting that results from implementation of these mitigation measures, NMFS will be contacted using the contact information specified in Table 3. In all cases, notification will reference the NMFS consultation tracking number AKRO-2024-00243.

USCG has agreed that the proposed action will incorporate the following mitigation measures:

<u>PSO Requirements</u>

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

2. PSO training will include:
    a. field identification of marine mammals and marine mammal behavior;
    b. ecological information on marine mammals and specifics on the ecology and management concerns of those marine mammals;
    c. ESA and MMPA regulations;
    d. proper equipment use;
    e. methodologies in marine mammal observation and data recording, and proper reporting protocols; and
    f. an overview of PSO roles and responsibilities.

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

4. USCG 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.

5. 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 shutdown zone and determine the marine mammal's location and distance from the 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 the mitigation measures; and
    f. possess data forms.

6. PSOs will not scan for marine mammals for more than four hours without at least a one-hour break from monitoring duties between shifts. PSOs will not perform PSO duties for more than 12 hours in a 24-hour period.

PSO Procedures

7. PSOs will have the ability, authority, and obligation to order appropriate mitigation response, including delay, to avoid takes of listed marine mammals.

8. One or more PSOs will perform PSO duties onsite throughout the authorized activity.

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

10. For each in-water activity, PSOs will monitor all marine waters within the indicated shutdown zone radius for that activity (Table 2. Shutdown and Harassment Zones for Each Activity).

Table 2. Shutdown and harassment zones by activity at Moorings Seward and Moorings Sitka.

Activity	Shutdown Zone (m) for humpback and fin whales	Shutdown Zone (m) for Steller sea lions	Harassment Zone (m) at Moorings Seward	Harassment Zone (m) at Moorings Sitka
Vibratory pile extraction	30	30	4,645	6,310
Impact drive plastic pile	30	30	N/A	5
Impact drive timber pile	30	30	N/A	50
DTH (Impulsive component) concrete pile	1,955	85	39,815	39,815
Vibratory concrete pile settling	30	30	7,360	7,360
Impact drive concrete pile proofing	30	30	545	545

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

12. Prior to commencing any activity listed in Table 2, PSOs will scan waters within the appropriate shutdown zone and confirm no listed marine mammals are within the shutdown 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 shutdown zone, the in-water activity will not begin until the listed marine mammals exit the shutdown zone of their own accord, or the shutdown zone has remained clear of listed marine mammals for 30 minutes immediately prior to the commencement of the activities listed in Table 2.

13. The on-duty PSOs will continuously monitor the shutdown zone and adjacent waters during any of the activities listed in Table 2 for the presence of listed marine mammals.

14. Activities listed in Table 2 will only take place:
    a. between sunrise and sunset;
    b. during conditions with a Beaufort Sea State of 4 or less; and
    c. when the entire shutdown zone and adjacent waters are visible (e.g., monitoring effectiveness is not reduced due to rain, fog, snow, haze, or other environmental/atmospheric conditions).

15. If visibility degrades such that PSOs can no longer ensure that the shutdown zone remains devoid of listed marine mammals during any of the activities listed in Table 2, the crew will stop activities until the entire shutdown zone is visible and the PSOs has indicated that the zone remained devoid of listed marine mammals for 30 minutes.

16. The PSOs will order ongoing activities listed in Table 2 to immediately cease if one or more listed marine mammals has entered, or appears likely to enter, the shutdown zone.

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

18. If a listed marine mammals is observed within a shutdown zone or is otherwise harassed, harmed, injured, or disturbed, the PSO will immediately report that occurrence to NMFS using the contact information specified in the IHAs.

19. Prior to commencing any activity listed in Table 2, or at changes in watch, PSOs will establish a point of contact with the construction crew. The PSO will brief the point of contact as to the shutdown procedures if the PSO observes that listed marine mammals are likely to enter or enter the shutdown zone. If the point of contact goes "off shift" and delegates their duties, the point of contact must inform the PSO and brief the new point of contact.

<u>Project-Dedicated Vessels</u> (vessel and crew safety should never be compromised)

20. Vessel operators will:
    a. maintain a watch for marine mammals at all times while underway;
    b. stay at least 100 yds (91.4 m) away from listed marine mammals, except that they will remain at least 500 yds (460 m) away from endangered North Pacific right whales;
    c. travel at less than 5 knots when within 300 yds (274 m) of a whale;
    d. avoid changes in direction and speed within 300 yds (274 m) of a whale, unless doing so is necessary for maritime safety;
    e. not position vessel(s) in the path of a whale, and will not cut in front of a whale in a way or at a distance that causes the whale to change direction of travel or behavior (including breathing/surfacing pattern);
    f. reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1 mile (1.6 km) or less; and
    g. adhere to the Alaska Humpback Whale Approach Regulations when vessels are transiting to and from the project site: (see 50 CFR §§ 216.18, 223.214, and

224.103(b); these regulations apply to all humpback whales). Specifically, pilot and crew will not:

i. approach, by any means, including by interception (i.e., placing a vessel in the path of an oncoming humpback whale), within 100 yds (91.4 m) of any humpback whale;

ii. cause a vessel or other object to approach within 100 yds (91.4 m) of any humpback whale; or

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

21. If a whale’s course and speed are such that it will likely cross in front of a vessel that is underway, or approach within 100 yds (91.4 m) 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 500 yds (460 m) from North Pacific right whales.

22. Vessels will not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear.

23. Project-specific barges will travel at 12 knots or less.

<u>Vessel Transit, North Pacific Right Whales, and their Designated Critical Habitat</u>

24. Vessels will:

    a. remain at least 500 yds (460 m) from North Pacific right whales; and

    b. not travel through designated North Pacific right whale critical habitat if practicable (50 CFR 226.215). If traveling through North Pacific right whale critical habitat cannot be avoided, vessels will:

        i. travel through North Pacific right whale critical habitat at 5 knots or less (without a PSO on watch); or at 10 knots or less while PSOs maintain a constant watch for listed species from the bridge; and

        ii. maintain a log indicating the time and geographic coordinates at which vessels enter and exit North Pacific right whale critical habitat.

<u>Vessel Transit, Western DPS Steller Sea Lions, and their Designated Critical Habitat</u>

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

26. Vessels will not approach within 3,000 ft (914 m) of any Steller sea lion haulout or rookery.

Vibratory Pile Removal and Installation

27. If no listed marine mammals are observed within the applicable shutdown zone (see Table 2) for 30 minutes immediately prior to pile removal or installation, vibratory pile removal or installation may commence. This pre-pile removal or installation observation period will take place at the start of each day's vibratory pile removal or installation, each time pile removal or installation has been shut down or delayed due to the presence of a listed species, and following a cessation of pile driving for a period of 30 minutes or longer.

28. Following a lapse of vibratory pile removal or installation activities of more than 30 minutes, the PSO will authorize resumption of vibratory pile removal or installation only after the PSO provides assurance that listed marine mammals have not been present in the shutdown zone for at least 30 minutes immediately prior to resumption of operations.

Down-the-Hole (DTH) drilling

29. If no listed marine mammals are observed within the DTH pile driving shutdown zone for 30 minutes immediately prior to pile driving, soft-start procedures will be implemented immediately prior to activities. Soft start requires contractors to activate the drilling equipment at no more than half the operational power for several seconds, followed by a 30 second waiting period, then two subsequent reduced power start-ups. A soft start must be implemented at the start of each day's DTH pile driving, any time pile driving has been shutdown or delayed due to the presence of a listed species and following cessation of pile driving for a period of 30 minutes or longer.

30. Following this soft-start procedure, operational pile driving may commence and continue provided listed marine mammals remain absent from the shutdown zone.

31. Following a lapse of pile driving activities of more than 30 minutes, the PSO will authorize resumption of pile driving only after the PSO provides assurance that listed marine mammals have not been present in the shutdown zone for at least 30 minutes immediately prior to resumption of operations.

Data Collection

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

33. USCG will ensure that PSO data will be submitted electronically to NMFS in a format that can be queried such as a spreadsheet or database (i.e., digital images of data sheets are not sufficient).

34. PSOs will record the following:
    a. project name, date, shift start time, shift stop time, and PSO identifier;
    b. date and time of each reportable event (e.g., a listed marine mammal observation, change in weather conditions);

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

d. species, numbers, and, if possible, sex and age class of observed listed marine mammals;

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

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

g. geographic coordinates of initial, closest, and last location of listed species, including distance from observer to the listed species, and minimum distance from the predominant sound-producing activity to listed species; and

h. whether the presence of a listed species necessitated the implementation of mitigation measures to avoid acoustic impact (i.e., delay), and the duration of time that normal operations were affected by the presence of listed species.

General Proposed Project Construction BMPs

Additional measures associated with the construction of the proposed Project that would be implemented include the following:

35. Contractors would be required to comply with policies and procedures, including the USCG oil spill and hazardous materials guidelines, the Alaska Regional Response Team's Wildlife Protection Guidelines for Oil Spill Response in Alaska, addressing hazardous materials management and hazardous waste management, including accidental spills and worker safety and training requirements.

36. Spill kits with appropriate materials to contain and clean spills would be kept on site at all times.

37. Any equipment proposed for use would be kept in good repair without leaks of fluids. If such leaks or drips occur, they would be cleaned up immediately in adherence to a site-specific Spill Prevention Response Plan and Spill Control and Countermeasures Plan.

38. The contractor would use only clean construction materials suitable for use in the oceanic environment. The contractor would ensure that no debris, soil, silt, sand, sawdust, rubbish, cement or concrete washings thereof, toxic chemical, oil or petroleum products from construction would be allowed to enter into, or placed where it may be washed by rainfall or runoff into, Waters of the U.S. Upon completion of each proposed Project component, all excess material or debris would be completely removed from the work area and disposed of in an appropriate upland site.

Protection of Sunflower Sea Stars

39. To prevent direct placement of a pile on a sunflower sea star, a pre-construction survey and biweekly (every other week) surveys of the seafloor near the project area will take place. If a sunflower sea star is identified during the pre-construction or biweekly surveys, more frequent surveys prior to pile driving shall be required.
    a. For the pre-construction survey, divers will observe the area within 10 m shutdown zone for sunflower sea stars. The contractor, at their own discretion, may monitor the seafloor at the placement of every pile in lieu of a pre-construction or biweekly surveys.
    b. If a sunflower sea star is found in the affected area or attached to a pile being removed from the water, the sunflower sea star will be gently removed from the affected area or pile by the Lead PSO, or a crew delegate due to possible safety concerns. It will be gently moved into a container of water collected at the site and taken to a location away from the action area and gently released onto the substrate. Individuals will be held in a nylon net within a bucket of water for no more than ten minutes. The number and approximate diameter of sunflower sea stars moved will be recorded and reported to NMFS (the sunflower sea star monitoring protocol can be requested from NMFS).
40. 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. All sunflower sea star findings will be reported to NMFS, including latitude/longitude and transect line, at akr.prd.reports@noaa.gov.

<u>Reporting</u>

Unauthorized Take

41. 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 within one business day, with information submitted to akr.prd.records@noaa.gov. These PSO records will include:
    a. digital, queryable documents containing PSO observation and records; 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 listed marine mammal, the contact information for the PSO on duty on the vessel 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

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

Illegal Activities

43. If the PSO observes listed marine mammals or other marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS Alaska Region Office of Law Enforcement at: 1-800-853-1964).

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

North Pacific Right Whales

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

Extralimital Sightings

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

Final Report

47. A final report will be submitted to NMFS within 90 calendar days of the completion of the project summarizing the data recorded by emailing it to akr.prd.records@noaa.gov. The report will summarize all in-water activities associated with the proposed action, and results of PSO monitoring conducted during the in-water activities.

48. The final report for projects will include:
    a. summaries of monitoring efforts, including dates and times of construction, dates and times of monitoring, dates and times and duration of shutdowns due to listed marine mammal presence;
    b. dates and times of listed marine mammal observations, geographic coordinates of listed marine mammals at their closest approach to the project site, including date, water depth, species, age/size/gender (if determinable), and group sizes;
    c. number of listed marine mammals observed (by species) during periods with and without project activities (and other variables that could affect detectability);
    d. observed listed marine mammal behaviors and movement types versus project activity at the time of observation;
    e. numbers of marine mammal observations/individuals seen versus project activity at time of observation;
    f. any photos or videos taken of marine mammals; and
    g. digital, queryable documents containing PSO observations and records, and digital, queryable reports.

Table 3. Summary of Agency Contact Information

Reason for Contact	**Contact Information**
Consultation Questions & Unauthorized Take	akr.prd.section7@noaa.gov
Reports & Data Submittal	akr.prd.records@noaa.gov
Stranded, Injured, or Dead Marine Mammals	Stranding Hotline (24/7 coverage) 1-877-925-7773
Oil Spill & Hazardous Materials Response	U.S. Coast Guard National Response Center: 1-800-424-8802 and AKRNMFSSpillResponse@noaa.gov

Reason for Contact	**Contact Information**
Illegal Activities *(not related to project activities; e.g., feeding, unauthorized harassment, or disturbance to marine mammals)*	NMFS Office of Law Enforcement (AK Hotline): 1-800-853-1964
In the event that this contact information becomes obsolete	NMFS Anchorage Main Office: 907-271-5006 or NMFS Juneau Main Office: 907-586-7236

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 consultation to include the area within which project-related noise levels exceed 120 dB re 1 µPa root mean square (rms) and are expected to approach ambient noise levels (i.e., the point where no measurable effect from the project would occur). See the Acoustic Threshold section for more information on the modeling and calculation of these isopleths and shutdown areas.

USCG Moorings Seward Project Site

The proposed USCG Moorings Seward project would be located along the east coast of Resurrection Bay within the SMIC area. Resurrection Bay includes a rich marine ecosystem with deep fjords, shallow rugged coves, estuaries, bays, islands, and beaches (ADFG 2023). Water depth increases rapidly to over 100 ft close to the shoreline, making it a natural deepwater port (Kenai Peninsula Fish Habitat Partnership 2011). The SMIC includes a small basin with one existing floating dock (North Dock). The basin is periodically dredged to an approximate depth of -21 ft below mean lower low water (MLLW), while the depth adjacent to the North Dock is maintained at -25 ft below MLLW.

NMFS defines the ensonified portion of the action area for USCG Moorings Seward (Figure 5) to include the area within which project-related noise levels exceed 120 dB re 1 µPa root mean square (rms). The ensonified zone extends a maximum of approximately 4.95 km across Resurrection Bay.

The action area also includes the vessel transit route from Seattle, Washington, to the project site within Resurrection Bay. Vessels transporting construction materials from Seattle to Moorings Seward will need to pass through designated critical habitat for Steller sea lion at the mouth of Resurrection Bay and may also need to pass through designated critical habitat for the Mexico

DPS humpback whale as they approach Resurrection Bay (Figure 6). In addition, they may pass through Mexico DPS humpback whale critical habitat at the Strait of Juan de Fuca near Seattle (Figure 8).

Figure 5. USCG Moorings Seward In-Water Action Area (WSP 2024)

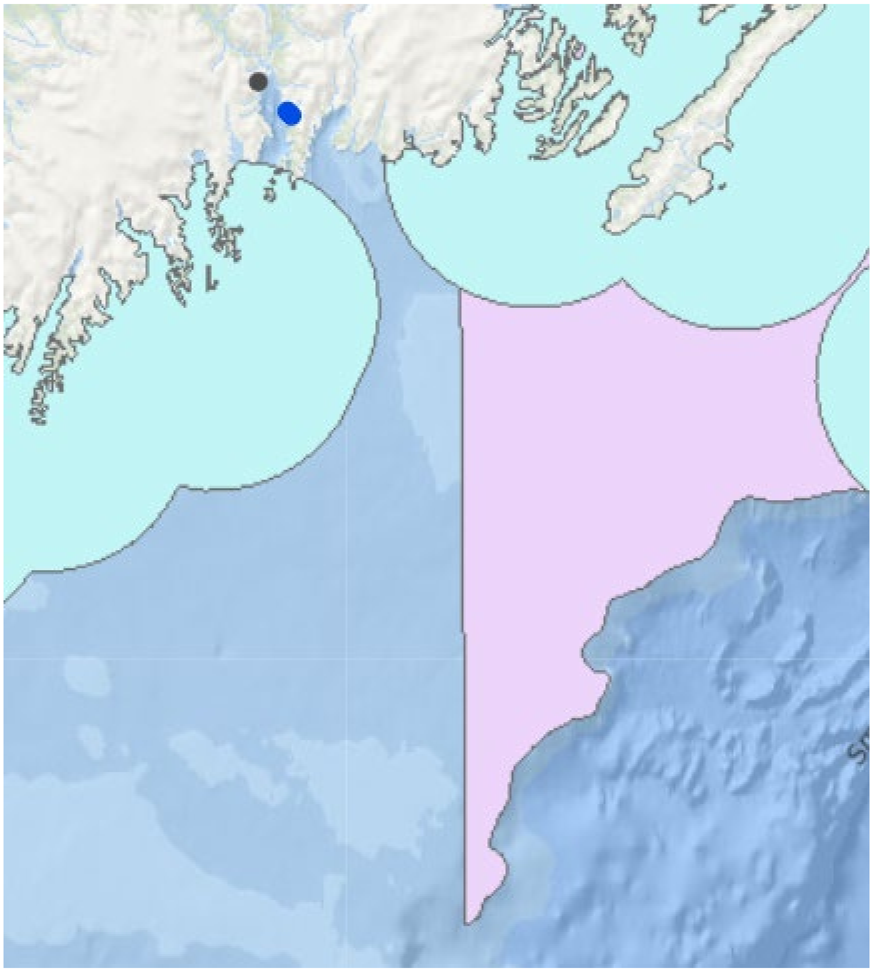

Figure 6. Designated critical habitat near Moorings Seward. Turquoise is Steller sea lion critical habitat and pink is Mexico DPS humpback whale critical habitat. Blue pin is project site.

USCG Moorings Sitka Project Site

The USCG Moorings Sitka project is located in Sitka Sound. Water depth at the Sitka project site is approximately -30 ft MLLW at the end of the pier where the new moorings will be located. Sitka Channel is approximately 1,000 ft wide at the project site. The mean tide range is 7.7 ft, the diurnal tide range is 9.94 ft, and the extreme range is 18.98 ft (NOAA Station 9451600). Sitka Channel connects to the larger Sitka Sound, an active fishery and transportation corridor. Underwater noise from rock socket drilling will be restricted along the axis of the Sitka Sound which limits the extent of the ensonified area where impacts to marine mammals may occur (Figure 7). Although it is only 1.1 km wide at its widest point, the ensonified zone extends a maximum of approximately 14.8 km to the northwest and approximately 6.1 km to the southeast. Therefore, pre-activity and in-process monitoring by protected species monitors located at the entrances to Sitka Sound will be able to detect marine mammals approaching the Harbor and could communicate a shutdown order if it appeared that the animal would continue towards Moorings Sitka. USCG has agreed to coordinate with NMFS on the placement of the PSOs. This will allow for the prevention of takes of marine mammals to the extent practicable.

The action area also includes the vessel transit route from Seattle, Washington, to the project site within Sitka Sound. Vessels will need to pass through designated critical habitat for Mexico DPS humpback whales while transporting the construction materials from Seattle to the Moorings Seward project site. Mexico DPS humpback whale critical habitat is located on the south side of the Strait of Juan de Fuca near Seattle. They may also approach near a Steller sea lion haulout in Sitka Sound, which is a designated critical habitat for Steller sea lions (Figure 8).

Figure 7. USCG Moorings Sitka In-Water Action Area (WSP 2024)

Figure 8. Designated critical habitat near Sitka Sound and Seattle includes Steller sea lion critical habitat (blue pin marking haulout site) in Sitka Sound and Mexico DPS humpback whale critical near Seattle (in pink).

3 RANGEWIDE STATUS OF THE SPECIES AND CRITICAL HABITAT

This opinion considers the effects of the proposed action on the species and designated critical habitats specified in Table 4.

Table 4. Listing status and critical habitat designation for species considered in this opinion.

Species	Status	Listing	Critical Habitat
Steller Sea Lion, Western DPS *(Eumetopias jubatus)*	Endangered	NMFS 1997, 62 FR 24345	NMFS 1993, 58 FR 45269
Humpback Whale, Mexico DPS *(Megaptera novaeangliae)*	Threatened	NMFS 2016, 81 FR 62259	NMFS 2021, 86 FR 21082
Humpback Whale, Western North Pacific DPS *(Megaptera novaeangliae)*	Endangered	NMFS 2016, 81 FR 62259	NMFS 2021, 86 FR 21082
Fin Whale (*Balaneoptera physalus*)	Endangered	NMFS 1970, 35 FR 18319	Not designated
North Pacific Right Whale *(Eubalaena japonica)*	Endangered	NMFS 2008, 73 FR 12024	NMFS 2008, 73 FR 19000
Sperm Whale (*Physeter macrocephalus*)	Endangered	NMFS 1970, 35 FR 18319	Not designated
Sunflower Sea Star (*Pycnopodia helianthoides*)	Proposed Threatened	Proposed, 88 FR 16212	Not designated

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

NMFS uses two criteria to identify those endangered, threatened or proposed species or critical habitat that are likely to be adversely affected by the proposed action. The first criterion is exposure or some reasonable expectation of a co-occurrence between one or more potential stressors associated with the proposed action and a listed species or designated critical habitat. The second criterion is an assessment of the potential response given exposure. For endangered or threatened species, we consider the susceptibility of the species that may be exposed; for example, species that are exposed to sound produced by vessels, but are not likely to exhibit physical, physiological, or behavioral responses given that exposure (at the combination of sound pressure levels and distances associated with an exposure), are not likely to be adversely affected by the exposure. We determine that an action would not likely adversely affect an animal if one could not meaningfully measure or detect the effects, or if the effects are extremely unlikely to occur.

We applied these criteria to the species listed above and determined that the following species are not likely to be adversely affected by the proposed action: North Pacific right whale and sperm whale. Below we discuss our rationale for those determinations. Critical habitat for North Pacific right whale and the WNP DPS of humpback whale will not be exposed to any of the stressors associated with the proposed projects because they are not located within the vessel routes. However, Steller sea lion critical habitat is located at the mouth of Resurrection Bay approximately 15.9 km away from the Moorings Seward project site and critical habitat for the

Mexico DPS humpback whales is located approximately 78 km away. Vessels approaching from Seattle heading to the Moorings Seward project site in Resurrection Bay may transit through both critical habitats. In addition, when the construction vessels leave from Seattle, Washington, they will need to pass through the Strait of Juan de Fuca, which includes critical habitat for the Mexico DPS humpback whale on the US side (southside) of the channel. Vessels heading to the Moorings Sitka action area within Sitka Sound will also pass by a Steller sea lion haulout that is designated critical habitat for Steller sea lions.

3.1.1 North Pacific Right Whale and Sperm Whale

The right whale was listed as an endangered species under the Endangered Species Conservation Act on June 2, 1970 (35 FR 8491 (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 the listing of 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). North Pacific right whales are among the world's rarest marine mammals (Wade et al. 2011). The eastern population of North Pacific right whales, with a range that includes the Gulf of Alaska and the Bering Sea, is thought to have less than 30 individuals.

Sperm whales were first listed in 1970 (35 FR 8491, June 2, 1970; 35 FR 18319, December 2, 1970). They are primarily found in deep waters (greater than 300 m) and the population in Alaska is relatively small with approximately 345 animals (Muto et al. 2021).

North Pacific right whales and sperm whales are unlikely to move into the immediate project areas at Seward or Sitka but may encounter project-dedicated vessels en route to either site.

3.1.1.1 Vessel Traffic

According to the applicant, construction materials will most likely be sourced from Seattle, Washington, and towed to Moorings Seward and Moorings Sitka via tugboat and barge. During the proposed construction/modification of the docks, the proposed projects would require one roundtrip for each tugboat and barge for the initial placement of the construction barge, potential realignment of the barge, and eventual removal of the barge from each project site. All barges will be towed at a speed between six and eight knots. Project vessels will have a short-term presence en route. Potential effects from project vessel traffic on these ESA listed species includes auditory and visual disturbance as well as vessel strike.

Mitigation measures will be implemented to minimize or avoid auditory and visual disturbance and potential vessel collisions with marine mammals during project activities. These mitigation measures include, but are not limited to, maintaining a vigilant watch aboard vessels for listed marine mammals and avoiding potential interactions with whales by implementing a 5 knot speed restriction when within 300 yds of observed whales and 100 yds from other marine mammals, and avoid approaching whales in a manner that causes them to change direction or separate from other whales in their group.

Although some marine mammals could receive sound levels in exceedance of the acoustic threshold of 120 dB from the project vessels or be disturbed by the visual presence of barges and tugs, disturbances rising to the level of harassment are extremely unlikely to occur.

NMFS has interpreted the term "harass" in the Interim ESA Guidance as to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." (Wieting 2016). While listed marine mammals will likely be exposed to acoustic stressors from barging activities, the nature of the exposure (primarily vessel noise) will be low-frequency, with much of the acoustic energy emitted by project vessels at frequencies below the best hearing ranges of many large baleen whales. In addition, because vessels will be in transit, the duration of the exposure to ship noise will be brief. NMFS expects that a vessel traveling at 10 knots in deep ocean water will ensonify a given point in space to levels above 120 dB for less than seven minutes. The vessels for this project will be traveling even slower, thus reducing the impacts of underwater sound. Vessels will emit continuous sound while in transit, which should alert marine mammals before the received sound level exceeds 120 dB. Therefore, a startle response would not be expected. Rather, slight 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 number of times marine mammals react to transiting vessels.

The factors discussed above, when considered as a whole, make it extremely unlikely that sound from transiting vessels will elicit behavioral responses from, or have adverse effects on North Pacific right whales or sperm whales that rise to the level of harassment under the ESA (Wieting 2016). We expect any effects to listed species to have little consequence and not to significantly disrupt normal behavioral patterns.

There have been no reported vessel strikes of North Pacific right whales since 1978 and one sperm whale mortality due to ship strike was reported in 2017 in Alaska. With the low number of vessel transits, slow transit speeds, implementation of the mitigation measures, and the low occurrence of these whale species over the majority of the route and in the project area, we conclude the probability of a project vessel striking a North Pacific right whale or sperm whale is extremely low and any adverse effects due to vessel strikes are extremely unlikely to occur.

In summary, we conclude that vessel traffic associated with the proposed action is not likely to adversely affect the North Pacific right whale or sperm whale.

3.1.1.2 Pile Driving and DTH

Dock construction activities for USCG Moorings Seward will take place in Resurrection Bay, at the SMIC near the city of Seward and for USCG Moorings Sitka in the Sitka Channel along the northeastern shore of Japonski Island near the city of Sitka. In the Sitka project area, the surrounding landmasses will truncate the spread of sound and funnel it out until it reaches the 120 dB isopleth or intersects with land. We are unaware of records of North Pacific right whales or sperm whales occurring near the two project areas and these species are not expected to occur in the area affected by pile driving or DTH activities. Therefore, adverse effects to those species are extremely unlikely.

In summary, NMFS concurs that pile driving activities associated with the proposed action are not likely to adversely affect the North Pacific right whale or sperm whale. These species will not be discussed further.

3.1.2 Steller Sea Lion and Mexico DPS Humpback Whale Designated Critical Habitat

3.1.2.1 Steller Sea Lion Critical Habitat

NMFS identified physical and biological features essential for conservation of Steller sea lions in the final rule to designate critical habitat (58 FR 45269; August 27, 1993), including terrestrial, air, and aquatic habitats (as described at 50 CFR § 226.202) that support reproduction, foraging, rest, and refuge. Although most of the project actions will occur away from Steller sea lion critical habitat, there will be some overlap when the project support vessels are transporting construction supplies from Seattle to the project sites at Moorings Seward and Moorings Sitka. However, mitigation specific to critical habitat will minimize project activities within these areas of overlap.

Disturbance consisting of both physical and acoustic effects could temporarily alter the quality of the essential features of designated critical habitat; however, the value of the critical habitat for the conservation of Steller sea lion will not be reduced by the action. The size and quality of unaffected critical habitat; the very low, temporary, and dispersed impacts to prey resources; and mitigation measures that will be implemented to vessel operations, suggests that effects on critical habitat will be insignificant.

We evaluate effects to each of the physical or biological features (PBFs) below.

1. Terrestrial zones that extend 3,000 ft (0.9 km) landward from each major haulout and major rookery in Alaska.

Project activities will not occur on land near haulouts or rookeries. Therefore, there are no effects expected to this PBF.

2. Air zones that extend 3,000 ft (0.9 km) above the terrestrial zone of each major haulout and major rookery in Alaska.

Project activities will not occur in air zones near haulouts or rookeries. Therefore, there are no effects expected to this PBF.

3. Aquatic zones that extend 3,000 ft (0.9 km) seaward of each major haulout and major rookery in Alaska that is east of 144° W longitude.

Project activities will not occur within 3,000 ft (0.9 km) seaward of a major haulout or major rookery in Alaska. Therefore, there are no effects expected to this PBF.

4. Aquatic zones that extend 20 nm (37 km) seaward of each major haulout and major rookery in Alaska that is west of 144° W longitude.

The USCG has mitigations that would require all vessels to follow critical habitat transit restrictions, except under emergency operations. Therefore, the effects to this aspect of Steller sea lion critical habitat are expected to be insignificant.

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

Project activities will not occur within these areas, therefore, this PBF will not be affected.

Given the existing USCG mitigations, any effects to the PBFs of critical habitat would be insignificant, and therefore proposed action is not likely to adversely affect critical habitat for Steller sea lions.

3.1.2.2 Mexico DPS Humpback Whale Critical Habitat

Critical habitat for the Mexico DPS humpback whales was designated April 21, 2021 (86 FR 21082) (Figure 4). Critical habitat for the Mexico DPS includes several areas in the Gulf of Alaska. The project vessel routes encompass portions of these areas near Resurrection Bay and father south near Seattle.

For the Mexico DPS, the physical and biological features associated with critical habitat include: Prey species, primarily euphausiids (Thysanoessa, Euphausia, Nyctiphanes, and Nematoscelis) and small pelagic schooling fishes, such as Pacific sardine (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), 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. Vessels may traverse Mexico DPS humpback whale critical habitat when they are leaving Seattle traveling through the Strait of Juan de Fuca and possibly when they are near Resurrection Bay but these brief transects are unlikely to affect prey quantity, availability, or quality. The noise generated by vessels is also likely to be brief and are similarly unlikely to affect prey distribution or limit availability to foraging whales. Therefore, any effects to Mexico DPS humpback whale critical habitat PBFs would be insignificant.

3.1.2.3 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.

3.2 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 or proposed 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.

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.

3.2.1 Western DPS Steller Sea Lion

3.2.1.1 Status and Population Structure

On November 26, 1990, NMFS published a final rule to list Steller sea lions as threatened (55 FR 49204). In 1997, NMFS reclassified Steller sea lions as two DPSs (62 FR 24345; May 5, 1997); the Eastern DPS was listed as threatened and the Western DPS was listed as endangered. On November 4, 2013, NMFS published a final rule to delist the Eastern DPS (78 FR 66140). Information on Steller sea lion biology and habitat (including critical habitat) is available in the revised Steller Sea Lion Recovery Plan (NMFS 2008) and five-year Status Review (NMFS 2020).

The Western DPS of Steller sea lions decreased from an estimated 220,000 to 265,000 animals in the late 1970s to fewer than 50,000 in 2000 (Young et al. 2023). Factors that may have contributed to this decline include incidental take in fisheries, competition with fisheries for prey, legal and illegal shooting, predation, exposure to contaminants, disease, and ocean regime shift-driven climate change (NMFS 2008). The most recent comprehensive surveys of Western DPS Steller sea lions estimated a total Alaska population (both pups and non-pups) of 49,320 (Sweeney et al. 2023). Between 2007 and 2022, Western DPS Steller sea lion pups increased by 0.50 percent per year and non-pups increased by 1.05 percent per year (Sweeney et al. 2023). While the data show the overall population trend is positive, abundance and trends are highly variable across regions and age classes.

Pup counts declined in the eastern and central Gulf of Alaska between 2015 and 2017, counter to the increases observed in both regions since 2002 (Sweeney et al. 2017). These declines may have been due to changes in prey availability from the marine heatwave that occurred in the northern Gulf of Alaska from 2014 to 2016 (Bond et al. 2015; Petersen et al. 2016; Muto et al. 2021). Pup counts rebounded to 2015 levels in 2019; however, non-pup counts in the eastern, central, and western Gulf of Alaska regions declined (Muto et al. 2021).

3.2.1.2 Distribution

Steller sea lions range along the North Pacific rim from northern Japan to California, with centers of abundance in the Gulf of Alaska and Aleutian Islands (Figure 9; Loughlin et al. 1984). Although Steller sea lions seasonally inhabit coastal waters of Japan in the winter, breeding rookeries outside of the U.S. are only located in Russia (Burkanov and Loughlin 2005). Steller sea lions are not known to migrate annually, but individuals may widely disperse outside of the breeding season (late May to early July; Jemison et al. 2013; Muto et al. 2021). Additionally, sea lions may make semi-permanent or permanent one-way movements from one site to another (Chumbley et al. 1997, Burkanov and Loughlin 2005). Animals from the Eastern DPS occur primarily east of Cape Suckling, Alaska (144° W) and animals from the endangered western DPS occur primarily west of Cape Suckling.

Land sites used by Steller sea lions are referred to as rookeries and haulouts (Figure 9). Rookeries are used by adult sea lions for pupping, nursing, and mating during the reproductive season. Haulouts are used by all age classes of both sexes but are generally not where sea lions reproduce. At the end of the reproductive season, some females may move with their pups to other haulout sites and males may migrate to distant foraging locations (Spalding 1964; Pitcher and Calkins 1981). Sea lions may make semi-permanent or permanent one-way movements from one site to another (Chumbley et al. 1997; Burkanov and Loughlin 2005). Round trip migrations of greater than 6,500 km have been documented for individual Steller sea lions (Jemison et al. 2013).

Most adult Steller sea lions occupy rookeries during the pupping and breeding season (Pitcher and Calkins 1981; Gisiner 1985), and exhibit high site fidelity (Sandegren 1970). During the breeding season some juveniles and non-breeding adults occur at or near the rookeries, but most are on haulouts (Rice 1998; Ban 2005; Call and Loughlin 2005).

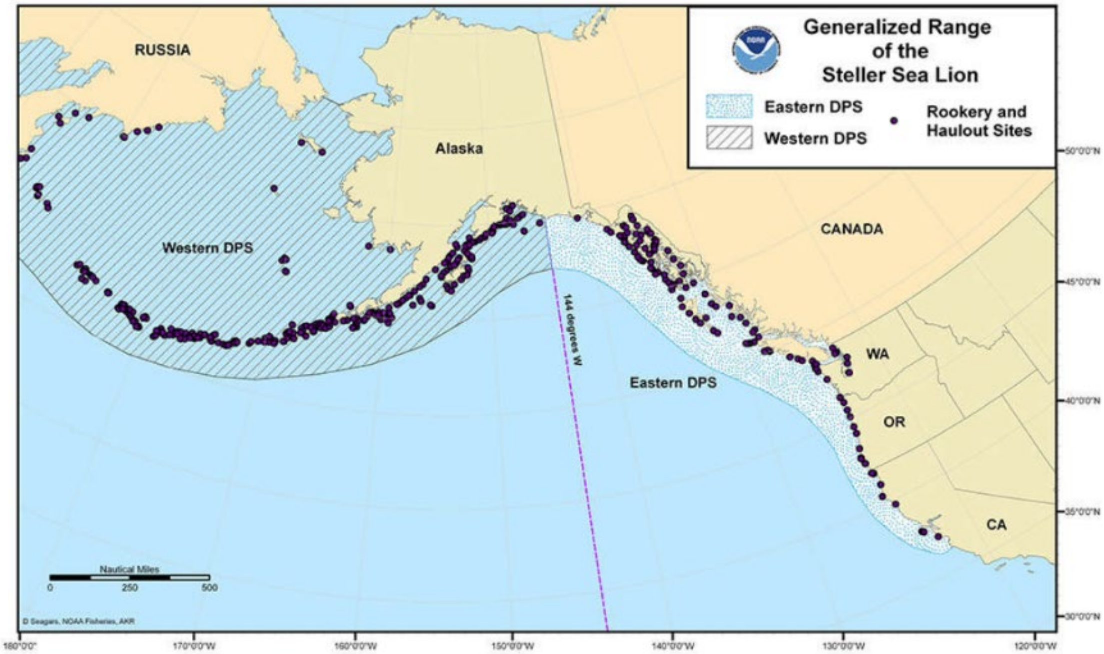

Figure 9. Ranges, rookeries, and haulout sites of Western and Eastern DPS Steller sea lions.

Occurrence in the Action Area

WDPS Steller sea lions may be found in the marine waters in the vicinity of the two project areas. In 1998, a lone Steller sea lion was identified within the interior waters of Resurrection Bay. However, the regular occurrence of Steller sea lions has been documented hauling out in several locations throughout the southern portion of Resurrection Bay, including Mary's Bay, Rugged Island, and near Cape Resurrection (ADFG 2023d). The nearest haulouts designated as critical habitat for Steller sea lions is Cape Resurrection B and C haulouts, located approximately 16 km southwest of the Seward project area. Sea lions have become accustomed to human activity near haulouts located in the vicinity of the action areas at all times of the year feeding and overwintering. In 1997, several Steller sea lion sightings (primarily lone individuals) were recorded within the interior waters of the Inside Passage near Sitka, although none were recorded within Sitka Sound. One was documented at the tip of Kruzof Island in 1997, approximately 19 miles west/southwest of the Sitka action area (OBIS 2023). Steller sea lions, however, have been documented as aggregating in the hundreds and foraging on herring that spawn during the spring in Sitka Sound (Womble et al. 2005; USACE 2012). Although the data do not identify the specific DPS to which these animals belong, it is possible that Western DPS Steller sea lions may visit the interior waters of Resurrection Bay and Sitka Sound. However, the occurrence of members of the endangered Western DPS would likely be different in the individual action areas for each proposed project, as Seward and Sitka are on opposite sides of the line that predominantly divides Eastern and Western DPS populations at 144° West longitude.

Western DPS individuals would likely be frequent in Seward but just occasional in Sitka. However, Hastings et al. (2020) highlights the recent and unprecedented mixing of the eastern and western populations at new rookeries in Southeast Alaska that are possibly driven by environmental changes and dispersal patterns. They found a significant proportion of animals in certain regions of Southeast Alaska now carry genetic material from the western population. Therefore, members of the Western DPS could be present at either project site.

3.2.1.3 Feeding, Diving, Hauling Out, and Social Behavior

The foraging strategy of Steller sea lions is strongly influenced by seasonality of sea lion reproductive activities on rookeries and the seasonal presence of many prey species. Steller sea lions are generalist predators that eat a variety of fishes and cephalopods (Pitcher and Calkins 1981; Calkins and Goodwin 1988; NMFS 2008), and occasionally other marine mammals and birds (Pitcher and Fay 1982; NMFS 2008).

During summer, Steller sea lions feed mostly over the continental shelf and shelf edge. Females attending pups forage within 37 km of breeding rookeries (Merrick and Loughlin 1997), and begin a regular routine of alternating foraging trips at sea with nursing their pups on land a few days after birth. Steller sea lions tend to make shallow dives of less than 250 m but are capable of deeper dives (NMFS 2018). Female foraging dives during summer tend to be closer to shore and are shallower (Merrick and Loughlin 1997). Winter foraging trips tend to be longer in duration, farther from shore, and with deeper dives.

Steller sea lions are gregarious animals that often travel in large groups of up to 45 individuals (Keple 2002), and rafts of several hundred animals are often observed adjacent to haulouts. Individual rookeries and haulouts may be comprised of hundreds of animals. At sea, groups usually consist of females and subadult males, as adult males are usually solitary (Loughlin 2002).

3.2.1.4 Reproduction

Male Steller sea lions reach sexual maturity between ages three and seven, but do not reach physical maturity and participate in breeding until about eight to ten years of age (Pitcher and Calkins 1981). Female Steller sea lions reach sexual maturity and first breed between three and eight years of age, and the average age of reproductive females is about ten (Pitcher and Calkins 1981; Calkins and Pitcher 1982; York 1994).

After reaching maturity, females normally ovulate and breed annually. There is a high rate of reproductive failure but, when successful, females give birth to a single pup between May and July. The sex ratio of pups at birth is assumed to be about 1:1, or slightly biased toward males. Newborn pups are dependent upon their mother for milk during at least the first three months, and observations suggest they continue to be highly dependent through the first winter (Trites et al. 2006).

3.2.1.5 Vocalization, Hearing, and Other Sensory Capabilities

The ability to detect sound and communicate underwater is important for a variety of Steller sea lion life functions, including reproduction and predator avoidance. NMFS categorizes Steller sea lions in the otariid pinniped functional hearing group, with an applied frequency range between 60 Hz and 39 kHz in water (NMFS 2018). Studies of Steller sea lion auditory sensitivities have found that this species detects sounds underwater between 1 and 25 kHz (Kastelein et al. 2005), and in air between 250 Hz and 30 kHz (Mulsow and Reichmuth 2010). Sound signals from vessels are typically within the hearing range of Steller sea lions, whether the animals are in the water or hauled out.

3.2.1.6 Threats

Natural Threats

Killer whale predation on the Western DPS, under reduced population size, may cause significant reductions in the stock (NMFS 2008). Steller sea lions are also vulnerable to predation from sleeper sharks. Juvenile Steller sea lions were found to underutilize foraging habitats and prey resources based on predation risk by killer whales and sleeper sharks (Frid et al. 2009).

Steller sea lions have tested positive for several pathogens, and parasites are common; however, disease levels and mortality resulting from infestation are unknown. Significant negative effects of these factors may occur in combination with stress, which may compromise the immune system. If other factors, such as disturbance, injury, or difficulty feeding occur, it is more likely that disease and parasitism can play a greater role in population reduction

The female spawning biomass of Pacific cod, an important prey species for Steller sea lions, was at its lowest point in 2018.[2] The federal Pacific cod fishery in the Gulf of Alaska was closed by regulation to directed Pacific cod fishing in 2020 (Barbeaux et al. 2020), and abundance has remained at reduced levels since the 2014-2016 marine heatwave.[3]

Anthropogenic Threats

Subsistence hunters removed 209 Western DPS Steller sea lions between 2014 and 2018 in controlled and authorized harvests (Young et al. 2023). Between 2016 and 2020, human-caused mortality and injury of the Western DPS Steller sea lions (n = 148) was primarily caused by entanglement in fishing gear, in particular, commercial trawl gear (n=113; Freed et al. 2022).

Concern also exists regarding competition between commercial fisheries and Steller sea lions for the same resource: stocks of pollock, Pacific cod, and Atka mackerel. Limitations on fishing grounds, duration of fishing season, and monitoring have been established to prevent Steller sea lion nutritional deficiencies as a result of inadequate prey availability.

Metal and contaminant exposure remains a focus of ongoing investigation. Total mercury concentrations measured in hair samples collected from pups in the western-central Aleutian Islands were detected at levels that cause neurological and reproductive effects in other species (Rea et al. 2013).

[2] https://apps-afsc.fisheries.noaa.gov/REFM/Docs/2018/GOA/GOApcod.pdf
[3] https://apps-afsc.fisheries.noaa.gov/REFM/docs/2023/GOABrief.pdf

3.2.2 Mexico and Western North Pacific DPS Humpback Whales

3.2.2.1 Population Structure and Status

In 1970, the humpback whale was listed under the ESCA as endangered worldwide (35 FR 18319; December 2, 1970), primarily due to overharvest by commercial whaling. Humpback whales continued to be listed as endangered following passage of the ESA, and are also considered "depleted" under the MMPA.

NMFS conducted a global status review of humpback whales (Bettridge et al. 2015) and published a final rule recognizing 14 DPSs on September 8, 2016 (81 FR 62260). Four of these DPSs were designated as endangered and one as threatened, with the remaining nine not warranting ESA listing status.

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).Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade (2021) concluded that humpbacks feeding in Alaska waters belong primarily to the Hawaii DPS (recovered), with small numbers from the Mexico DPS (threatened) and WNP DPS (endangered). 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.

There are approximately 2,913 animals in the Mexico DPS and 1,084 animals in the WNP DPS (Wade 2021). The population trend is unknown for both DPSs. The Hawaii DPS is estimated at 11,540 animals, and the annual growth rate is between 5.5 and 6.0 percent (Wade 2021). Humpbacks in the Gulf of Alaska summer feeding area are comprised of approximately 89 percent Hawaii DPS individuals, 11 percent Mexico DPS individuals, and less than 1 percent WNP DPS individuals (Table 5). Additional information on humpback whale biology and natural history is available at: https://www.fisheries.noaa.gov/species/humpback-whale.

Table 5. Probability of encountering humpback whales from each DPS in the North Pacific Ocean in various feeding areas, Adapted from Wade (2012).

	Western North Pacific DPS (endangered)	Hawaii DPS (not listed)	Mexico DPS (threatened)
Kamchatka	91%	9%	0%
Aleutian Islands, Bering, Chukchi, Beaufort	2%	91%	7%
Gulf of Alaska	1%	89%	11%
Southeast Alaska/Northern BC	0%	98%	2%
Southern BC/WA	0%	69%	25%
OR/CA	0%	0%	58%

3.2.2.2 Distribution

Humpback whales are found in all oceans of the world with a broad geographical range from tropical to temperate waters in the Northern Hemisphere and from tropical to near-ice-edge waters in the Southern Hemisphere. Seasonal migrations occur from their tropical calving and breeding grounds in winter to their high latitude feeding grounds in summer.

Most humpbacks that summer in Alaska winter in temperate or tropical waters near Mexico, Hawaii, or in the western Pacific near Japan. In the spring, these animals migrate back to Alaska, where food is abundant. They tend to concentrate in several areas, including Southeast Alaska, Prince William Sound, Kodiak, the Bering Sea, and along the Aleutian Islands (Wild et al. 2023). Large numbers of humpbacks have also been reported in waters over the continental shelf, extending up to 185 km offshore in the western Gulf of Alaska (Wade 2021). Some individuals remain in Alaska waters year-round.

Occurrence in the Action Area

Year-round opportunistic aerial surveys conducted from 1999 to 2013 (University of Alaska Fairbanks Gulf Apex Predator-Prey (UAF GAP) program) detected humpback whales in the Gulf of Alaska every month (Witteveen, pers. comm., 12 January 2015, as cited in Ferguson et al. (2015). The mean number of whales per month was greatest from July through September, moderate numbers were recorded from October through December, and very few whales were documented from January through June (Witteveen, pers. comm., 12 January 2015, as cited in Ferguson et al. (2015). During summer (May-September) surveys conducted in 2002-2003, humpback whales were documented in Chiniak Bay and Ferguson et al. (2015) identified Biologically Important Areas (BIA) for humpback whales (Figure 10). Hundreds of humpback whale sightings have been recorded within Resurrection Bay and Sitka Sound, primarily between 1977 and 2022 (Figure 11 and Figure 12) (OBIS 2023). Given the documented presence of humpback whales in these areas and information in Table 5, adapted from Wade (2021), we assume humpback whales primarily from the Mexico DPS and to a lesser extent from the WNP DPS could be present in the Seward action area and only individuals from the Mexico DPS would possibly be found in the Sitka action area during the proposed activities.

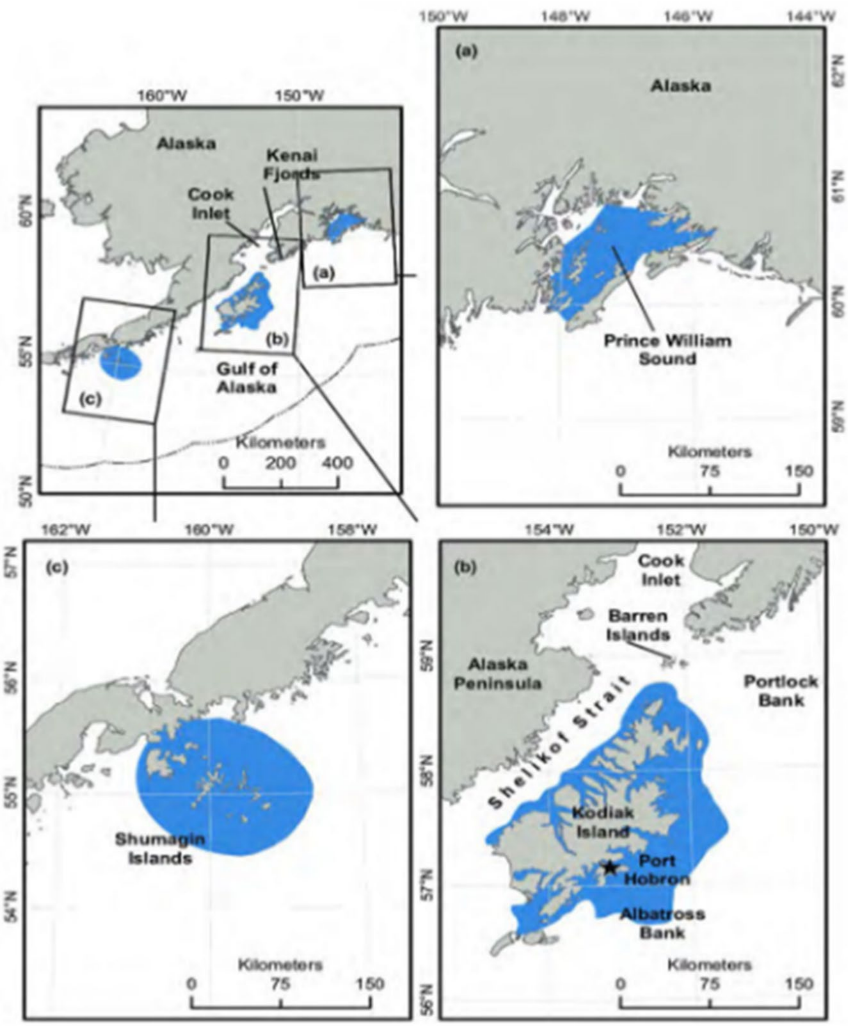

Figure 10. Biologically Important Areas for Humpback Whales in the Gulf of Alaska (Ferguson et al. 2015).

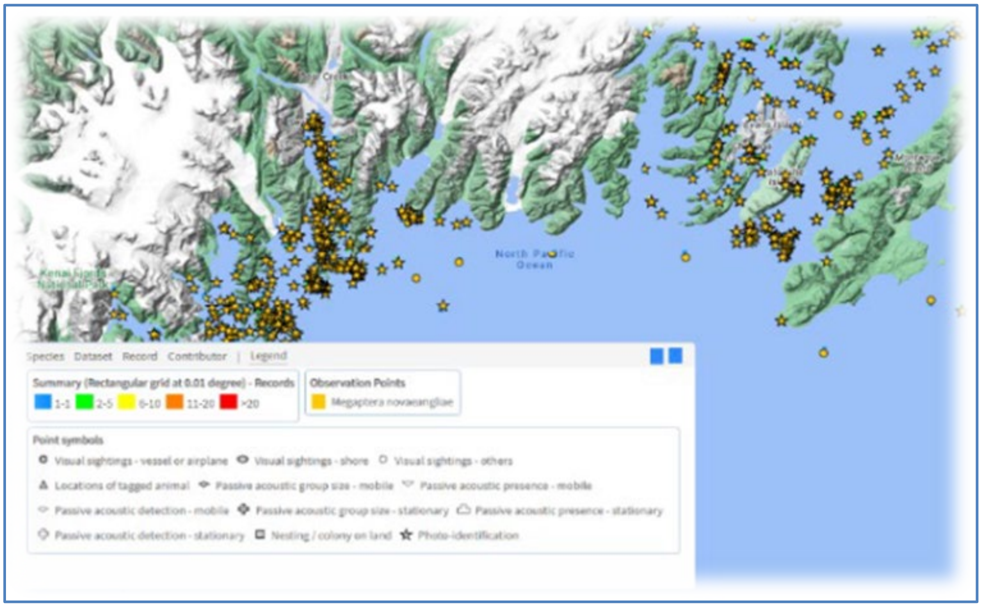

Figure 11. Location of Humpback Whales Identified in Resurrection Bay (OBIS 2023).

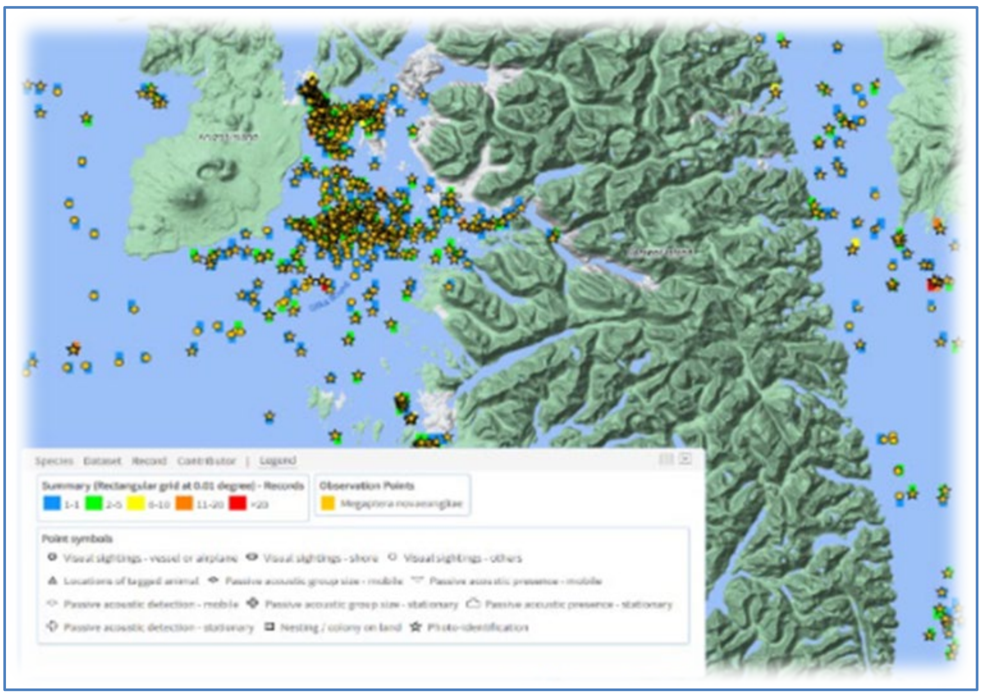

Figure 12. Location of Humpback Whales Identified in Sitka Sound (OBIS 2023).

3.2.2.3 Feeding and Prey Selection

Humpback whales exhibit flexible feeding strategies, sometimes foraging alone and sometimes cooperatively (Clapham 1993). Humpback whales are 'gulp' or 'lunge' feeders, capturing large mouthfuls of prey during feeding rather than continuously filtering food, as may be observed in some other large baleen whales (Goldbogen et al. 2008; Simon et al. 2012). When lunge feeding, whales advance on prey with their mouths wide open, then close their mouths around the prey and trap them by forcing engulfed water out past the baleen plates. Compared to some other baleen whales, humpbacks are relatively generalized in their prey selection. In the Northern Hemisphere, known prey includes euphausiids (krill), copepods, juvenile salmonids, herring, Arctic cod, walleye pollock, pteropods, and cephalopods (Johnson and Wolman 1984; Perry et al. 1999; Straley et al. 2018).

In the North Pacific, humpback whales forage in the coastal and inland waters along California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk (Tomilin 1967; Johnson and Wolman 1984). The waters surrounding Kodiak Island have been identified as a biologically important area for seasonal feeding and are considered active May through September (Wild et al. 2023).

3.2.2.4 Reproduction

Humpbacks in the Northern Hemisphere give birth and presumably mate on low-latitude wintering grounds from January to March. Females attain sexual maturity at five years old in some populations and exhibit a mean calving interval of approximately two years (Clapham 1992; Barlow and Clapham 1997). Gestation is about 12 months, and calves are probably weaned by the end of their first year (Perry et al. 1999).

3.2.2.5 Vocalization, Hearing, and Other Sensory Capabilities

Mysticetes are likely most sensitive to sound from an estimated tens of hertz to approximately ten kilohertz (Southall et al. 2007). Evidence suggests that humpbacks can hear sounds as low as 7 Hz up to 24 kHz, and possibly as high as 30 kHz (Ketten 1997; Au et al. 2006). NMFS categorizes humpback whales in the low-frequency cetacean functional hearing group, with a generalized hearing range between 7 Hz and 35 kHz (NMFS 2018). Baleen whales have inner ears that appear to be specialized for low-frequency hearing. In a study of the morphology of the mysticete auditory apparatus, Ketten (1997) hypothesized that large mysticetes have acute infrasonic hearing.

Humpback whales produce a wide variety of sounds (especially animals in mating groups) ranging from 20 Hz to 10 kHz (Tyack 1981; Silber 1986). During the breeding season males sing long, complex songs, with frequencies in the 20 to 5,000 Hz range and intensities as high as 181 dB (Payne 1970; Winn et al. 1970; Thompson et al. 1986). Source levels average 155 dB and range from 144 to 174 dB (Thompson et al. 1979). The songs appear to have an effective range of approximately 10 to 20 km.

Social sounds associated with male aggressive behavior in breeding areas are very different than songs and extend from 50 Hz to 10 kHz (or higher), with most energy in components below 3 kHz (Tyack and Whitehead 1983; Silber 1986). These sounds appear to have an effective range of up to nine kilometers (Tyack and Whitehead 1983).

Humpback whales produce sounds less frequently in their summer feeding areas. Feeding groups produce distinctive sounds ranging from 20 Hz to 2 kHz, with median durations of 0.2 to 0.8 seconds and source levels of 175-192 dB (Thompson et al. 1986). These sounds are thought to be attractive and appear to rally animals to the feeding activity (D'Vincent et al. 1985; Sharpe and Dill 1997).

3.2.2.6 Threats

Natural Threats

There is limited information on natural sources of injury or mortality to humpback whales. Based upon the prevalence of tooth marks, attacks by killer whales appear to be highest among humpback whales migrating between Mexico and California, although populations throughout the Pacific Ocean appear to be targeted to some degree (Steiger et al. 2008). Juveniles appear to be the primary age group targeted.

Thirteen marine mammal species in Alaska were examined for domoic acid; humpback whales indicated a 38 percent prevalence (Lefebvre et al. 2016). Humpback whales in the study were also found to have the highest prevalence of saxitoxin with 50 percent (Lefebvre et al. 2016).

Anthropogenic Threats

Historically, commercial whaling represented the greatest threat to every population of humpback whale. In 1963, the International Whaling Commission (IWC) banned commercial hunting of humpback whales in the Pacific Ocean, and, as a result, this threat has largely been curtailed. No commercial whaling occurs within the range of Mexico DPS humpbacks. Japan resumed commercial whaling in its territorial sea and exclusive economic zone, which is within the WNP DPS humpback range, in 2019. Previously, “commercial bycatch whaling” was documented within the WNP DPS humpback range in Japan and South Korea (Bettridge et al. 2015). Alaska Native subsistence hunters are not granted aboriginal subsistence whaling permits under the IWC to take humpback whales.

Vessel strike is one of the main threats and sources of anthropogenic impacts to humpback whales in Alaska. Eighteen humpbacks were struck by vessels between 2016 and 2020 (Freed et al. 2022). Most ship strikes of humpback whales are reported in Southeast Alaska (Helker et al. 2019), where high vessel traffic overlaps with whale presence.

Fishing gear entanglement is another major threat. Entanglement may result in only minor injury or may significantly affect individual health, reproduction, or survival. Every year humpback whales are reported entangled in fishing gear in Alaska, particularly pot gear and gill net gear. Between 2016 and 2020, entanglement of humpback whales (n = 47) was the most frequent human-caused source of mortality and injury of large whales in Alaska (Freed et al. 2022).

3.2.3 Fin Whale

3.2.3.1 Population Structure and Status

NMFS recognizes three stocks of fin whale in U.S. Pacific waters: Northeast Pacific (Alaska), California/Washington/Oregon, and Hawaii (Young et al. 2023). There are no reliable estimates of current or historical abundances for the entire Northeast Pacific fin whale stock. Many of the studies that provide information on the distribution, occurrence, and/or abundance estimates for areas within the range of the Northeast Pacific stock are over a decade or more old. A dedicated line-transect survey of the offshore waters of the Gulf of Alaska in 2013 provided an abundance estimate of 3,168 fin whales (Rone et al. 2017) and a minimum population estimate of 2,554 whales was derived from this provisional estimate (Young et al. 2023). This is an underestimate for the entire stock as it is based on surveys that covered a small portion of their range. Additional information on fin whale biology and natural history is available at: https://www.fisheries.noaa.gov/species/fin-whale.

The fin whale was listed as an endangered species under the Endangered Species Conservation Act (ESCA) on December 2, 1970 (35 FR 18319). Congress replaced the ESCA with the ESA in 1973 and fin whales continued to be listed as endangered (39 FR 41367). A recovery plan for the fin whale was published on July 30, 2010 (NMFS 2010).

3.2.3.2 Distribution

Fin whales are typically found in deep, offshore waters of all major oceans, primarily in temperate to polar latitudes. Most migrate from tropical breeding and calving areas in the winter to colder feeding areas in the summer. In the North Pacific, fin whales generally spend the spring and early summer feeding in cold, high latitude waters as far north as the Chukchi Sea, with regular feeding grounds in the Gulf of Alaska, Bering Sea/Aleutian Islands, and around Kodiak Island (Young et al. 2023).

Fin whale feeding biologically important areas have been identified around Kodiak Island, including the mouth of Cook Inlet (Ferguson et al. 2015a; Wild et al. 2023), and in the Bering Sea (Ferguson et al. 2015b). The highest densities of fin whales occur between June and August around Kodiak Island and from June to September in the Bering Sea (Ferguson et al. 2015a; Ferguson et al. 2015b). Fin whales tend to return to low latitudes for the winter breeding season, though some may remain in their high latitude ranges if food resources remain plentiful. There have been year-round acoustic detections of fin whales in the Gulf of Alaska, with the highest call occurrence rates from August through December (Moore et al. 2006, Stafford et al. 2007). During winter months, fin whales have been seen over a wide geographic area from 23°N to 60°N, but winter distribution and the location of primary wintering areas (if any) are poorly known (Young et al. 2023).

Occurrence in the Action Areas

Until 2022, only five individual fin whales were recorded in the Gulf of Alaska near Resurrection Bay. According to these data, one was located at the very southern extent of Resurrection Bay, one at the very southern extent of the adjacent Aialik Bay to the west, and two more just south of these two bays. The remaining fin whale was located well east of Resurrection Bay (Figure 13) (OBIS 2023).

Based on the same data, a limited number of sightings (primarily lone individuals) were recorded far off the coast of Baranof Island (Figure 14). According to this information, no fin whales have been recorded within, or near, the upper extent of Resurrection Bay or Sitka Sound (OBIS 2023).

However, fin whales have the potential to occur at both the Seward and Sitka Moorings. Based on survey data from the Navy, fin whales in the vicinity of Moorings Seward are anticipated to occur at a density of 0.068/km^2. Based on survey data, fin whales in the vicinity of Moorings Sitka are anticipated to occur at a density of 0.0001/km^2 (Navy 2014). As a result, it is unlikely but possible for a fin whale to occasionally be found within either of the action areas.

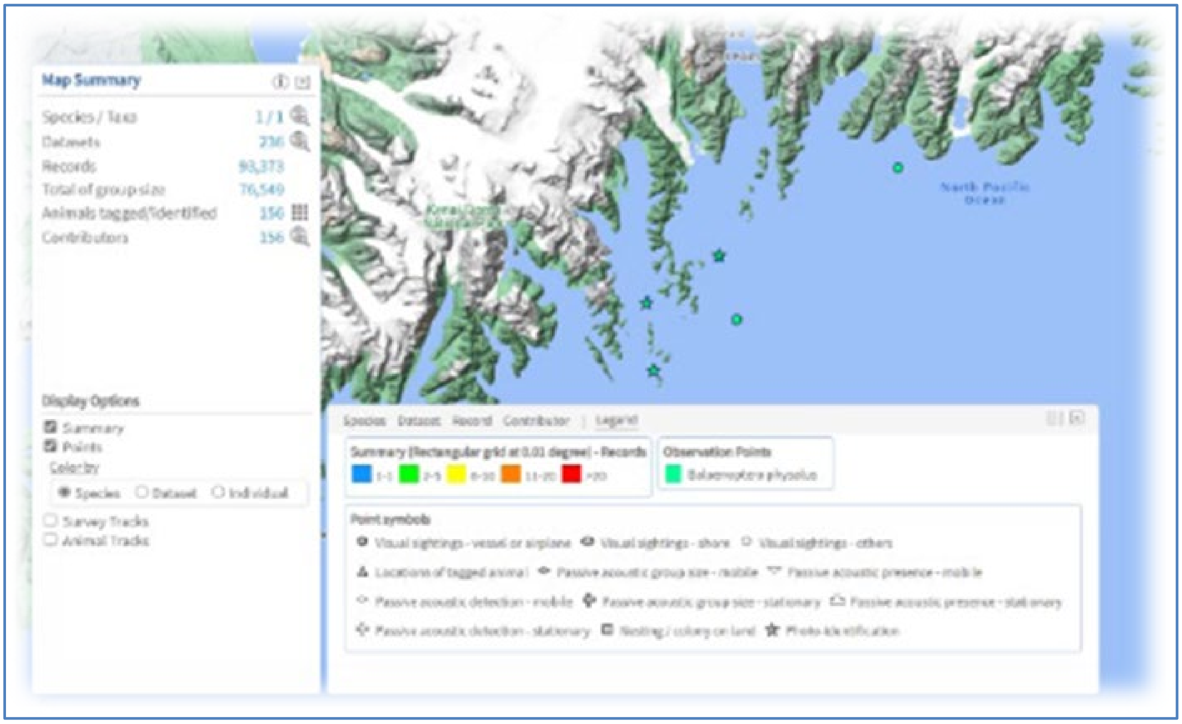

Figure 13. Location of Fin Whales Identified in Northern Gulf of Alaska (OBIS 2023).

Figure 14. Location of Fin Whales Identified in Southeast Alaska (OBIS 2023).

3.2.3.3 Feeding and Prey Selection

Fin whales exhibit lunge-feeding behavior, where large amounts of water and prey are taken into the mouth and filtered through the baleen (Brodie 1993; Goldbogen et al. 2006; Goldbogen et al. 2008). In the North Pacific, fin whales prefer euphausiids (mainly *Euphausia pacifica*, *Thysanoessa longipes*, *T. spinifera*, and *T. inermis*) and large copepods (mainly *Calanus cristatus*), followed by schooling fish such as herring, walleye Pollock, and capelin (Nemoto 1970; Kawamura 1980). Feeding may occur in shallow waters on prey such as sand lance (Overholtz and Nicolas 1979) and herring (Nøttestad et al. 2002), but most foraging is observed in high-productivity, upwelling, or thermal front marine waters (Panigada et al. 2008).

Average dives for foraging fin whales are 98 m deep and 6.3 minutes long, compared to non-foraging dives that are 59 m deep and 4.2 minutes long (Croll et al. 2001). Foraging dives deeper than 150 m have been documented (Panigada et al. 1999).

3.2.3.4 Reproduction

Male fin whales reach sexual maturity between 6 and 10 years of age, while females mature between 7 and 12 years old. Fin whales in the North Pacific are thought to mate around December to February. The gestation period is approximately 11 to 12 months, and females give birth in tropical and subtropical areas during midwinter. Calves weigh from 4,000 to 6,000 pounds and are nursed for 6 to 7 months. Reproductive females may produce a calf every two to three years. Despite reaching sexual maturity between 6 and 12 years of age, adult fin whales reach physical maturity around 25 years of age.

3.2.3.5 Vocalization, Hearing, and Other Sensory Capabilities

Fin whales produce a variety of low-frequency sounds in the 10 Hz to 0.2 kHz range (Thompson et al. 1992; Rice et al. 2021). The most typical signals are long, patterned sequences of short duration (0.5 to 2 seconds) infrasonic pulses in the 18 to 35 Hz range (Patterson and Hamilton 1964). The seasonality and stereotype of the bouts of patterned sounds suggest that these sounds are male reproductive displays (Watkins et al. 1987), while the individual counter calling data of McDonald et al. (1995) suggest that the more variable calls are contact calls. Some authors suggest there are geographic differences in the frequency, duration, and repetition of the pulses (Thompson et al. 1992).

Their low-frequency sounds have the potential to travel over long distances, and it is possible that fin whales participate in long-distance communication (Payne and Webb 1971, Edds-Walton 1997). The sounds may also function for long-range echolocation of large-scale geographic targets such as seamounts, which may be used for orientation and navigation (Tyack 1999).

There is no direct data on hearing in low-frequency cetaceans and the applied frequency range is expected to be between 7 Hz and 35 kHz, based on their vocalizations (NMFS 2018). Synthetic audiograms produced by applying models to X-ray computed tomography scans of a fin whale calf skull indicate the range of best hearing for fin whale calves is from approximately 20 Hz to 10 kHz, with maximum sensitivities between 1 to 2 kHz (Cranford and Krysl 2015).

3.2.3.6 Threats

Natural Threats

There is limited information on natural sources of injury or mortality to fin whales. Predation of fin whales by killer whales has been observed (Vidal and Pechter 1989); adults engage in flight responses (up to 40 km/h) to evade the predators, but show little resistance if overtaken (Ford and Reeves 2008). Killer whale or shark attacks may also result in serious injury or death in very young and sick individuals (Perry et al. 1999).

An unusual mortality event (UME) of thirteen fin whales stranded in the Gulf of Alaska occurred between May 1 to November 30, 2015 (Savage 2017). A definitive cause of the UME was not determined, although the primary cause likely involved one or more consequences of shifting environmental conditions such as exposure to algal toxins or lack of prey.

Anthropogenic Threats

Ship strikes are a known threat for fin whales, and this species may be more vulnerable to strikes due to their large body size and the amount of time they spend at the surface (Sèbe et al. 2022). Reductions in sea-ice coverage may lead to range extension and increased susceptibility to ship strikes from increased shipping in the Chukchi and Beaufort seas. Between 2009 and 2021, six ship strikes of fin whales were reported in Alaskan waters (Helker et al. 2015; Delean et al. 2020; Freed et al. 2023). Vessel strikes of fin whales in Alaska are likely underreported, which is likely due to their preference for offshore waters, the animal sinking before it is visible (Rockwood et al. 2017), and/or the carcass washing ashore in a remote location inaccessible to humans.

Fin whales may also experience significant injury and mortality from fishing gear and entanglements. Between 2009 and 2021, two fin whales were reported as entangled or entrapped in gear in Alaskan waters (Helker et al. 2015; Delean et al. 2020; Freed et al. 2023).

3.2.4 Sunflower sea star

3.2.4.1 Population Structure and Status

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.

Distribution

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). It occupies waters from the intertidal zone to at least 435 m deep but is 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 from the Aleutian Islands to Baja California, Mexico, but are most abundant in waters off eastern 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 regularly found in eelgrass meadows as well (Dean and Jewett 2001; Gravem et al. 2021).

Occurrence in the Action Area

Currently we assume that the sunflower sea star occupies inter-and sub-tidal habitats throughout southeast Alaska, the Gulf of Alaska, and around the project areas. Although surveys and data are very sparse in most Alaskan waters, limited transect surveys were conducted by the Alaska Fisheries Science Center in 2023. Based on those surveys, we know that the two USCG mooring facilities (Mooring Seward and Moorings Sitka) fall within the range of the sunflower sea star and the species may be found in the action areas. Prior to the sea star wasting syndrome (SSWS) pandemic, sunflower sea star 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). Alaska Department of Fish and Game (ADFG) completed surveys in and around the Sitka Channel and found average densities of 0.002/m^2 (Lowry 2023). Observations of individual sea stars have been documented occurring at the O'Connell Bridge near Moorings Sitka and near the Seward Marina located across Resurrection Bay from Moorings Seward (https://www.inaturalist.org). No recent surveys have been conducted at the Moorings Seward project site. Based on the estimated density of sunflower sea stars present pre-pandemic in Alaskan waters and the estimated decline in the population, the expected density in the Moorings Seward action area would be 0.04/m2.

3.2.4.2 Threats to the Species

Prior to 2013, the global abundance of sunflower sea star was estimated at several billion animals, but from 2013–2017 SSWS reached pandemic levels, killing an estimated 90 percent or more of the population (Lowry et al. 2022). Sunflower sea stars are currently estimated to number approximately 600 million (Lowry 2022). Declines in the northern portion of its range 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 et al. 2022).

3.2.4.3 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).

3.2.4.4 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.

4 APPROACH TO THE ASSESSMENT

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy their designated critical habitat. The jeopardy analysis considers both survival and recovery of the species. To jeopardize the continued existence of a listed species means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02). As NMFS explained when it promulgated this definition, NMFS considers the likely impacts to a species' survival as well as likely impacts to its recovery. Further, it is possible that in certain, exceptional circumstances, injury to recovery alone may result in a jeopardy biological opinion (51 FR 19926, 19934; June 3, 1986).

We use the following approach to determine whether the proposed action described in Section 2 of this opinion is likely to jeopardize listed and proposed species or adversely modify critical habitat:

- Identify those aspects (or stressors) of the proposed action that are likely to have effects on listed and proposed species or critical habitat. As part of this step, we identify the action area – the spatial and temporal extent of these effects.

- Identify the range wide status of the species and critical habitat likely to be adversely affected by the proposed action. This section describes the current status of each species and critical habitat relative to the conditions needed for recovery. We determine the range-wide status of critical habitat by examining the condition of its PBFs - which were identified when the critical habitat was designated. Species statuses are discussed in Section 3 of this opinion.

- Describe the environmental baseline including: past and present impacts of Federal, state, or private actions and other human activities in the action area; anticipated impacts of proposed Federal projects that have already undergone formal or early section 7 consultation, and the impacts of state or private actions that are contemporaneous with the consultation in process. The environmental baseline is discussed in Section 5 of this opinion.

- Analyze the effects of the proposed action. Identify the species that are likely to co-occur with these effects in space and time and the nature of that co-occurrence (these represent our exposure analyses). In this step of our analyses, we try to identify the number, age (or life stage), and gender of the individuals that are likely to be exposed to stressors and the populations or subpopulations those individuals represent. NMFS also evaluates the proposed action's effects on critical habitat PBFs. The effects of the action are described in Section 6 of this opinion with the exposure analysis described in Section 6.2 of this opinion.

- Once we identify which species are likely to be exposed to an action's effects and the nature of that exposure, we examine the scientific and commercial data available to determine whether and how those listed species are likely to respond given their exposure (these represent our response analyses). Response analysis is considered in Section 6.3 of this opinion.

- Describe any cumulative effects. Cumulative effects, as defined in NMFS's implementing regulations (50 CFR § 402.02), are the effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area. Future Federal actions that are unrelated to the proposed action are not considered because they require separate section 7 consultation. Cumulative effects are considered in Section 7 of this opinion.

- Integrate and synthesize the above factors to assess the risk that the proposed action poses to the species and critical habitat. In this step, NMFS adds the effects of the action (Section 6) to the environmental baseline (Section 5) and the cumulative effects (Section 7) to assess whether the action could reasonably be expected to: (1) appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing its numbers, reproduction, or distribution; or (2) appreciably diminish the value of critical habitat for the conservation of the species. These assessments are made in full consideration of the status of the species and critical habitat (Section 3). Integration and synthesis with risk analyses occurs in Section 8 of this opinion.

- Reach jeopardy and adverse modification conclusions. Conclusions regarding jeopardy and the destruction or adverse modification of critical habitat are presented in Section 9. These conclusions flow from the logic and rationale presented in the Integration and Synthesis Section 8.

If necessary, define a reasonable and prudent alternative to the proposed action. If, in completing the last step in the analysis, NMFS determines that the action under consultation is likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat, NMFS must identify a reasonable and prudent alternative (RPA) to the action.

5 ENVIRONMENTAL BASELINE

The "environmental baseline" refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat 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 anticipated 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 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).

This section focuses on existing anthropogenic and natural activities within the action areas and their influences on the listed or proposed species that may be adversely affected by the proposed actions. Although some of the activities discussed below occur outside of the action areas, they may still impact listed or proposed species in the action areas. Because of the similarity of the affected ESA-listed and proposed species and project effects associated with the two projects addressed in this opinion, the following pertains to both projects (Moorings Seward and Moorings Sitka).

5.1 Climate and Environmental Change

Increased air temperatures, increased ocean temperatures, and ocean acidification are the three facets of climate change presented here as they have the most direct impact on marine mammals and their prey.

Air temperature

Recording of global temperatures began in 1850, and the last 10 years (2014–2023) have ranked as the 10 warmest years in the 174-year record. The yearly temperature for North America has increased at an average rate of 0.23°F per decade since 1910; however, the average rate of increase is more than double the rate (0.61°F) since 1982.[4]

The Arctic (latitudes between 60ºN and 90ºN) has been warming at more than two times the rate of lower latitudes since 2000. This is due to "Arctic amplification", a characteristic of the global climate system influenced by changes in sea ice extent, albedo, atmospheric and oceanic heat transports, cloud cover, black carbon, and many other factors (Serreze and Barry 2011; Richter-Menge et al. 2017; Richter-Menge 2019). The average annual temperature is now 3-4°F warmer than during the early and mid-century (Figure 15). The average annual temperature for Alaska in 2023 was 28.4°F, 2.4°F above the long-term average, ranking the 17th warmest year in the historical record for the state.[5] Some of the most pronounced effects of climate change in Alaska include disappearing sea ice, shrinking glaciers, thawing permafrost, and changing ocean temperatures and chemistry (Chapin et al. 2014).

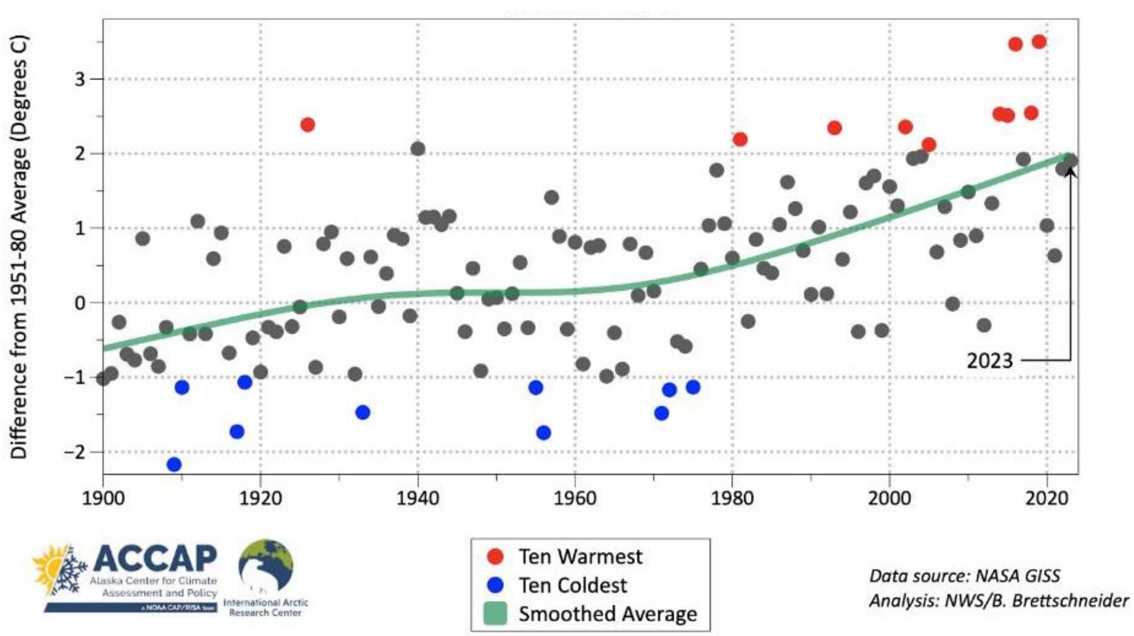

Figure 15. Alaska annual average temperature 1900 to 2023.[6]

[4] https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202313
[5] https://www.ncei.noaa.gov/access/monitoring/monthly-report/national/202313
[6] https://www.flickr.com/photos/alaskaclimategraphics/albums/72177720310047711/

Marine water temperature

Higher air temperatures have led to higher ocean temperatures. More than 90 percent of the excess heat created by global climate change is stored in the world's oceans, causing increases in ocean temperature (IPCC 2019; Cheng et al. 2020). The five highest annual global ocean heat content (OHC) measurements, which is the amount of heat stored in the upper 2,000 m of the ocean, have all occurred in the last five years (2019–2023), and regions of the North Pacific, North Atlantic, and Southern oceans, as well as the Mediterranean Sea, recorded their highest OHC since the 1950s.[7]

The seas surrounding Alaska have been unusually warm in recent years, with unprecedented warmth in some cases (Thoman and Walsh 2019). This effect is observed throughout the Alaska region, including the Bering, Chukchi, and Beaufort seas (Figure 16). Along the west coast, the surface waters were 4–11ºF warmer than average in the summer of 2019 (Thoman and Walsh 2019).

Warmer ocean water affects sea ice formation and melt. In the first decade of the 21st century, Arctic sea ice thickness and annual minimum sea ice extent began declining at an accelerated rate and continues to decline at a rate of approximately 2.7 percent per decade (Stroeve et al. 2007; Stroeve and Notz 2018). None of the species we are considering in this biological opinion are directly dependent on or greatly affected by sea ice or changes to sea ice. Humpback and fin whales have been sighted in the Bering Sea in recent years, but this is primarily during summer months when the sea ice has retreated (Clarke et al. 2020). WDPS Steller sea lions can be found on St Lawrence Island and even farther north but are not dependent on seasonal sea ice movement.

In the Pacific Arctic, with the reduction in the cold-water pool in the northern Bering Sea, large scale northward movements of commercial stocks are underway as previously cold-dominated ecosystems warm and fish move northward to higher latitudes (Grebmeier et al. 2006, Eisner et al. 2020). Not only fish, but plankton, crabs and ultimately, sessile invertebrates like clams are affected by these changes in water temperature (Grebmeier et al. 2006, Fedewa et al. 2020).

[7] https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202313

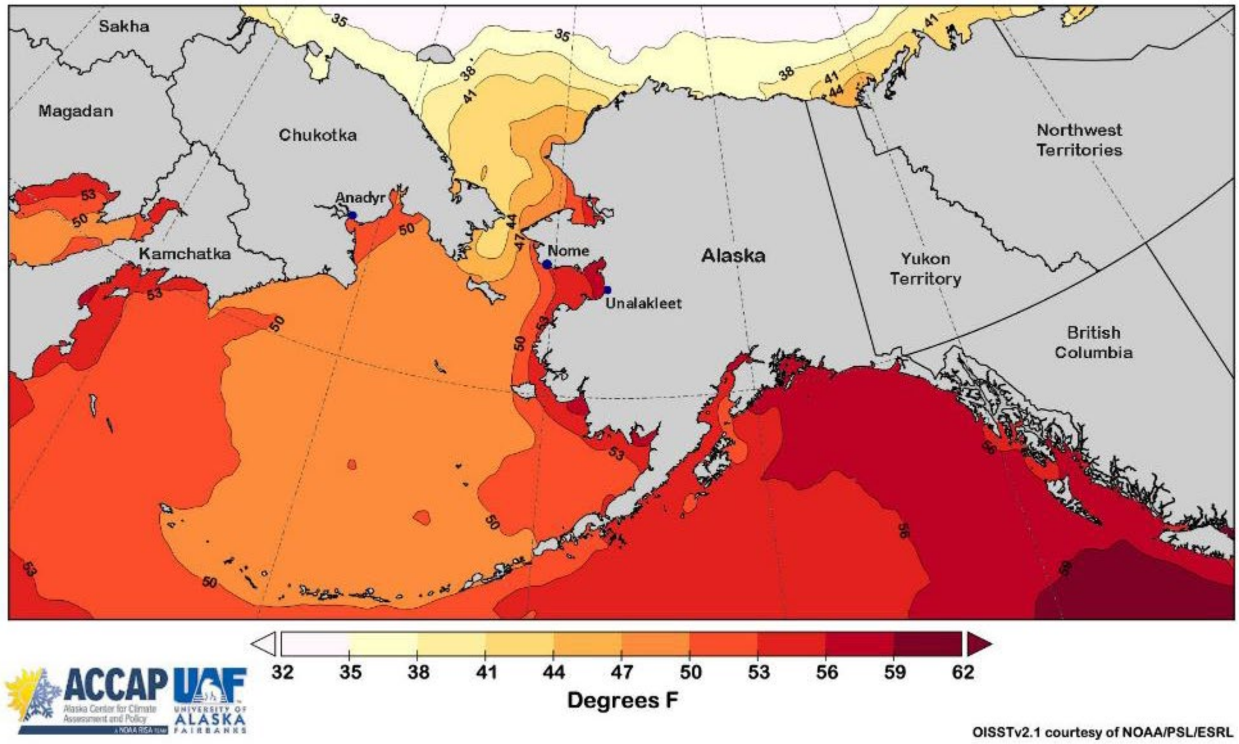

Figure 16. Highest average sea surface temperature.[8]

With the reduction in the cold-water pool in the northern Bering Sea, large scale northward movements of commercial fish stocks are underway, as previously cold-dominated ecosystems warm and fish move northward to higher latitudes (Grebmeier et al. 2006; Eisner et al. 2020). Not only fish, but plankton, crabs, and sessile invertebrates like clams are affected by these changes in water temperature (Grebmeier et al. 2006; Fedewa et al. 2020).

The marine heat wave, a coherent area of extreme warm temperature at the sea surface that persists, is another ocean water anomaly (Frölicher et al. 2018). Marine heatwaves are a key ecosystem driver and nearly 70 percent of global oceans experienced strong or severe heatwaves in 2016, compared to 30 percent in 2012 (Suryan et al. 2021). The largest recorded marine heat wave occurred in the northeast Pacific Ocean, appearing off the coast of Alaska in the winter of 2013-2014 and extending south to Baja California by the end of 2015 (Frölicher et al. 2018). The Pacific marine heatwave began to dissipate in mid-2016 but warming re-intensified in late-2018 and persisted through 2021 (Suryan et al. 2021; Hastings et al. 2023). Consequences of this event included an unprecedented harmful algal bloom that extended from the Aleutian Islands to southern California, mass strandings of marine mammals, shifts in the distribution of invertebrates and fish, and shifts in abundance of several fish species (Cavole et al. 2016). Cetaceans, forage fish such as capelin and herring, Steller sea lions, adult cod, chinook and sockeye salmon in the Gulf of Alaska were all impacted by the Pacific marine heatwave (Bond et al. 2015; Peterson et al. 2016; Sweeney et al. 2018).

[8] https://www.flickr.com/photos/alaskaclimategraphics/albums/72177720310044870/

The 2018 Gulf of Alaska Pacific cod stock assessment estimated that the female spawning biomass of Pacific cod (an important prey species for Steller sea lions) was at its lowest point in the 41-year time series, following three years of poor recruitment and increased natural mortality as a result of the 2014-2016 Pacific marine heatwave.[9] The spawning stock biomass dropped below 20 percent of the unfished spawning biomass in 2020; 20 percent is a minimum spawning stock size threshold instituted to help ensure adequate prey availability for the endangered Western DPS of Steller sea lions. The federal Pacific cod fishery in the Gulf of Alaska was closed by regulation to directed Pacific cod fishing in 2020 as a result (Barbeaux et al. 2020). As of late 2023, Pacific cod abundance remained at reduced levels; however, the population is showing signs of growth.[10]

Ocean Acidification

For 650,000 years or more, the average global atmospheric carbon dioxide (CO_2) concentration varied between 180 and 300 parts per million (ppm). Since the beginning of the industrial revolution in the late 1700s, atmospheric CO_2 concentrations have been increasing rapidly, primarily due to anthropogenic inputs (Fabry et al. 2008; Lüthi et al. 2008). The world's oceans have absorbed approximately one-third of the anthropogenic CO_2 released, which has buffered the increase in atmospheric CO_2 concentrations (Feely et al. 2004; Feely et al. 2009). Despite the ocean's role as a large carbon sink, the CO_2 level continues to rise and is currently at 419 ppm.[11]

As the oceans absorb CO_2, the buffering capacity and pH of seawater is reduced. This process is referred to as ocean acidification. Ocean acidification reduces the saturation states of certain biologically important calcium carbonate minerals like aragonite and calcite that many organisms use to form and maintain shells (Bates et al. 2009; Reisdorph and Mathis 2014). When seawater is supersaturated with these minerals, calcification (growth) of shells is favored. Likewise, when the seawater becomes undersaturated, dissolution is favored (Feely et al. 2009).

High latitude oceans have naturally lower saturation states of calcium carbonate minerals than more temperate or tropical waters, making Alaska's oceans more susceptible to the effects of ocean acidification (Fabry et al. 2009; Jiang et al. 2015). Model projections indicate that aragonite undersaturation was expected to start to occur by about 2020 in the Arctic Ocean and by 2050, all of the Arctic will be undersaturated with this mineral (Feely et al. 2009; Qi et al. 2017). Large inputs of low-alkalinity freshwater from glacial runoff and melting sea ice contribute to the problem by reducing the buffering capacity of seawater to changes in pH (Reisdorph and Mathis 2014). As a result, seasonal undersaturation of aragonite was already detected in the Bering Sea at sampling stations near the outflows of the Yukon and Kuskokwim Rivers and the Chukchi Sea (Fabry et al. 2009). Models and observations indicate that rapid sea ice loss will increase the uptake of CO_2 and exacerbate the problem of aragonite undersaturation in the Arctic (Yamamoto et al. 2012; DeGrandpre et al. 2020).

Undersaturated waters are potentially highly corrosive to any calcifying organism, such as corals,

[9] https://apps-afsc.fisheries.noaa.gov/REFM/Docs/2018/GOA/GOApcod.pdf
[10] https://apps-afsc.fisheries.noaa.gov/REFM/docs/2023/GOABrief.pdf .
[11] https://gml.noaa.gov/ccgg/trends/global.html

bivalves, crustaceans, echinoderms and many forms of zooplankton, and, consequently, may affect Arctic food webs (Fabry et al. 2008; Bates et al. 2009). Pteropods, which are often considered indicator species for ecosystem health, are prey for many species of carnivorous zooplankton, fishes including salmon, mackerel, herring, and cod, and baleen whales (Orr et al. 2005). With their thin shells and dependence on aragonite, pteropods may not be able to grow and maintain shells under increasingly acidic conditions (Lischka and Riebesell 2012). It is uncertain if these species, which play a large role in supporting many levels of the Alaskan marine food web, will be able to adapt to changing ocean conditions (Fabry et al. 2008; Lischka and Riebesell 2012).

Climate change is projected to have substantial direct and indirect effects on individuals, populations, species, and the structure and function of marine, coastal, and terrestrial ecosystems in the foreseeable future (Hinzman et al. 2005; Burek et al. 2008; Doney et al. 2012; Huntington et al. 2020). The physical effects on the environment described above have impacted, are impacting, and will continue to impact marine species in a variety of ways (IPCC 2014), including shifting abundances, changes in distribution, changes in timing of migration, and changes in periodic life cycles of species. For example, cetaceans with restricted distributions linked to water temperature may be particularly susceptible to range restriction (Learmonth et al. 2006; Isaac 2009). Macleod (2009) estimated that, based on expected shifts in water temperature, 88 percent of cetaceans will be affected by climate change, 47 percent will be negatively affected, and 21 percent will be put at risk of extinction. Of greatest concern are cetaceans with ranges limited to non-tropical waters and preferences for shelf habitats (Macleod 2009).

Since the 1950s the atmosphere and oceans have warmed, snow and sea ice have diminished, sea levels have risen, and concentrations of greenhouse gases have increased (IPCC 2014). There is little doubt that human influence has been the dominant cause of the observed warming since the mid-20th century (IPCC 2014). The impacts of climate change are especially pronounced at high latitudes and in polar regions. Average temperatures have increased across Alaska at more than twice the rate of the rest of the United States.

In the past 60 years, average air temperatures across Alaska have increased by approximately 3°F, and winter temperatures have increased by 6°F (Chapin et al. 2014). Some of the most pronounced effects of climate change in Alaska include disappearing sea ice, shrinking glaciers, thawing permafrost, and changing ocean temperatures and chemistry (Chapin et al. 2014). Climate change is projected to have substantial direct and indirect effects on individuals, populations, species, and the structure and function of marine, coastal, and terrestrial ecosystems in the foreseeable future (Houghton 2001, McCarthy et al. 2001). The impacts of these changes and their interactions on listed species in Alaska are hard to predict.

Indirect threats associated with climate change include increased human activity as a result of regional warming. Less ice could mean increased vessel activity or construction activities with an associated increase in sound, pollution, and risk of vessel strike. Human fishing pressure could change the abundance, seasonality, or composition of prey species. Fisheries in Alaska are managed with the goal of sustainability; however, not all fish stocks are assessed, and it is unknown whether management of fisheries for optimal returns provides sufficient densities in feeding areas for efficient foraging by ESA-listed marine mammal species.

An Unusual Mortality Event (UME) of large cetaceans occurred in Alaskan waters in 2015-2016. Reports of dead whales included 22 dead humpback, 12 fin, 2 gray, 1 sperm, and 6 unidentified whales. The fin whales were observed stranded within a 27-day period around Kodiak Island. This was concurrent with an unusually large number of dead whales found in British Columbia. The strandings were concurrent with the arrival of the Pacific marine heat wave, one of the strongest El Nino weather patterns on record, decreasing ice extent in the Bering Sea, and one of the warmest years on record in Alaska in terms of air temperature.

Recent studies and observations have shown changes in distribution (Brower et al. 2018), body condition (Neilson and Gabriele 2020), and migratory patterns of humpback whales, likely in response to climate change. The indirect effects of climate change on Mexico DPS humpback whales over time would likely include changes in the distribution of ocean temperatures suitable for many stages of their life history, the distribution and abundance of prey, and the distribution and abundance of competitors or predators.

The Pacific marine heat wave is also likely responsible for poor growth and survival of Pacific cod, an important prey species for Steller sea lions. The 2018 Pacific cod stock assessment estimated that the female spawning biomass of Pacific cod was at its lowest point in the 41-year time series considered. This assessment was conducted following three years of poor recruitment and increased natural mortality during the Gulf of Alaska marine heat wave from 2014 to 2016 (NMFS 2018a).

The Steller Sea Lion Recovery Plan ranks environmental variability as a potentially high threat to recovery of the Western DPS (NMFS 2008). The Bering Sea and Gulf of Alaska are subjected to large-scale forcing mechanisms that can lead to basin-wide shifts in the marine ecosystem resulting in significant changes to physical and biological characteristics, including sea surface temperature, salinity, and sea ice extent and amount.

Physical forcing affects food availability and can change the structure of trophic relationships by impacting climate conditions that influence reproduction, survival, distribution, and predator-prey relationships at all trophic levels. Warmer waters could favor productivity of some species of forage fish, but the impact on recruitment of important prey fish of Steller sea lions is unpredictable. Recruitment of large year-classes of gadids (e.g., pollock) and herring has occurred more often in warm than cool years, but the distribution and recruitment of other fish (e.g., osmerids) could be negatively affected (NMFS 2008). Populations of Steller sea lions in the Gulf of Alaska and Bering Sea have experienced large fluctuations due to environmental and anthropogenic forcing (Mueter et al. 2009).

5.2 Sound

ESA-listed species in the action area are exposed to several sources of ambient (natural) and anthropogenic (human-caused) sound. The combination of anthropogenic and ambient sounds contributes to the total sound at any one place and time. Ambient sources of underwater sound include sea ice, wind, waves, precipitation, and biological sounds from marine mammals, fishes, and crustaceans. Other anthropogenic sources of underwater sound of concern to listed species in Alaska include in-water construction activities such as drilling, dredging, and pile driving; oil, gas, and mineral exploration and extraction; Navy sonar and other military activities; geophysical seismic surveys; and ocean research activities. Levels of anthropogenic sound can vary dramatically depending on the season, type of activity, and local conditions. Sound impacts to listed marine mammal species from many of these activities are mitigated through ESA Section 7 consultations state-wide.

Sound is of particular concern to marine mammals because many species use sound as a primary sense for navigating, finding prey, avoiding predators, and communicating with other individuals. As described in greater detail later in this opinion, sound may cause marine mammals to leave a habitat, impair their ability to communicate, or cause stress. Sound can cause behavioral disturbances, mask other sounds including their own vocalizations, may result in injury, and, in some cases, may result in behaviors that ultimately lead to death. The severity of these impacts can vary greatly between minor impacts that have no real cost to the animal, to more severe impacts that may have lasting consequences.

Because responses to anthropogenic sound vary among species and individuals within species, it is difficult to determine long-term effects. Habitat abandonment due to anthropogenic sound exposure has been found in terrestrial species (Francis and Barber 2013). The presence and movements of ships in the vicinity of seals can affect their normal behavior (Jansen et al. 2010) and may cause them to abandon their preferred breeding habitats in areas with high traffic (Allen 1984, Henry and Hammill 2001, Edrén et al. 2010). Clark et al. (2009) identified increasing levels of anthropogenic sound as a habitat concern for whales because of its potential effect on their ability to communicate (i.e., masking). Some research (Parks 2003, McDonald et al. 2006, Parks 2009) suggests marine mammals compensate for masking by changing the frequency, source level, redundancy, and timing of their calls. However, the long-term implications of these adjustments, if any, are currently unknown.

5.3 Fisheries Interactions

Commercial, recreational, and subsistence fishing occurs in and around the action area considered in this opinion. Commercial fisheries pose a threat to recovering marine mammal stocks in the Gulf of Alaska and the waters of southeast Alaska. Entanglement may result in minor injury or may potentially significantly affect individual health, reproduction, or survival. Additionally, reductions in seasonal availability and distribution of fish can cause cumulative effects on many species that depend on reliable sources of prey for survival.

Bettridge et al. (2015) report that fishing gear entanglements may moderately reduce the population size or the growth rate of ESA-listed whales. Humpback whales have been killed and injured during interactions with commercial fishing gear; however, the frequency of these interactions does not appear to have a significant adverse consequence for humpback whale populations. Most entanglements occur between early June and early September, when humpbacks are foraging in nearshore Alaska waters. A photographic study of humpback whales in southeastern Alaska found at least 53 percent of individuals showed some kind of scarring from fishing gear entanglement (Neilson et al. 2005).

Fishing gear involved in humpback entanglements between 1990 and 2016 included gillnet gear

(37 percent), pot gear (29 percent), and longline gear (1-2 percent). The minimum mean annual mortality and serious injury rate due to interactions with all fisheries between 2014 and 2018 is 19 humpbacks for the Central North Pacific stock and 1.7 whales for the Western North Pacific stock (Muto et al. 2021). Between 2016 and 2020, entanglement of humpback whales (n = 47) was the most frequent human-caused source of mortality and injury of large whales (Freed et al. 2022).

Among Steller sea lions, the minimum estimated mean annual mortality and serious injury rate in U.S. commercial fisheries between 2014 and 2018 was 38 individuals (Muto et al. 2021). This is likely an underestimate as it is an actual count of verified human-caused deaths and serious injuries, and not all entangled animals strand nor are all stranded animals found, reported, or have the cause of death determined. Between 2016 and 2020, entanglement in fishing gear accounted for mortality and injury of 148 Western DPS Steller sea lions, with commercial trawl gear being the most common cause of entanglement (n=113; Freed et al. 2022).

Commercial fisheries may additionally indirectly affect whales and sea lions by reducing the amount of available prey or affecting prey species composition. In Alaska, commercial fisheries target known marine mammal prey species, such as pollock and cod, and bottom-trawl fisheries may disturb habitat for bottom-dwelling prey species of marine mammals. The Mexico DPS humpback whales considered in this biological opinion also feed on a variety of other species, some of which are not commercially or recreationally viable fisheries. As it is unknown how much of the humpback whale diet consists of species exploited by commercial fisheries near Seward, we cannot assess the degree to which competition for prey with fisheries affects these large whale species. However, we have no indication that this is a serious concern. Whether fisheries reduce Steller sea lion prey biomass and quality at local and/or regional spatial scales, leading to a reduction in Steller sea lion survival and reproduction, has been a matter of considerable debate among the scientific community (NMFS 2008).

Due to their highly migratory nature, the species considered in this opinion have the potential to interact with fisheries both within and outside of the action area. Assessing the impact of fisheries on such species is difficult due to the large number of fisheries that may interact with the animals and the inherent complexity of evaluating ecosystem-scale effects.

5.4 Pollutants and Contaminants

A number of contaminant discharges pollute the marine waters of Alaska annually. Marine water quality in the action area can be affected by discharges from shipyard and other industrial activities, treated sewer system outflows, seafood processing plants, vessels operating in marine waters, and sediment runoff from paved surfaces and developed areas (HDR 2017). Intentional sources of pollution, including domestic, municipal, and industrial wastewater discharges, are managed and permitted by the Alaska Department of Environmental Conservation (ADEC). Using ADEC’s databases for contaminated sites and impaired waterbodies, we identified possible sources of pollution and contaminants for the marine waters, or impaired waters, close to the action area. We only included sites that were close to the shoreline and had evidence of contaminants spreading into local water bodies. In addition to activities managed by ADEC, pollution may also occur from accidental discharges and spills.

5.5 Vessel Interactions

Ferries, cruise ships, tankers, ore carriers, commercial fishing vessels, recreational vessels, and barges and tugs transit or operate within Alaska state and U.S. exclusive economic zone (EEZ) waters. Much of the vessel traffic in Alaskan waters is concentrated in coastal areas of southeastern and south-central Alaska during the summer months, where recreational vessels, charter vessels, commercial whale watch vessels, tour boats, and cruise ships are prevalent. Traffic from large vessels is more likely to occur year-round statewide, in both near shore and offshore waters, and includes commercial fishing vessels, freighters/tankers, passenger ferries, etc. In general, there is less vessel traffic off western and northern Alaska compared to other parts of the state, although considerable traffic passes through the Aleutian Islands via the Great Circle Route. These trends are changing with climate change-driven decreases in sea ice in the Bering, Chukchi, and Beaufort seas (Neilson et al. 2012).

Statewide, marine vessels are a known source of injury and mortality to marine mammals in Alaska, including some of the species considered in this opinion (Laist et al. 2001, Neilson et al. 2012). In addition to the potential for entanglement discussed in section 5.4 above, vessel traffic may affect listed species through collisions (strikes) and increased ocean sound. Vessel traffic also has the potential to impact species via pollution from discharges and spills, and behavioral disruption (e.g., interference with foraging or migration, disturbance while resting or hauled-out).

Vessel sound and presence can impact whales by causing behavioral disturbances, auditory interference, or non-auditory physical and physiological effects (e.g., vessel strike). From 1978-2011, 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 knots 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. Seventeen humpback whales were reported struck by vessels between 2013 and 2015 (Delean et al. 2020) and 18 humpbacks were reported struck by vessels between 2016 and 2020 (Freed et al. 2022). NMFS implemented regulations to minimize harmful interactions between ships and humpback whales in Alaska (see 50 CFR §§ 216.18, 223.214, and 224.103(b)).

Steller sea lions may be more susceptible to vessel strike mortality or injury in harbors or in areas where animals are concentrated, e.g., near rookeries or haulouts (NMFS 2008). There are four records of stranded Steller sea lions with injuries indicative of vessel strike in Alaska, three occurred in Sitka and one in Kachemak Bay (NMFS Alaska Regional Office Stranding Database accessed February 2023). The risk of vessel strike, however, has not been identified as a significant concern for Steller sea lions.

There is substantial vessel activity near Seward, with the Port of Seward serving as home to numerous commercial fishing vessels. The Port of Seward also provides moorage for large ferries, cruise ships, tankers, recreational vessels, and barges and tugs that may be found near or within the proposed action area. Based on vessel traffic density data collected between 2008 and 2015, Resurrection Bay records just over 5,800 large vessel transits on average per year (AOOS

2023).

The Port of Sitka is ranked as the largest harbor system in Alaska with almost 1,350 permanent slips. It is the sixth largest port for annual seafood harvest in the U.S. The port hosts commercial fishing, recreational, and charter vessels throughout the year. Based on thermal imaging from 2021, and vessel traffic density data compiled between 2008 and 2015, it appears that the Sitka records upwards of 15,000 large vessel transits on average per year, primarily to and from north of the city center (Marine Traffic 2023; AOOS 2023). In 2015, 2,748 large vessel transits were recorded in the proposed project footprint (AOOS 2023).

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.Seventeen humpback whales were reported struck by vessels between 2013 and 2015 (Delean et al. 2020), and 18 humpbacks were reported struck by vessels between 2016 and 2020 (Freed et al. 2022) in Alaskan waters. From 2007 to 2013, there were four documented cases of Steller sea lions killed or injured by vessel strikes in Alaska (NMFS 2020). There have also been two additional vessel strikes of humpback whales in the same area where the Steller sea lions were killed that occurred between 2012 and 2020 (NMFS Alaska Regional Office Stranding Database).

5.6 Coastal Development

Coastal zone development results in the loss and alteration of nearshore marine mammal and sunflower sea star habitat and changes in habitat quality. Increased development may prevent marine mammals from reaching or using important feeding, breeding, and resting areas. While some habitat for sunflower sea stars may be lost, installation of some in-water infrastructure such as dock pilings may create additional feeding areas for this species. The SMIC, where Moorings Seward is located, is across Resurrection Bay away from the developed areas around Seward and may provide additional vertical habitat from the installation of more pilings in the project area.

5.7 Subsistence Harvest

The ESA and MMPA allow for the harvest of marine mammals by Alaska Natives for subsistence purposes and for creating and selling authentic native articles of handicrafts. Except for 11 Arctic village members of the Alaska Eskimo Whaling Commission that have IWC-issued quota for aboriginal subsistence harvest of bowhead whales, subsistence hunters in Alaska are not authorized to take large whales (Muto et al. 2018). However, one humpback whale was illegally harvested in Kotlik in October 2006, and another was illegally harvested in Toksook Bay in May, 2016, while a gray whale was illegally harvested in the Kuskokwim River in July, 2017.

Subsistence hunting of Steller sea lions occurs throughout south-central and southeast Alaska. As of 2009, data on community subsistence harvest are no longer being consistently collected; therefore, the most recent estimate of annual statewide harvest (excluding St. Paul Island, Atka, and Akutan, which actively collect harvest data) is 172 individuals from the 5-year period from 2004 to 2008. Data were collected on Alaska Native harvest of Steller sea lions for 7 communities on Kodiak Island for 2011 and 15 communities in south-central Alaska in 2014; the

Alaska Native Harbor Seal Commission and ADF&G estimated a total of 20 adult sea lions were harvested on Kodiak Island in 2011, and 7.9 sea lions (CI = 6-15.3) were harvested in South-central Alaska in 2014, with adults comprising 84 percent of the harvest (Muto et al. 2017, Muto et al. 2018).

5.8 Sea Star Wasting Syndrome

SSWS is the primary threat and stressor to sunflower sea stars across their range. A SSWS pandemic occurred across the range of the sunflower sea star from 2013-2017. 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 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, including in the action area. SSWS is thought to be exacerbated by warming ocean temperatures and other climate change related characteristics.

5.9 Prior Section 7 Consultations

Based on a search of the Environmental Consultation Organizer (ECO), there has been one formal Section 7 consultation conducted for a project in the Seward area since 2017 and four formal consultations conducted for projects in Sitka. For the formal Section 7 consultations conducted in Seward (AKRO-2023-03224) and Sitka (AKRO-2017-00903, AKRO-2017-00904, AKRO-2018-00245, AKRO-2023-02513), the most common stressor was acoustic disturbance.

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

5.10 Environmental Baseline Summary

The existing anthropogenic and natural activities described above (e.g., climate change, fisheries, pollution, coastal development, etc.) are expected to continue. Listed species in the action areas may be impacted by one or more of these risk factors.

The population trend is unknown for fin whales and both the Mexico and WNP DPS of humpback whales. Western DPS Steller sea lion numbers within Southeast Alaska appear to be stable or increasing. Although we do not have information on other measures of the demographic status of Steller sea lions (for example, age structure, sex ratios, or the distribution of reproductive success) that would facilitate a more robust assessment of the probable impact of factors discussed in the Environmental Baseline,[12] we can infer from their increasing abundance in some areas that no factor alone or in combination is preventing this population from increasing in the two action areas. The primary threat to the sunflower sea star continues to be

[12] Increase in a population's abundance is only one piece of evidence that a population is improving in status; however, because populations can increase while experiencing low juvenile survival (e.g., if low juvenile survival is coupled with reduced adult mortality) or when those individuals that are most sensitive to a stress regime die, leaving the most resistant individuals, increases in abundance are not necessarily indicative of the long-term viability of a species.

sea star wasting syndrome and was identified as the factor of greatest concern for the species throughout its range. Sunflower sea stars are currently estimated to number approximately 600 million.

The main threats to recovery of Mexico and WNP DPS humpback whales are thought to be entanglement in fishing gear and vessel strike due to increased shipping throughout their range (Young et al. 2023). These threats are discussed in this Environmental Baseline, but do not appear to be significant stressors in the two project areas because vessel speeds in and around both mooring sites are slowed due to levels of vessel traffic.

Many of the projects and issues discussed in this Environmental Baseline are specific examples of these types of threats (e.g., sound, habitat loss or degradation, pollution, cumulative effects, etc.).

6 EFFECTS OF THE ACTION

"Effects of the action" are all consequences to listed species 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 biological and conference opinion relies on the best scientific and commercial information available. We try to note areas of uncertainty, or situations where data is 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* 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, threatened and proposed 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 and proposed species.

6.1 Project Stressors

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

Based on our review of the IHA application, personal communications, and available literature as referenced in this biological and conference opinion, the proposed activities may cause the following stressors to ESA-listed and proposed species:

Minor Stressors:

- Vessel sound and strike disturbance
- Seafloor, habitat, and prey resource disturbance
- Pollutants and contaminants
- Direct pile contact on sunflower sea stars
- Underwater sound produced by impulsive and non-impulsive sound sources related to pile repair and replacement activities, including vibratory pile driving , and DTH on sunflower sea stars

Major Stressors:

- Direct human contact
- Underwater sound produced by impulsive and non-impulsive sound sources related to pile repair and replacement activities, including vibratory pile driving, and DTH drilling

6.1.1 Minor Stressors on ESA-Listed and Proposed Species

Based on a review of available information, we determined the following stressors are either unlikely to occur or likely to have minimal impacts on Western DPS Steller sea lions, Mexico and WNP DPS humpback whales, fin whales, or sunflower sea stars.

6.1.1.1 Vessel Sound

Vessel sound transmitted through water is a continuous (non-impulsive) sound source. Broadband source levels for tugs and barges have been measured at 145 to 170 dB re 1 µPa, and 151 to 152 dB re 1µPa for small vessels with outboard motors (Richardson et al. 1995). Sound from vessels within this size range would reach the 120 dB threshold at distances between 86 and 233 m (282 and 764 feet) from the source (Richardson et al. 1995).

Vessel activity associated with the proposed work at the USCG mooring facilities will be minimal, with a total of five vessels (two barges, two tugs, and one skiff) used throughout the course of the projects at the two project sites. Barges and their associated tugs are expected to complete one round trip from their location of origin (construction barges possibly from Seward, AK and Juneau, AK), traveling at speeds of ~8 knots, and when on site, the barges will move at ~100-foot increments at speeds less than two knots from one pile to the next. Skiffs will have short movements transporting workers to and from the construction platform, traveling at speeds of ~3 knots. The slow vessel speeds will result in lower levels of vessel sound compared to vessels moving at faster speeds. Because pile replacement activities are not expected to last longer than 22 days at Moorings Seward and 117 nonconsecutive days at Moorings Sitka, and the project vessels will only be traveling short distances twice per day (start and end of the working period), the sound produced by the limited number of project vessels is not expected to add to the baseline sound conditions around the USCG mooring facilities.

NMFS expects minimal low-level exposure of short-term duration to listed humpback and fin whales and Steller sea lions from vessel sound related to this action. If animals are exposed and do respond, they may exhibit slight deflection from the sound source and engage in low-level avoidance behavior, short-term vigilance behavior, or short-term masking behavior, but these behaviors are not likely to result in adverse consequences for the animals. The nature and duration of response is not expected to be a significant disruption of important behavioral patterns such as feeding or resting. Further, marine mammals that frequent the action area are likely to have developed a tolerance to vessel sound and disturbance due to the common presence of vessels such as ferries, fishing vessels, tenders, barges, tugboats, and other commercial and recreational vessels. The impact of vessel sound on Western DPS Steller sea lions, Mexico or WNP DPS humpback whales, and fin whales is therefore determined to be minor. We do not expect vessel sound to have effects on the sunflower sea star because they lack a sensory system that would detect changes in pressure that correspond to sound.

6.1.1.2 Vessel Strike

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 surface. From 1978 to 2011, there were 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 knots 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. Forty-four humpback whales were reported struck by vessels in Alaskan waters between 2013 and 2021 (Delean et al. 2020; Freed et al. 2023; Freed et al. 2022).

Fin whale mortality due to ship strike was reported in 2014, 2016, 2018, and 2020 in Alaskan waters (Delean et al. 2020; Freed et al. 2023; Freed et al. 2022). A dead fin whale was discovered on the bulbous bow of a freighter at the Port of Alaska in 2015 (Savage 2017). The vessel traveled from Seattle, and it was unknown where the strike occurred.

There are only four records of stranded Steller sea lions with injuries indicative of vessel strike in Alaska, three occurred in Sitka and one in Kachemak Bay. Steller sea lions are likely more susceptible to ship strike mortality or injury in harbors or in areas where animals are concentrated, e.g., near rookeries or haulouts (NMFS 2008b).

The possibility of a vessel strike associated with the proposed action is extremely unlikely. As there will be five project-related vessels, of which only one skiff will be moving any considerable distance each day to transport workers for each project. These vessels will be traveling at slow speeds (~3 knots), as will the barges and tugs as they travel to the construction site (6-8 knots). Vessel operators will also reduce speed further to five knots if within 300 yds (274 m) of a whale. Due to the common presence of commercial and recreational vessels in the action areas and presumable tolerance of marine mammals to regular vessel traffic, the use of slow-moving tugboats, barges, and small skiffs associated with construction is not anticipated to result in vessel strikes of ESA-listed species with the action area.

In addition to the small number of vessels and slower transit speeds, the local bathymetry or other surrounding environmental conditions (e.g., sediment loads, lack of prey species) may greatly reduce the likelihood of humpback or fin whales from entering the action area. The mitigation measures in Section 2.1.2. also state that vessels will stay at least 100 yds (91.4m) from listed marine mammals, as well as adhere to the Alaska Humpback Whale Approach Regulations (see 50 CFR §§ 216.18, 223.214 and 224.103(b)). All of these factors limit the risk of a vessel interacting with marine mammals in the project action areas, leading us to determine that a vessel strike is improbable.

6.1.1.3 Seafloor, Habitat, and Prey Resource Disturbance

Removal and replacement of piles at the two USCG mooring facilities may temporarily increase local turbidity. Pile driving and DTH drilling causes localized increases in turbidity around piles being removed and installed. In general, turbidity associated with pile installation is localized to about a 25 ft (7.6 m) radius around a pile (Everitt et al. 1980) and local tidal activity can reduce turbidity quickly. With the shutdown zone around each construction site, listed animals are not expected to be close enough to be affected by project-generated turbidity. Sunflower sea stars may be in close enough proximity to experience localized turbidity, but being highly mobile, they can move from the area if negatively impacted, if they have not already been removed from the area during pre-construction surveys. Therefore, we conclude that effects of seafloor disturbance and increased turbidity on humpback whales, fin whales, Steller sea lions, and sunflower sea stars would be immeasurably small.

Construction activities associated with pile removal and replacement would produce non-impulsive (i.e., vibratory pile removal and installation) and impulsive (i.e., DTH) sounds, which could impact prey resources of ESA listed species. Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish, although several are based on studies related to large, multiyear bridge construction projects (e.g., Scholik and Yan 2001, Popper and Hastings 2009). Impulsive sounds at received levels of 160 dB may cause subtle changes in fish behavior. Sound pressure levels (SPLs) of 180 dB may cause noticeable changes in behavior (Pearson et al. 1992, Skalski et al. 1992) and SPLs of sufficient strength have been known to cause injury to fish and fish mortality.

The most likely impact to fish from pile driving and DTH activities at the project areas would be temporary behavioral avoidance of the area. The duration of fish avoidance of construction areas after pile driving ceases is unknown, but a rapid return to normal distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary given the small area of pile driving within the action areas relative to known feeding areas for humpback and fin whales, and Steller sea lions. We expect fish will be capable of moving away from project activities to avoid exposure to sound and that areas in which stress, injury, temporary threshold shifts (TTS), or changes in balance of prey species that may occur will be limited to a few meters directly around the pile driving and drilling operations. We consider potential adverse impacts to prey resources from pile-driving and DTH in the action area to be minor.

Studies on euphausiids and copepods, two of the more abundant and biologically important groups of zooplankton, have documented some sensitivity of zooplankton to sound (Chu et al. 1996, Wiese 1996); however, any effects of pile driving and DTH activities on zooplankton would be expected to be restricted to the area within a few meters of pile replacement and would likely be sub-lethal. While previous studies concluded that crustaceans (such as zooplankton) are not particularly sensitive to sound produced by even louder impulsive sounds such as seismic operations (Wiese 1996), a recent study provides evidence that seismic surveys may cause significant mortality (McCauley et al. 2017). However, seismic surveys are significantly louder and lower frequency than the sound sources associated with pile replacement activities and are not directly comparable.

No appreciable adverse impact on zooplankton populations will occur due in part to large reproductive capacities and naturally high levels of predation and mortality of these populations. Any mortality or impacts on zooplankton that result of pile replacement activities is immaterial as compared to the naturally occurring reproductive and mortality rates of these species.

Construction activities will temporarily increase turbidity and in-water sound and may adversely affect habitat and prey in the action area. Adverse effects on prey species populations during project activities will be short-term, based on the limited duration of the in-water pile driving/extraction for Moorings Seward (22 days) and Moorings Sitka (117 non-consecutive days). After pile driving and DTH activities are completed, habitat use and function are expected to return to similar pre-construction levels and fish, zooplankton, and other prey are expected to repopulate the area. Therefore, we conclude that impacts to seafloor, habitat disturbance, and prey species will be minor.

6.1.1.4 Pollutants and Contaminants

Listed and proposed species could be exposed to accidental discharges through project vessels and pile removal and replacement activities. Accidental spills could occur from a vessel leak or onboard spill during construction activities. The size of the spill influences the number of individuals that will be exposed to spilled material and the duration of that exposure. Contact through the skin, eyes, or through inhalation and ingestion could result in temporary irritation or long-term endocrine or reproductive impacts, depending on the duration of exposure. The greatest threat to cetaceans is likely from the inhalation of the volatile toxic hydrocarbon fractions of fresh oil, which can damage the respiratory system (Hansen 1985, Neff 1990), cause neurological disorders or liver damage (Geraci 1990), have anesthetic effects (Neff 1990), and cause death (Geraci 1990). However, for small spills there is expected to be a rapid dissipation of toxic fumes into the atmosphere from rapid aging of fresh refined oil, which limits potential exposure of whales and Steller sea lions to prolonged inhalation of toxic fumes. We do not expect that sunflower sea stars would be affected by pollutants that are released and remain at the surface, or higher in the water column.

The USCG has measures is in place to address oil and other contaminant spill prevention. These include always having a spill cleanup kit and oil booms on-site, regular monitoring of any hoses or valves for fuel or other contaminants, and proper storage of potentially harmful chemicals and contaminants. Based on the localized nature of small spills or pollutant releases, the relatively rapid weathering and dispersion, and the safeguards in place to prevent spills from occurring, NMFS concludes that exposure of listed species to an oil spill or pollutant release from the project is highly unlikely to occur, and should such exposure occur, its effects upon listed species will be immeasurably small.

6.1.1.5 Direct Pile Contact on Sunflower Sea Stars

Direct pile contact is expected only to affect the sunflower sea star. The potential for an individual sunflower sea star to be hit by a pile during installation is possible. At Moorings Seward, 30 piles will be driven using a combination of vibratory, impact, and DTH drilling. At Moorings Sitka, 178 piles will be driven using a combination of vibratory, impact, and DTH drilling. Pile size, the area covered per pile, and the total area covered by the piles is summarized below in Table 6.

Table 6. Summary of piles to be installed at Moorings Seward and Moorings Sitka.

Number of Piles	Diameter (in)	Area/Pile (ft^2)	Area/pile (m^2)	Total Area (ft^2)	Total area (m^2)
Moorings Seward					
10	30	4.909	0.456	49.087	4.560
20	30	4.909	0.456	98.175	9.120
				Total	**13.68**
Moorings Sitka					
6	14	1.069	0.099	6.414	0.596
105	30	4.909	0.456	515.417	47.288
54	13	0.922	0.086	49.775	4.624
10	30	4.909	0.456	49.087	4.560
3	30	4.909	0.456	14.726	1.368
				Total	**58.436**

Based on surveys conducted in 2022 in the Sitka Channel area (Lowry 2023), the estimated density of sunflower sea stars present pre-pandemic, and the estimated decline in the population, the expected density in the action area would be 0.002-sunflower sea star per m^2. Using this figure and multiplying it by the total area of 58.436 m^2 benthic disturbance, results in 0.12 sunflower sea star impacted. Less than one sea star or 0.547 sunflower sea stars would be likely to be impacted in the 13.68 m^2 affected in the Moorings Seward project area when using the estimated 0.04 m^2 density standard used when no site-specific survey is available. Therefore, NMFS believes that it would be highly unlikely for there to be any adverse effects to sunflower sea stars within the two action areas where disturbance due to pile driving would occur (See Lowry et al. 2022). In addition, a survey of the shutdown zone will be performed prior to the start of activity. If sunflower sea stars are found during the survey, all work will halt until the sea star can be gently relocated thereby further decreasing the chances of a pile landing on a sunflower sea star.

6.1.1.6 Effect of Sound on Sunflower Sea Stars

While there is a paucity of literature on the effects of loud underwater sounds on sunflower sea stars, there are a few studies that look at the effects of loud sounds on other echinoderms. We do not know whether sunflower sea stars possess underwater vibration receptors that could be affected by loud sounds. However, we do know that they possess no gas bladder, as most fish do. With no gas bladder, the number of ways a sunflower sea star could be affected by pile removal/driving and DTH sound is limited. The consensus of the available studies is that continuous loud sound exposure (>140 dB) can cause echinoderms such as sea urchins to have increased levels of stress related hormones (Vazzana et al. 2020, Solé et al. 2023). However, there is no information about whether the increase in these hormones have any impact on the behavior or survival of echinoderms. Furthermore, there are currently no studies that suggest sea stars, or more specifically sunflower sea stars, have this response. Therefore, we conclude that, based on the best available information that we have, adverse effects of acoustic disturbance from pile removal and installation activities on sunflower sea stars will be very minor, if there are any effects at all.

6.1.2 Major Stressors on ESA-Listed and Proposed Species

The following sections analyze the stressors likely to adversely affect ESA-listed and proposed species due to direct pile contact, direct human contact, and underwater anthropogenic sound. A brief explanation of the sound measurements and acoustic thresholds used in the discussions of acoustic effects in this opinion is provided.

6.1.2.1 Major Stressors on Sunflower Sea Stars

Activities impacting the benthic environment due to pile driving and removal may interact with sunflower sea stars on the sea floor or on the pilings that will be removed. Pilings could potentially come in contact with sea stars, or sunflower sea stars could be brought to the surface on pilings when they are removed from the water. In addition, marine invertebrates such as mussels and barnacles have likely settled and grown on the pilings that will be removed as part of the action description. These are prey items for sunflower sea stars, and it is possible that a few individual sea stars will be attracted onto the pilings prior to the pilings' removal. 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.

Direct Human Contact

The USCG will be conducting scans for the presence of sunflower sea stars on the pilings that are to be removed. If a sea star is found, it will be carefully removed, relocated to an area outside of the active work zone, and reported as outlined in the mitigation measures.

Table 7. Summary of Surface Area/Pile to be removed from Moorings Seward and Moorings Sitka.

Number of Piles	Diameter (in)	Surface Area/Pile (ft^2)	Surface Area/pile (m^2)	Total Surface Area (ft^2)	Total Surface Area (m^2)
Moorings Seward					
10	14	91.58	8.51	915.83	85.10
				Total	**85.10**
Moorings Sitka					
6	14	109.90	10.21	659.40	61.26
4	24	188.50	17.51	753.98	70.04
				Total	**131.30**

If we again assume a sea star density of 0.04 /m^2, for the Moorings Seward project site and calculate the surface area of the ten piles that will be removed we can calculate how many sea stars may be handled. To calculate the number of sunflower sea stars that may be affected by direct human contact at Moorings Seward, we multiplied the sea star density (0.04/ m^2) by the surface area of the ten piles (85.10 m^2) to get three sea stars that could be affected by direct human contact as they are removed from the piles prior to pile removal. For Moorings Sitka, we multiplied the reported sea star density (0.002/m^2) by the surface area of the ten piles (131.30 m^2) to get less than one sea star or 0.263 sea star that could be affected by direct human contact as they are removed from the piles prior to pile removal. Therefore, NMFS believes that it would be highly unlikely for there to be any adverse effects to sunflower sea stars within the Mooring Sitka project site by removing the ten piles as we think less than one sunflower sea star is likely to be present. However, three sea stars could be affected by direct human contact and relocation as they are removed from the piles at the Moorings Seward project site.

The maximum number of sea stars that could be affected by relocation efforts off of the pilings is a conservative estimate, as the area to be surveyed is likely smaller than the calculated surface area because tidal fluctuations will impact how much habitat (i.e., vertical piling) is available for sea stars at a given time and if the project activities are likely to occur during lower water levels. Sunflower sea stars are habitat generalists that tend to occupy low intertidal and subtidal zones, and are common at depths less than 25 m. The surface area to be surveyed for sea star removal is 85.10 m^2 at Moorings Seward, and 131.0 m^2 at Moorings Sitka, these account for relatively small amounts of the total habitat available for the species in Alaska's waters. Additionally, removal of sea stars from the pilings is expected to cause minor harm and not cause fatality to the individuals while helping to conserve the species. Sunflower sea stars are fairly tolerant to handling, but handling/moving them can be a major stressor if done incorrectly. If a sunflower sea star is attached to a pile being removed from the water, the sunflower sea star will be gently removed from the pile by the Lead PSO, and released into an intertidal location, submerged in seawater, outside of the disturbed area such that harm or injury cannot occur.

Immediate responses to handling include reduced appetite and high movement/activity. Holding periods for longer than 60 minutes require monitoring of water quality (temperature, salinity, airflow). The use of a cooler with an aerator/bubbler, water pump/overflow (seawater only), ice packs, and frequent water changes is required for holding periods longer than 60 minutes.

Although care will be taken to reduce these affects, injury to the sea stars could occur during attempts to move sea stars out of the construction area or during a temporary hold of sea stars while awaiting an opportunity to move.

Relocation will introduce some stress for sea stars and may also expose them to a greater predation risk as they move to find shelter and attach to the substrate. 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 fill placement and pile driving activities. The amount of area from which sea stars will be removed is small compared to their total available habitat and limited impacts are expected on individuals.

6.1.2.2 Acoustic Thresholds for Marine Mammals

Since 1997, NMFS has used generic sound exposure thresholds to determine whether an activity produces underwater and in-air sounds that might result in impacts to marine mammals (70 FR 1871, 1872; January 11, 2005). NMFS has developed comprehensive guidance on sound levels likely to cause injury to marine mammals through onset of permanent and temporary thresholds shifts (83 FR 28824; June 21, 2018; 81 FR 51693; August 4, 2016). NMFS is in the process of developing guidance for behavioral disruption (Level B harassment). However, until such guidance is available, NMFS uses the following conservative thresholds of underwater sound pressure levels,[13] expressed in root mean square[14] (rms), from broadband sounds that cause behavioral disturbance, and referred to as Level B harassment under section 3(18)(A)(ii) of the Marine Mammal Protection Act (MMPA) (16 U.S.C § 1362(18)(A)(ii)):

- impulsive sound: 160 dB_{rms} re 1 μPa
- non-impulsive sound: 120 dB_{rms} re 1μPa

Under the Auditory Injury (AUD INJ)/TTS Technical Guidance, NMFS uses the following thresholds (Table 8) for underwater sounds that cause injury, referred to as Level A harassment under section 3(18)(A)(i) of the MMPA (16 U.S.C § 1362(18)(A)(i)) (NMFS 2024). Different

[13] Sound pressure is the sound force per unit micropascals (μPa), where 1 pascal (Pa) is the pressure resulting from a force of one newton exerted over an area of one square meter. Sound pressure level is expressed as the ratio of a measured sound pressure and a reference level. The commonly used reference pressure level in acoustics is 1 μPa, and the units for underwater sound pressure levels are decibels (dB) re 1 μPa.

[14] Root mean square (rms) is the square root of the arithmetic average of the squared instantaneous pressure values.

thresholds and auditory weighting functions are provided for different marine mammal hearing groups, which are defined in the Technical Guidance (NMFS 2024). The generalized hearing range for each hearing group is in Table 9.

These acoustic thresholds are presented using dual metrics of cumulative sound exposure level (L_E) and peak sound level (PK) for impulsive sounds and L_E for non-impulsive sounds. Level A harassment radii can be calculated using the optional user spreadsheet[15] associated with NMFS Acoustic Guidance or through modeling.

Table 8. Acoustic Thresholds for Level A Harassment (NMFS 2024).

	AUD INJ Onset Criteria* (Received Level)	
Hearing Group	**Impulsive**	**Non-impulsive**
Low-Frequency (LF) Cetaceans	$L_{p,\text{0-pk,flat}}$: 222 dB $L_{E,p,\text{ LF,24h}}$: 183 dB	$L_{E,p,\text{ LF,24h}}$: 197 dB
High-Frequency (HF) Cetaceans	$L_{p,\text{0-pk,flat}}$: 230 dB $L_{E,p,\text{ HF,24h}}$: 193 dB	$L_{E,p,\text{ HF,24h}}$: 201 dB
Very High-Frequency (VHF) Cetaceans	$L_{p,\text{0-pk,flat}}$: 202 dB $L_{E,p,\text{VHF,24h}}$: 159 dB	$L_{E,p,\text{ VHF,24h}}$: 181 dB
Phocid Pinnipeds (PW)	$L_{p,\text{0-pk.flat}}$: 223 dB $L_{E,p,\text{PW,24h}}$: 183 dB	$L_{E,p,\text{PW,24h}}$: 195 dB
Otariid Pinnipeds (OW)	$L_{p,\text{0-pk,flat}}$: 230 dB $L_{E,p,\text{OW,24h}}$: 185 dB	$L_{E,p,\text{OW,24h}}$: 199 dB

[15] The Optional User Spreadsheet can be downloaded from the following website: http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm

Table 9. Underwater marine mammal hearing groups (NMFS 2024).

Hearing Group^	ESA-listed Marine Mammals in the Project Area	Generalized Hearing Range*
Low-frequency (LF) cetaceans *(Baleen whales)*	Humpback whales Fin whales	7 Hz to 36+ kHz
High-frequency (HF) cetaceans *(dolphins, toothed whales, beaked whales)*	none	150 Hz to 160 kHz
Very High-frequency (VHF) cetaceans *(true porpoises)*	none	200 Hz to 165 kHz
Phocid pinnipeds (PW) *(true seals)*	none	40 Hz to 90 kHz
Otariid pinnipeds (OW) *(sea lions and fur seals)*	Steller sea lion	60 Hz to 68 kHz

^ Southall et al. 2019 indicates that as more data become available there may be separate hearing group designations for Very Low-Frequency cetaceans (blue, fin, right, and bowhead whales) and Mid-Frequency cetaceans (sperm, killer, and beaked whales). However, at this point, all baleen whales are part of the LF cetacean hearing group, and sperm, killer, and beaked whales are part of the HF cetacean hearing group. Additionally, recent data indicate that as more data become available for Monachinae seals, separate hearing group designations maybe appropriate for the two phocid subfamilies (Ruscher et al. 2021; Sills et al. 2021)

***** Represents the generalized hearing range for the entire group as a composite (i.e., all species within the group), where individual species' hearing ranges may not be as broad. Generalized hearing range chosen based on ~65 dB threshold from composite audiogram, previous analysis in NMFS 2018, and/or data from Southall et al. 2007; **Southall** et al. 2019. Additionally, animals can detect very loud sounds above and below that generalized hearing range.

+ NMFS is aware that the National Marine Mammal Foundation successfully collected preliminary hearing data on two minke whales during their third field season (2023) in Norway. These data have implications for not only the generalized hearing range for low-frequency cetaceans but also on their weighting function. However, at this time, no official results have been published. Furthermore, a fourth field season (2024) is proposed, where more data will likely be collected. Thus, it is premature for us to propose any changes to our current Updated Technical Guidance. However, mysticete hearing data is identified as a special circumstance that could merit re-evaluating the acoustic criteria in this document. Therefore, we anticipate that once the data from both field seasons are published, it will likely necessitate updating this document (i.e., likely after the data gathered in the summer 2024 field season and associated analysis are published).

The MMPA defines "harassment" as any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or, (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]" (16 U.S.C. § 1362(18)(A)).

While the ESA does not define "harass", NMFS issued guidance interpreting the term "harass" under the ESA as: to "create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering" (Wieting 2016). Exposure to sound capable of causing Level A or Level B harassment under the MMPA often, but not always, constitutes take under the ESA.

For the purposes of this consultation, we have determined that pile installation and DTH drilling procedures have sound source levels capable of causing take under the MMPA and ESA.

As described below, we anticipate that exposures to listed marine mammals from noise associated with the proposed action may result in disturbance. However, no mortalities or permanent impairment to hearing is anticipated.

6.2 Exposure Analysis

As discussed in the *Approach to the Assessment* section of this opinion, exposure analyses are designed to identify the listed and proposed species that are likely to co-occur with these effects in space and time and the nature of that co-occurrence. In this step of our analysis, we try to identify the number, age (or life stage), and gender of the individuals that are likely to be exposed to an action's effects and the populations or subpopulations those individuals represent

As discussed in Sections 2.1.2 and 2.1.3 above, the USCG and NMFS Permits Division proposed mitigation measures that should avoid or minimize exposure of WDPS Steller sea lions, Mexico DPS and WNP DPS humpback whales, fin whales, and sunflower sea stars to one or more stressors from the proposed action.

6.2.1 Ensonified Area

This section describes the operational and environmental parameters of each construction activity that allow NMFS to estimate the area ensonified above the acoustic thresholds, based on only a single construction activity occurring at a time, as proposed by the USCG.

The sound field in the action area is the existing background sound plus additional construction sound from the proposed project. Marine mammals may be affected via sound generated by the primary components of the project (i.e., vibratory pile removal/installation and DTH pile installation). NMFS used acoustic monitoring data from other locations to develop the source levels used to calculate distances to the Level B thresholds for different sizes of piles and removal/installation methods. The calculated distance to the farthest Level B harassment isopleth is approximately 39,815 m (24.7 mi) at Moorings Seward and 39,815 m (24.7 mi) at Moorings Sitka. Each site has land features that truncate the sound spreading. The values used and the source from which they were derived are summarized in the following tables (Table 10, Table 11, Table 12, and Table 13).

Table 10. Potential Non-impulsive Noise-Generating Proposed Project Activities and Associated Noise Levels Likely to Occur at Moorings Seward.

Non-Impulsive Noise Activity	RMS SPL (dB re 1 µPa)	Average duration per pile (seconds)	Piles per day
Vibratory Pile Extraction – 14-inch steel guide pile	160.0	1,800	5
Vibratory Pile Setting -30-inch concrete guide pile	163.0	600	2
DTH Pile Driving – up to 30-inch concrete piles	174.0	10,800	2
Pile Clipping (24-inch clipper)	161.2	622	5
Diamond Wire Sawing (66-inch round single wire saw)	161.5	930	5

Table 11. Potential Impulsive Noise-Generating Proposed Activities and Associated Noise Levels Likely to Occur at Moorings Seward.

Impulsive Noise Activity	RMS SPL (dB re 1 µPa) at 10m	Maximum strikes per pile	Piles per day
Impact hammer proofing – 30-inch concrete guide pile	186	5	2
DTH Pile Driving – up to 30-inch concrete piles	174.0	108,000	2

Table 12. Potential Non-impulsive Noise Generating Proposed Project Activities and Associated Noise Levels Likely to Occur at Moorings Sitka.

Non-Impulsive Noise Activity	RMS SPL (dB re 1 µPa)	Average duration per pile (seconds)	Piles per day
Vibratory Pile Extraction – 12-inch timber pile	162.0	1,800	5
Vibratory Pile Setting -30-inch concrete guide pile	163.0	600	2
DTH Pile Driving – up to 30-inch concrete piles	174.0	10,800	2
Pile Clipping (24-inch clipper)	161.2	622	5
Diamond Wire Sawing (66-inch round single wire saw)	161.5	930	5

Table 13. Potential Impulsive Noise-Generating Proposed Activities and Associated Noise Levels Likely to Occur at Moorings Sitka.

Impulsive Noise Activity	RMS SPL (dB re 1 µPa) at 10m	Maximum strikes per pile	Piles per day
Impact drive – 13-inch plastic fender pile	153	100	2
Impact drive – 14-inch timber guide pile	170	160	2
Impact hammer proofing – 30-inch concrete guide pile	186	5	2
DTH Pile Driving – up to 30-inch concrete piles	174.0	108,000	2

Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic sound exposure is also informed to varying degrees by other factors related to the source (e.g., frequency, predictability, duty cycle), the environment (e.g., bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall et al. 2007, Ellison et al. 2012). Based on the available science and the practical need to use a threshold that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic sound above received levels of 120 dB re 1 µPa rms for continuous or non-impulsive sources (e.g., vibratory pile-driving and DTH) and above 160 dB re 1 µPa rms for non-explosive impulsive (e.g., DTH) or intermittent sources.

6.2.1.1 Summary of Ensonified Areas

The methods and sound source levels described above were used to calculate the ensonified areas associated with each activity of the proposed action, which are shown in (Figure 17, Figure 18, Figure 19, and Figure 20) and were based on the previous Technical Guidance document used by the applicant.

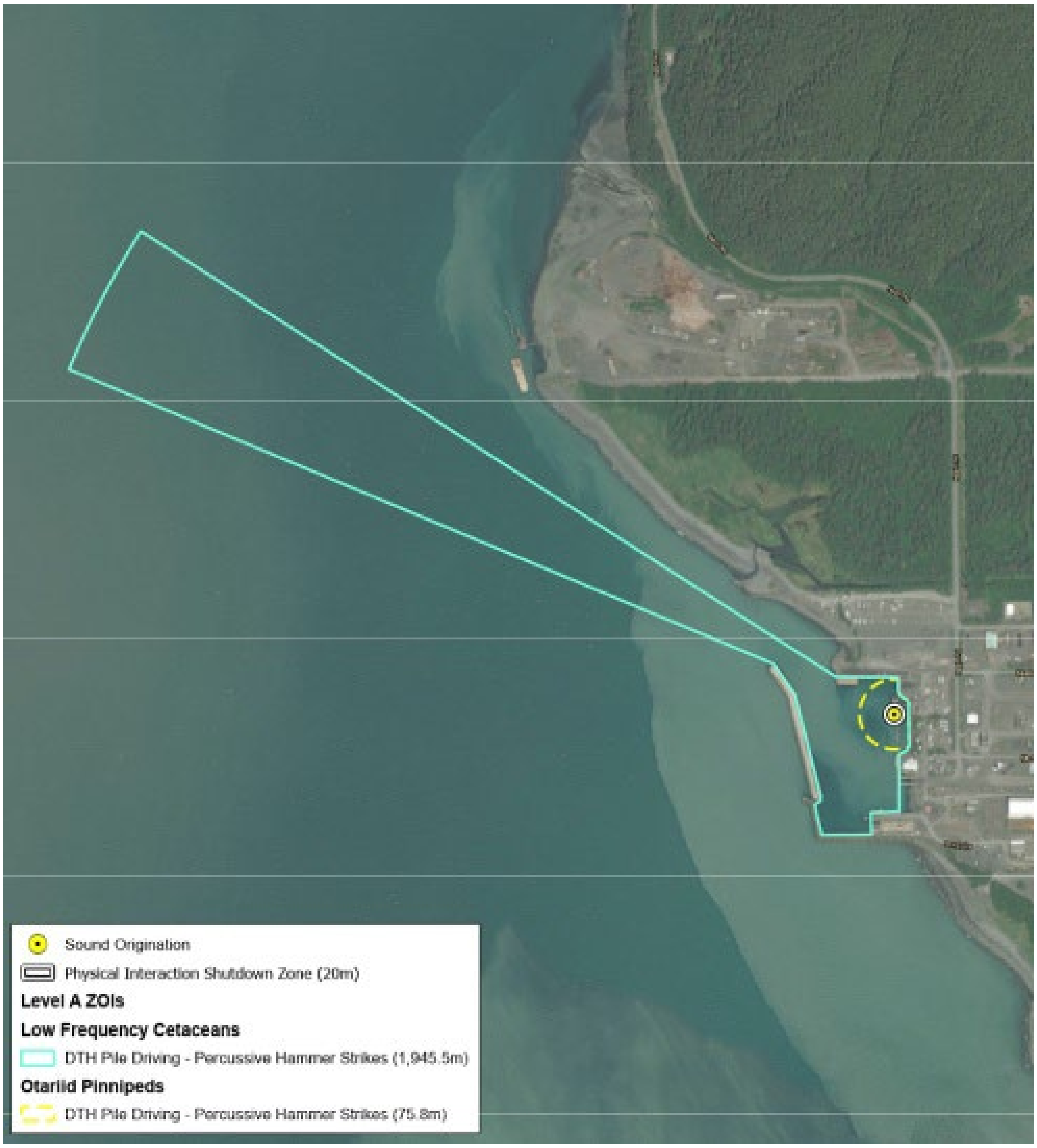

Figure 17. Level A Shutdown Zones based on activity at Moorings Seward (WSP 2024).

Figure 18. Level A Shutdown Zones Based on Activity at Moorings Sitka, Alaska (WSP 2024).

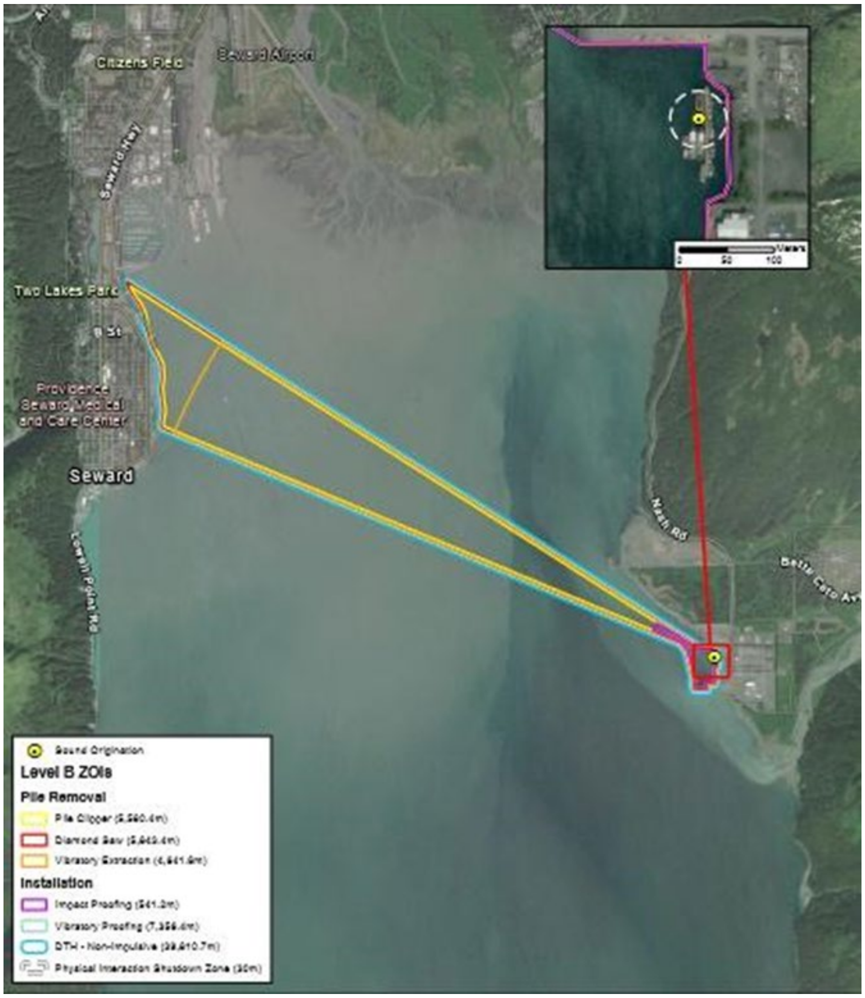

Figure 19. Level B Zones at Moorings Seward, Alaska (WSP 2024).

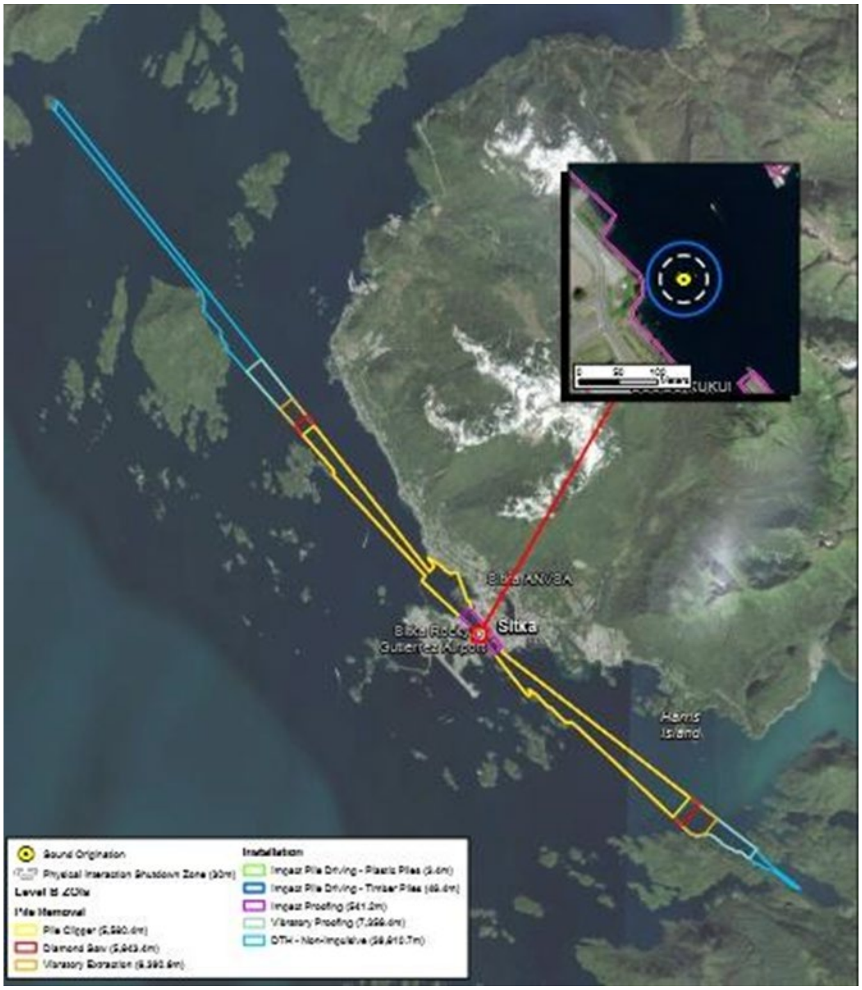

Figure 20. Level B Zones at Moorings Sitka, Alaska (WSP 2024).

The USCG's proposed dock replacement activities include the use of continuous and impulsive sources, and therefore the 120 and 160 dB re 1 μPa rms thresholds for Level B behavioral harassment are applicable. When site-specific transmission loss measurements are not available, the recommended TL coefficient for most nearshore environments is the default practical spreading value of 15. This value results in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions, which is the most appropriate assumption for The USCG's proposed activities. The default 15 spreading value was used in calculating transmission loss.

DTH pile installation includes drilling (non-impulsive sound) and hammering (impulsive sound) to penetrate rocky substrates (Denes et al. 2016, Denes et al. 2019, Reyff and Heyvaert 2019). DTH pile installation was initially thought to be a non-impulsive sound source. However, Denes et al. (2019) concluded from their study at Thimble Shoal, VA, that DTH should be characterized as impulsive based on a >3 dB difference in sound pressure level in a 0.035-second window (Southall et al. 2007) compared to a 1-second window. Thus, impulsive thresholds are used to evaluate Level A harassment, and continuous thresholds are used to evaluate Level B harassment. Vibratory pile driving will occur as well, but it will have a smaller continuous threshold than DTH.

Summary of Ensonified Areas

The methods and sound source levels describe above were used to calculate the ensonified areas associated with each activity of the proposed action, which are described below in Table 14 for Moorings Seward and in Table 15 for Moorings Sitka.

Table 14. Level A and Level B harassment isopleths from DTH and pile driving activities for Moorings Seward.

Sound Source	Level A harassment isopleths (m)			Level B harassment isopleths (m)
	Low-frequency cetaceans	Mid-frequency cetaceans	Otariids	
Vibratory pile extraction	30	30	30	4,645
DTH (impulsive component) concrete pile	1,955	85	85	39,815
Vibratory concrete pile settling	30	30	30	7,360
Impact drive concrete pile proofing	30	30	30	545

Table 15. Level A and Level B harassment isopleths from DTH and pile driving activities for Moorings Sitka.

Sound Source	Level A harassment isopleths (m)			Level B harassment isopleths (m)
	Low-frequency cetaceans	Mid-frequency cetaceans	Otariids	
Vibratory pile extraction	30	30	30	6,310
Impact drive plastic pile	30	30	30	5

Sound Source	Level A harassment isopleths (m)			Level B harassment isopleths (m)
	Low-frequency cetaceans	Mid-frequency cetaceans	Otariids	
Impact drive timber pile	30	30	30	50
DTH (impulsive component) concrete pile	1,955	85	85	39,815
Vibratory concrete pile settling	30	30	30	7,360
Impact drive concrete pile proofing	30	30	30	545

6.2.2 Marine Mammal Occurrence and Exposure Estimates

In this section we provide the information about the presence, density, or group dynamics of WDPS Steller sea lions, humpback and fin whales that informed the exposure estimate calculations. Sunflower sea stars are not expected to be impacted by these sound sources (see Section 6.3.1.5), so exposure estimates for sea stars are not included in this section.

For our calculations, we used either density data (humpback whale, fin whale) or occurrence data (Steller sea lions). Occurrence data were based mostly on marine mammal monitoring reports from previous projects or studies that had been conducted in the same area. The metrics used and their sources are described in Table 16. The following outlines the best available information about the occurrence of marine mammals used to calculate exposure estimates.

Table 16. Density and occurrence data used for exposure estimates.

Species	**Occurrence**	
	Moorings Seward	**Moorings Sitka**
WDPS Steller Sea Lions	2 (individuals/day)	2 groups of 2 individuals/day
Humpback Whales	1 individual/day of either DPS	1 group of 3.4 individuals/ week of either DPS
Fin Whales	0.068 individuals/ km2	0.0001 individuals/ km2

As described in Section 4.3.1., an estimated 11 percent of humpback whales in the Gulf of Alaska are from the Mexico DPS and less than one percent are from the Western North Pacific DPS (Wade 2021). Based on a comprehensive photo-identification study, members of the Mexico DPS have a small potential to occur in both project locations (11 percent at Moorings Seward, two percent at Moorings Sitka) and it is estimated that one individual per day of either DPS may occur at Moorings Seward while one group of 3.4 individuals per week of either DPS may occur at Moorings Sitka. Exposure estimates of humpback whales based on the sum of exposure estimates from all activities were multiplied by 11 percent to determine the number of Mexico and Western North Pacific DPS humpback whales that would be exposed to Level B harassment for Moorings Seward and multiplied by two percent for Moorings Sitka. Steller sea lions in the action area are presumed to be from the WDPS. See Table 17 for calculated exposure estimates.

Table 17. Proposed Take of Marine Mammals by Level A and Level B Harassment at Moorings Seward and Moorings Sitka.

	Exposure Estimate at Moorings Seward		**Exposure Estimate at Moorings Sitka**	
Species	Level A	Level B	Level A	Level B
Western DPS Steller sea lion (*Eumetopias jubatus*)	10	34	2	6
Mexico/Western North Pacific DPS Humpback whale (*Megaptera novaeangliae*)	0	2	0	1
Fin Whale (*Balaenoptera physalus*)	0	3	0	0

No take by Level A harassment of humpback whales or fin whales is proposed for authorization or expected to occur due to their large size and ability to be visibly detected in the project area if whales should approach the Level A harassment zone.

Western DPS Steller Sea Lion

Commensurate with the calculated exposure estimate shown in Table 17, NMFS expects that 10 Western DPS Steller sea lions could be exposed to Level A harassment from noise generated by DTH drilling at Moorings Seward and two at Moorings Sitka. In addition, NMFS expects that 34 Western DPS Steller sea lions could be exposed to Level B harassment from noise generated by DTH drilling at Moorings Seward and six at Moorings Sitka. Here we assume that if an animal is present in the ensonified area, it will be exposed to acoustic harassment, acknowledging that not all animals within the action area will be equally exposed to the same intensity.

Mexico and WNP DPS Humpback Whale

While humpback whales are found near the action area, few are expected to be within the ensonified areas. NMFS expects that two humpback whales (Moorings Seward) and one humpback whale (Moorings Sitka) could be exposed to Level B harassment from noise generated by DTH drilling. Here we assume that if an animal is present in the ensonified area, it will be exposed to acoustic harassment, acknowledging that not all animals within the action area will be so exposed. In the project areas, 11 percent of humpback whales are expected to be from the ESA-listed Mexico DPS and one percent are expected to be from the ESA-listed WNP DPS (Wade 2021). Because humpbacks that may be present in the action areas come from mixed populations, and those populations are unable to be differentiated in the field during surveys, estimates are based on the total number of humpback whales that may be exposed to behavioral harassment. Therefore, NMFS expects that the individuals from the Mexico *or* the WNP DPS may be exposed to Level B harassment from noise generated by DTH drilling.

Fin Whale

Fin whales are rarely observed, but when they are seen, they are most often observed traveling alone or in pairs. Occasionally, a group of individuals are recorded. NMFS expects that three fin whales based on the mean group size could be exposed to Level B harassment from noise generated by DTH drilling at Moorings Seward. Here we assume that if an animal is present in the ensonified area, it will be exposed to acoustic harassment, acknowledging that not all animals within the action area will be equally exposed to the same intensity. No fin whales are expected to be exposed to Level B harassment from noise generated by DTH drilling at Moorings Sitka.

6.3 Response Analysis

As discussed in the *Approach to the Assessment* section of this opinion, response analyses determine how listed species/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. Our response analyses consider and weigh evidence of adverse consequences, beneficial consequences, or the absence of such consequences.

Loud underwater noise can result in physical effects on the marine environment that can affect marine organisms. Possible responses by Western DPS Steller sea lions, Mexico and WNP DPS humpback whales, and fin whales to the impulsive and continuous sound produced by pile removal and installation activities are:

- Physical Response
  - Auditory threshold shifts (or hearing loss)
  - Non-auditory physiological effects

- Behavioral responses
  - Auditory interference (masking)
  - Tolerance, habituation, or sensitization
  - Change in dive, respiration, or feeding behavior
  - Change in vocalizations
  - Avoidance or displacement
  - Vigilance
  - Startle or fleeing/flight

6.3.1 Responses to Major Sound Sources (Pile Removal/Installation Activities)

As described in the Exposure Analysis, WDPS Steller sea lions, Mexico DPS and WNP DPS humpback whales, and fin whales are anticipated to occur in the action areas and are anticipated to overlap with sound associated with pile removal and installation. We assume that some individuals are likely to be exposed and respond to these continuous and impulsive sound sources.

With proper implementation of the BMPs and mitigation measures and shutdown procedures described in Sections 2.1.2 and 2.1.3, we do not expect that any humpback or fin whales will be exposed to sound levels loud enough, long enough, or at distances close enough for the proposed actions to cause Level A exposures. All Level B instances of take are expected to occur at received levels greater than 120 dB and 160 dB for non-impulsive and impulsive sound sources, respectively. However, we do expect that Steller sea lions will be exposed to sound levels loud enough, long enough, or at distances close enough for the proposed actions to cause Level A exposures at Moorings Seward and Moorings Sitka.

The introduction of anthropogenic sound into the aquatic environment from pile removal/driving and DTH activities are the primary means by which marine mammals may be harassed from project activities covered in this opinion. In general, animals exposed to natural or anthropogenic sound may experience physical and physiological effects, ranging in magnitude from none to severe (Southall et al. 2007). Exposure to anthropogenic sound can also lead to non-observable physiological responses such as an increase in stress hormones. Additional sound in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions such as communication and predator and prey detection.

Exposure to pile removal/driving and DTH sound has the potential to result in auditory threshold shifts and behavioral reactions (e.g., avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). The effects of pile removal/driving and DTH sound on marine mammals are dependent on several factors, including, but not limited to, sound type (e.g., impulsive vs. non-impulsive), the species, age and sex class (e.g., adult male vs. cow with calf), duration of exposure, the distance between the pile and the animal, received levels, behavior at time of exposure, and previous history with exposure (Wartzok et al. 2003, Southall et al. 2007).

6.3.1.1 Threshold Shifts

NMFS defines a noise-induced threshold shift (TS) as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS 2018). In other words, a threshold shift is a hearing impairment, and may be temporary (such as ringing in your ears after a loud rock concert) or permanent (such as the loss of the ability to hear certain frequencies or partial or complete deafness). There are numerous factors to consider when examining the consequence of TS, including: the signal's temporal pattern (e.g., impulsive or non-impulsive); likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS; the magnitude of the TS; time to recovery; the frequency range of the exposure (i.e., spectral content); the hearing and vocalization frequency range of the exposed species relative to the signal's frequency spectrum (i.e., how an animal uses sound within the frequency band of the signal; Kastelein et al. 2014); and, the overlap between the animal and the sound (e.g., spatial, temporal, and spectral; NMFS 2018). The amount of threshold shift is customarily expressed in dB.

6.3.1.1.1 Temporary Threshold Shift

Temporary threshold shift (TTS) is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter 1970). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends. Few data exist on the sound levels and durations necessary to elicit mild TTS in marine mammals, and none of the published data describe TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in (Southall et al. 2007).

Although some exposures to sound capable of causing harassment may occur during the course of the proposed actions, with behavioral impacts resulting in avoidance and required monitoring and shutdown zones, TTS is considered extremely unlikely to occur.

6.3.1.1.2 Auditory Injury (formerly called Permanent Threshold Shift)

When auditory injury (AUD INJ) occurs, there is physical damage to the sound receptors in the ear. The animal will have an impaired ability to hear sounds in specific frequency ranges, and there can be total or partial deafness in severe cases (Kryter 1985). There is no specific evidence that exposure to pulses of sound can cause AUD INJ in any marine mammal. However, given the possibility that mammals close to a sound source can incur TTS, it is possible that some individuals will incur AUD INJ. Single or occasional occurrences of mild TTS are not indicative of permanent auditory damage, but repeated or (in some cases) single exposures to a level well above that causing the onset of TTS might elicit AUD INJ.

Relationships between TTS and AUD INJ thresholds have not been studied in marine mammals but are assumed to be similar to those in humans and other terrestrial mammals, based on anatomical similarities. AUD INJ might occur at a received sound level at least several decibels above that which induces mild TTS, if the animal were exposed to strong sound pulses with rapid rise time. For non-impulsive exposures, a variety of terrestrial and marine mammal data sources indicate that threshold shift up to 40 to 50 dB may be induced without AUD INJ, and that 40 dB is a conservative upper limit for threshold shift to prevent AUD INJ. An exposure causing 40 dB of TTS is, therefore, considered equivalent to AUD INJ onset (NMFS 2018).

Level A (AUD INJ onset) harassment would only potentially result from DTH rock socket drilling activities that would generate underwater noise in exceedance of Level A harassment thresholds for all marine mammal hearing groups beyond the 30-m shutdown zone that will be implemented for all in-water activities. Therefore, larger shutdown zones will be implemented during DTH activities and at least two additional PSOs will be assigned to a captained vessel at one or more monitoring locations that provide full views of the shutdown zones and as much of the monitoring zones as possible. For the proposed actions at Moorings Seward and Moorings Sitka, no exposures are expected at levels resulting in AUD INJ due to estimates of Level A isopleths and mitigation measures to shut down pile driving activities if a humpback whale or Steller sea lion approaches a Level A zone.

6.3.1.1.3 Non-auditory Physiological Effects

Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, internal bubble formation, resonance effects, and other types of organ or tissue damage (Cox et al. 2006; Southall et al. 2007). Studies examining such effects are limited. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall et al. 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. Marine mammals that show behavioral avoidance of strong underwater sounds are especially unlikely to incur auditory impairment or non-auditory physical effects.

An animal’s perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (Moberg 2000). In many cases, an animal’s first, and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal’s fitness.

The primary distinction between stress, which is adaptive and does not normally place an animal at risk, and "distress" is the cost of the response. During a stress response, an animal uses glycogen stores that can be quickly replenished once the stress is alleviated. In such circumstances, the cost of the stress response would not pose serious fitness consequences. However, when an animal does not have sufficient energy reserves to satisfy the energetic costs of a stress response, energy resources must be diverted from other functions. This state of distress will last until the animal replenishes its energetic reserves sufficient to restore normal function.

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (Jessop et al. 2003; Lankford et al. 2005; Crespi et al. 2013). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker 2000; Romano et al. 2002) and, more rarely, studied in wild populations (Romano et al. 2002). For example, noise reduction from reduced ship traffic in the Bay of Fundy following September 11, 2001 was linked to a significant decline in fecal stress hormones in North Atlantic right whales, suggesting that chronic exposure to increased noise levels, although not acutely injurious, can produce stress (Rolland et al. 2012). These stress hormones returned to their previous level within 24 hours after the resumption of shipping traffic. Exposure to loud noise can also adversely affect reproductive and metabolic physiology (Kight and Swaddle 2011). In a variety of factors, including behavioral and physiological responses, females appear to be more sensitive or respond more strongly than males (Kight and Swaddle 2011).

These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as "distress". In addition, any animal experiencing TTS would likely also experience stress responses (NRC 2003).

The proposed action may result in ESA-listed species experiencing stress responses. However, the estimated 22 days of in-water activities at Moorings Seward and the estimated 117 days at Moorings Sitka will be non-consecutive and only during daylight hours, thus limiting the potential for chronic stress. Steller sea lions, humpback whales, and fin whales that show behavioral avoidance of pile removal/driving and DTH are especially unlikely to incur auditory impairment or non-auditory physical effects, like stress and distress, because they will be further limiting the duration of their exposure. If listed marine mammals are not displaced and remain in the stressful environment (within the behavioral shutdown zone), we expect the stress response will dissipate shortly after the individual leaves the area or after the cessation of the acoustic stressor.

6.3.1.1.4 Behavioral Disturbance Reactions

Behavioral responses are influenced by an animal's assessment of whether a potential stressor poses a threat or risk. Behavioral responses may include: changing durations of surfacing and dives, number of blows per surfacing, or changing direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or, flight responses.

Disturbance includes a variety of effects, including subtle changes in behavior, more conspicuous changes in activities, and displacement. Behavioral responses to sound are highly variable and context-specific, and reactions, if any, depend on species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day, and many other factors (Southall et al. 2007).

Tolerance can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok et al. 2003). Animals are most likely to tolerate, and possibly habituate to, sounds that are predictable and unvarying. The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson et al. 1995; NRC 2003; Wartzok et al. 2003).

The biological significance of behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be biologically significant if the change affects growth, survival, or fitness. Significant behavioral modifications that could potentially lead to effects on growth, survival, or fitness include drastic changes in diving/surfacing patterns, longer-term habitat abandonment due to loss of desirable acoustic environment, longer-term cessation of feeding or social interaction, and cow/calf separation.

The onset of behavioral disturbance from anthropogenic sound depends on both external factors (characteristics of sound sources and their paths) and the specific characteristics of the receiving animals (hearing, motivation, experience, demography), and is difficult to predict (Southall et al. 2007).

6.3.1.1.5 Auditory Masking

Natural and artificial sounds can disrupt behavior by masking, or interfering with, a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. Chronic exposure to excessive, though not high-intensity, sound could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions. Masking can interfere with detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance or fitness in survival and reproduction. If the coincident masking sound were anthropogenic, it could be potentially harassing if it disrupted hearing-related behavior. It is important to distinguish TTS and AUD INJ, which persist after the sound exposure, from masking, which occurs only during the sound exposure. Because masking (without resulting in threshold shift) is not associated with abnormal physiological function, it is not considered a physiological effect, but may result in a behavioral effect.

Masking occurs at the frequency band the animal utilizes, so the frequency range of the potentially masking sound is important in determining any potential behavioral impacts. Lower frequency man-made sounds are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey sound. Anthropogenic sounds may also affect communication signals when both occur in the same sound band and thus reduce the communication space of animals (Clark et al. 2009; Eickmeier and Vallarta 2023), and cause increased stress levels (Foote et al. 2004; Holt et al. 2009).

Masking has the potential to affect species at the population or community levels, as well as at individual levels. Masking affects both senders and receivers of the signals and can potentially have long-term chronic effects on marine mammal species and populations. Research suggests that low frequency ambient sound levels have increased by as much as 20 dB (more than a three-fold increase in terms of SPL) in the world's ocean from pre-industrial periods, and that most of these increases are from distant shipping (Hildebrand 2009). All anthropogenic sound sources, such as those from project activities, contribute to the elevated ambient sound levels, thus intensifying masking.

Noise from pile removal/driving and DTH activities may mask acoustic signals important to humpback and fin whales. However, these activities will be intermittent and affect a limited area. Masking only exists for the duration of time that the masking sound is emitted and interfering with biologically important sounds; extended periods of time where masking could occur are not expected.

Masking is likely less of a concern for Steller sea lions, which vocalize both in air and water and do not echolocate or communicate with complex underwater “songs”. Any masking event that could harass sea lions would occur concurrently within the zones of behavioral harassment already estimated for and which have already been taken into account in the Exposure Analysis.

6.3.1.2 Changes in Dive, Respiration, Vocalizations, or Feeding Behavior

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (Lusseau and Bejder 2007). This highlights the importance of assessing the context of the acoustic effects alongside the estimated received levels. Severity of effects from a response to acoustic stimuli can likely vary based on the context in which the stimuli were received, particularly if it occurred during a biologically sensitive temporal or spatial point in the life history of the animal. There are broad categories of potential responses, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals, as well as changes in the rates of ascent and descent during a dive (Frankel and Clark 2000). Variations in dive behavior may reflect interruptions in biologically significant activities (e.g., foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (e.g., bubble nets or sediment plumes), or changes in dive behavior. As for other types of behavioral responses, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (Croll et al. 2001). A determination of whether foraging disruptions incur fitness consequences would require information or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Rates of respiration naturally vary with different behaviors, and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may indicate annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater sound when determining the potential for impacts resulting from anthropogenic sound exposure (Kastelein et al. 2000).

Based on this analysis, we expect Mexico and WNP DPS humpback whales, fin whales and WDPS Steller sea lions to continue foraging in the face of moderate levels of disturbance. For example, humpback whales, which only feed during part of the year and must satisfy their annual energetic needs during the foraging season, may continue foraging in the face of disturbance in the action area. Similarly, a humpback cow accompanied by her calf is less likely to flee or abandon an area at the cost of her calf’s survival. We also expect that these animals could resume foraging close by if the in-water sound associated with the proposed action causes them to avoid the action area. The proposed action is not expected to result in WDPS Steller sea lions moving to a different haulout but could cause them to temporarily move to different foraging areas near the action area. It is likely some change in dive, respiration, or feeding behavior of Mexico or WNP DPS humpback whales, fin whales and WDPS Steller sea lions may occur in the action area, but we do not expect much change in these behaviors. Any change in behavior that could rise to Level B harassment under the MMPA is included within the zones of behavioral harassment and has been taken into account in the exposure analysis. In addition, the in-water work season is structured at each site to avoid impacts to prey species (salmon smolts) that may attract marine mammals to the areas (See Section 2.1.2).

Prey for Steller sea lions, humpback whales, and fin whales could experience similar effects. Fish could experience behavioral impacts, causing them to move away from sound sources, and planktonic prey could be injured or destroyed by conductor pipe pile installation. However, we expect fish to move away from the sound source without impact to their survival, fitness, or reproductive success.

6.3.2 Response Analysis Summary

Marine Mammals

Probable responses of Steller sea lions, humpback whales, and fin whales to pile removal, installation, and DTH include TTS, increased stress, and/or short-term behavioral disturbance reactions such as changes in activity and vocalizations, masking, avoidance or displacement, or tolerance. The reactions and behavioral changes described above are expected to be temporary and subside quickly when the exposure ceases. The primary mechanism by which these behavioral changes may affect the fitness of individual animals is through the animals' energy budget, time budget, or both; the two are related because foraging requires time. Some animals may leave the area during project activities if they are disturbed, and alternative, high-quality habitat is located throughout the surrounding areas. The individual and cumulative energy costs of the behavioral responses we have discussed are not likely to reduce the energy budgets of Steller sea lions, humpback whales, and fin whales and their probable exposure to noise sources are not likely to reduce their fitness.

Sunflower Sea Stars

Sunflower sea star relocation will introduce some stress for sea stars and may also expose them to a greater predation risk as they move to find shelter and attach to the substrate. 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 fill placement and pile driving activities. In addition, it is unlikely that the project effects in this small, localized area of habitat would have any effect on each ESA-listed and proposed species ability to recover. The individual and cumulative energy costs of the behavioral responses we have discussed are not likely to increase the energy budgets of ESA-listed or proposed individuals, and their probable exposure to these stressors are not likely to reduce their fitness. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activities would have only minor, short-term effects on individuals. The specified activities are not expected to impact rates of recruitment or survival and would therefore not result in population-level impacts.

7 CUMULATIVE EFFECTS

"Cumulative effects" are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area (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 and those summarized below. Reasonably foreseeable future state, local, or private actions include vessel traffic and shipping, state fisheries, pollution, and tourism, and are discussed in the following sections.

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 Status of the Species and the Environmental Baseline sections.

7.1 Vessel Traffic, Tourism, and Transportation

The action areas for the proposed activities experiences moderate to heavy levels of marine vessel traffic year-round. Ice-free year-round, port and dock facilities in Seward are operational 365 days a year with a range of marine services and railroad systems, Marine vessels that use the action areas include cruise ships, passenger ferries, whale watching tour boats, charter and commercial fishing vessels, barges, freight vessels, recreational vessels, and kayaks. Seward has deep-water piers to support ferry, cargo, and cruise vessels. From 2018 to 2019, there was an 18 percent increase in the total number of cruise passengers to Alaskan ports (McDowell Group 2020a). Though cruises practically ceased in 2020 and into 2021 due to the pandemic, 2022 saw ~1.15 million cruise passengers came to Alaska, and 2023 saw ~1.65 million. Larger vessels and longer seasons have the potential to bring many more passengers to Seward, which could have effects on listed species.

Sitka has the second-highest number of commercial vessel port calls (approximately 1,800 in 2018) following Ketchikan in Alaska. CBS Harbor Department operates and maintains the following five boat harbors in the Sitka area: Crescent Harbor, Sealing Cove Harbor, ANB Harbor, Thomsen Harbor, and Eliason Harbor as well as the existing sea plane base (A29). Thomsen and Eliason Harbors are directly across Sitka Channel from the proposed project. Sitka is part of the Alaska Marine Highway with sailings multiple days a week and provides transit to numerous communities in Southeast Alaska, Washington state, and Canada. Marine vessels that use the action area include passenger ferries, commercial freight vessels/barges, commercial tank barges, cruise ships, commercial fishing boats, charter vessels, recreational vessels, kayaks, and floatplanes. Ongoing vessel activities in and around Sitka Channel, as well as land-based industrial and commercial activities, result in elevated in-air and underwater acoustic conditions in the action area. Background sound levels likely vary seasonally, with elevated levels during summer when the cruise ship, commercial, and fishing industries are at their peaks.

Many residents at either site maintain a subsistence and commercial fishing lifestyle. The action area experiences moderate levels of commercial fishing vessels and recreational marine vessel traffic during the summer season.

It is unknown whether overall vessel traffic or shipping will increase in the future, as this depends largely on economics, tourism, and other factors, but it is unlikely to decrease significantly. As a result, there will be continued risk to marine mammals of ship strikes, exposure to vessel sound and presence, and small spills. Vessel traffic, including shipping, is expected to continue in the two action areas. It is unknown whether overall vessel traffic or shipping will increase in the future, as this depends largely on population growth, economics, tourism, and other factors, but it is unlikely to decrease significantly. As a result, there will be continued risk to marine mammals of ship strikes, exposure to vessel noise and presence, and small spills.

7.2 Fisheries (State of Alaska Managed)

Fishing, a major industry in Alaska, is expected to continue near the Ports of Seward and Sitka and the USCG mooring facilities. As a result, there will be continued risk to marine mammals as a result of prey competition, ship strikes, harassment, and entanglement in fishing gear. For whales, there is also a risk of continued displacement from former summer foraging habitat due to human activity associated with salmon harvest (Ovitz 2019). It remains unknown whether and to what extent marine mammal prey may become less available due to commercial, subsistence, personal use, and sport fishing, especially near the mouths of streams that salmon and eulachon migrate up to spawning areas. Reduction in availability of prey due to activities such as fishing is considered to be a moderate threat to marine mammals (NMFS 2016).

7.3 Pollution

As the human population in urban areas around Seward and Sitka continues to grow, an increase in pollutants entering the surrounding waters is likely to occur. Hazardous materials are released from vessels, aircraft, and municipal runoff. Oil spills could occur from vessels traveling within the action area. In addition, oil spilled from outside the action area could migrate into the action area. There are many nonpoint sources of pollution within the action area. Pollutants can pass from streets, construction and industrial areas.

8 INTEGRATION AND SYNTHESIS

The Integration and Synthesis section is the final step of NMFS's assessment of the risk posed to species as a result of implementing the proposed action. In this section, we add the effects of the action (Section 6) to the environmental baseline (Section 5) and the cumulative effects (Section 7) to formulate the agency's biological 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 (Section 3).

As we discussed in the *Approach to the Assessment* section of this opinion, we begin our risk analyses 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 listed species to all the stressors associated with the proposed action, individually and cumulatively, 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.

8.1 Mexico/WNP DPS Humpback Whale and Fin Whale Risk Analysis

Based on the results of the exposure analysis, for Moorings Seward, we expect a maximum of two humpback whales from the Mexico or Western North Pacific DPSs and three fin whales may be exposed to Level B harassment associated with underwater sound from pile removal and installation activities. For Moorings Sitka, we expect a maximum of one humpback whale from the Mexico DPS and no fin whales to be exposed to Level B harassment associated with underwater sound from pile removal and installation activities.

Exposure to adverse effects from vessel disturbance and vessel sound are likely to be insignificant due to the limited amount and duration of vessel traffic expected to occur and the baseline amount of vessel sound present in the action area. Adverse effects from vessel strikes are considered extremely unlikely to occur because there will be very few project-specific vessels, these vessels will be traveling at very slow speeds, and there are existing regulations and mitigation measures regarding approaching whales that will be followed by vessel operators.

Disturbance to seafloor, habitat, and prey resources are not expected to adversely affect whales because these disturbances are temporary, and the action area is not important habitat to humpback or fin whales for migrating, breeding, or other essential life functions. The action areas of the proposed activities are in areas that are not necessarily preferable for foraging based on vessel traffic and bathymetry. Adherence to mitigation measures is expected to minimize the risk of exposure of humpback and fin whales to the potential introduction of pollutants into the action area.

The proposed activities may cause some individual whales to experience changes in their behavioral states; however, these responses are not likely to alter the physiology, behavioral ecology, and social dynamics of individual whales in ways or to a degree that would reduce their fitness. The most likely responses to noise from project activities include brief startle reactions or short-term behavioral modification. These reactions are expected to subside quickly when the exposure ceases. The primary mechanism by which behavioral changes affect the fitness of individual animals is through the animal's energy budget, time budget, or both. Large whales, such as fin and humpbacks, are able to acquire energy at high rates and store substantial amounts, which allows them to survive for months with minimal to no feeding during migration and while in their wintering areas. Additionally, in-water activities will only occur for a short duration and the calculated harassment thresholds are a small footprint in comparison to the available habitat. Humpback and fin whales may occur in the action area throughout all months of project activity; however, the area is only utilized occasionally and in small numbers by these species. The individual and cumulative energy costs of these potential behavioral responses are not likely to measurably increase energetic costs of humpback or fin whales, and their potential exposure to project-related noise is not likely to reduce their fitness.

As mentioned in the Environmental Baseline section, Mexico DPS humpback whales, Western North Pacific DPS humpback whales and fin whales may be impacted by a number of anthropogenic activities in the project areas. Increased human activity has produced a number of anthropogenic risk factors that marine mammals must contend with, including: coastal and marine development, oil and gas development, ship strikes, noise pollution, water pollution, prey reduction, and fisheries. These risk factors are in addition to those operating on a larger scale such as predation, disease, and climate change. These species 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.

Based on the best information currently available, the effects of the proposed action, when combined with the existing activities described in the environmental baseline section and the cumulative effect is not expected to appreciably reduce the likelihood of survival or recovery of Mexico DPS or Western North Pacific DPS humpback whales, or fin whales.

8.2 Western DPS Steller Sea Lion Risk Analysis

For Moorings Seward, based on the results of the exposure analysis, we expect that 11 WDPS Steller sea lions may be exposed to Level A harassment from underwater sound associated with pile removal and installation. Approximately 40 sea lions may also be exposed to Level B harassment from underwater sound associated with pile removal and installation. For Moorings Sitka, we expect that two WDPS Steller sea lions may be exposed to Level A harassment from underwater sound associated with pile removal and installation and seven may be exposed to Level B harassment from underwater sound associated with pile removal and installation. This estimate represents the maximum number of takes that may be expected to occur, but not necessarily the number of individuals taken, as a single individual may be taken multiple times over the course of the proposed action. Sound from pile removal and installation activities is likely to cause some individual Steller sea lions to experience changes in their behavioral states that might have adverse consequences (Frid and Dill 2002). However, these responses are not likely to alter the physiology, behavioral ecology, or social dynamics of individual Steller sea lions in ways or to a degree that would reduce their fitness.

Commercial fishing likely affects prey availability throughout much of the WDPS's range, and causes a small number of direct mortalities each year. Predation has been considered a threat to this DPS and may remain so in the future. Subsistence hunting occurs at low levels for this DPS. Illegal shooting is also a continuing threat, but the number of illegally shot sea lions found in the region to date is relatively low and has not precluded or measurably delayed recovery of the species.

Exposure to non-biodegradable marine debris, specifically to debris that can cause entanglement, remains an unquantifiable risk, but associated effects from this project will be immeasurably small. Best practices regarding waste management (cutting loops prior to disposal) will further reduce the impact of debris on Steller sea lions. Any increases in turbidity or seafloor disturbance will be temporary and localized, and have an immeasurably small effect, if any, upon Steller sea lions. Based on the localized nature of small oil spills, the relatively rapid weathering expected, and the safeguards in place to avoid and minimize oil spills, we conclude that the probability of the proposed action causing a small oil spill and exposing WDPS Steller sea lions is extremely small, and thus the effects are considered highly unlikely to occur.

Exposure to vessel noise and presence, seafloor disturbance and turbidity, and small oil spills may occur, but such exposure will have a very small impact, and we conclude that these stressors will not result in take of Steller sea lions. The temporary increase in vessel traffic due to the proposed action is unlikely to result in a vessel strike. Project vessels will be traveling at slow speeds, the increase in vessel traffic will be small, and vessel strike is not considered a significant concern for Steller sea lions (only four reports of potential vessel strikes involving Steller sea lions have been reported in Alaska).

It is difficult to estimate the behavioral responses, if any, that WDPS Steller sea lions may exhibit to underwater sounds generated by project activities. Though the sounds produced during project activities may not greatly exceed levels that Steller sea lions already experience in Seward and Sitka, the sources proposed for use in this project are not among sounds to which they are commonly exposed. In response to project-related sounds, some Steller sea lions may move out of the areas or change from one behavioral state to another, while other Steller sea lions may exhibit no apparent behavioral changes at all.

The primary mechanism by which the behavioral changes may affect the fitness of individual animals is through the animal's energy budget, time budget, or both. Most adult Steller sea lions occupy rookeries during the pupping and breeding season, which extends from late May to early July (NMFS 2008). There are no rookeries but there are haulouts a few miles away from each project site. The natural surrounding geography will make it highly unlikely that project-related sound will reach these haulouts. The individual and cumulative energy costs of the behavioral responses we have discussed are not likely to measurably reduce the energy budgets of Steller sea lions in the action areas.

The probable responses (i.e., tolerance, avoidance, short-term masking, and short-term vigilance behavior) to close approaches by vessel operations and their probable exposure to sound from pile removal and installation activities are not likely to reduce the current or expected future reproductive success or reduce the rates at which Steller sea lions grow, mature, or become reproductively active. Therefore, these exposures are not likely to reduce the abundance, reproduction rates, or survival and growth rates of the population those individuals represent.

The implementation of mitigation measures (including shutdown zones) to reduce exposure to high levels of sound decrease the likelihood of a behavioral response that may affect vital functions, or cause TTS or AUD INJ of Steller sea lions. Based on the best information currently available, the proposed action is not expected to appreciably reduce the likelihood of survival or recovery of WDPS Steller sea lions.

As mentioned in the Environmental Baseline section, and similar to what was discussed for whales in the previous section, WDPS Steller sea lions may be impacted by a number of anthropogenic activities present in the channels. Human activity has produced a number of anthropogenic risk factors that marine mammals must contend with, including: coastal and marine development, oil and gas development, ship strikes, sound pollution, water pollution, prey reduction, fisheries, tourism, and research. These risk factors are in addition to those operating on a larger scale such as predation, disease, and climate change. WDPS Steller sea lions 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.

The implementation of mitigation measures (including shutdown zones) to reduce exposure to high levels of sound decrease the likelihood of a behavioral response that may affect vital functions, or cause TTS or AUD INJ of Steller sea lions. Based on the best information currently available, the proposed action is not expected to appreciably reduce the likelihood of survival or recovery of WDPS Steller sea lions.

8.3 Sunflower Sea Star Risk Analysis

Little is known about how sunflower sea stars respond to underwater sound. As concluded in our analysis, we expect any effects of sound on sea stars from the proposed action to be insignificant, if there are any effects at all. The primary risks to sea stars from this action are direct pile contact and direct human contact. Assuming a density of 0.04 sea stars/m^2, for Moorings Seward and a density of 0.002 sea stars/m^2 at Moorings Sitka, we calculated that there will be less than one sea stars impacted by direct pile contact at Moorings Seward or at Moorings Sitka.

Sea stars may also be impacted by direct human contact during pre-construction site inspections. If a sea star is found on a pile that will be removed, the sea star will be removed and relocated outside of the action area. For Moorings Seward, assuming a density of 0.040 sea stars/m^2, we estimate that a maximum of three sea stars could be impacted by direct human contact during the proposed activities. Assuming a density of 0.002 sea stars/m^2, there would be less than one sea star impacted at Moorings Sitka. Including both project areas in this action, it is anticipated that sea stars could be impacted by either direct pile or human contact within a total area (pile surface area + footprint of piles) of 288.52 m^2 area. 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, the proposed action is not expected to decrease the likelihood of survival or recovery of the sunflower sea star.

As mentioned in the Environmental Baseline section, sunflower sea stars may be impacted by a number of anthropogenic activities present in the project areas. Human activity has produced anthropogenic risk factors that marine species must contend with. We expect that the following factors may affect sunflower sea stars: coastal and marine development, oil and gas development, water pollution, prey reduction, and research. These risk factors are in addition to those operating on a larger scale such as predation, disease, and climate change. As with the other species considered in this opinion, 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.

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, the proposed action is not expected to decrease the likelihood of survival or recovery of the sunflower sea star.

8.4 Summary

As we discussed in the *Approach to the Assessment* section of this opinion, an action that is not likely to reduce the fitness of individuals would not be likely to reduce the viability of the populations those individuals represent. That is, we would not expect reductions in the reproduction, numbers, or distribution of such populations. For this project, we do not expect that the noise created by pile removal/installation rig will reduce the fitness of any individual marine mammals. An action that is not likely to reduce the viability of those populations is not likely to increase the extinction probability of the species those populations comprise; in this case, the Western DPS Steller sea lion, Mexico and WNP DPS humpback whale, and fin whale. As a result, the proposed action is not likely to appreciably reduce the likelihood of recovery or survival of the Western DPS Steller sea lion, Mexico or WNP DPS humpback whale, or fin whale. We also do not expect non-lethal impacts of direct human contact will reduce the fitness of any individual sunflower sea star and therefore not expected to decrease the likelihood of survival or recovery of the sunflower sea star.

9 CONCLUSION

After reviewing the current status of the listed species, the environmental baseline within the action area, the effects of the proposed action, and cumulative effects, it is NMFS's biological opinion that the proposed action is not likely to jeopardize the continued existence of the Western DPS Steller sea lion, Mexico or Western North Pacific DPS humpback whale, and fin whale. It is NMFS's further opinion that the proposed action is not likely to adversely affect North Pacific right whales, sperm whales, or the designated critical habitat for western DPS Steller sea lions or Mexico DPS humpback whales. It is NMFS's conference opinion that the proposed action is not likely to jeopardize the continued existence of the sunflower sea star. 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 actions and finds that there have been no significant changes in the actions as planned or in the information used during the conference, NMFS will confirm the conference opinion as the biological opinion on the projects and no further section 7 consultation will be necessary for the sunflower sea star concerning the proposed actions.

10 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). For this consultation, NMFS Permits Division anticipate that any take of Mexico DPS humpback whales and fin whales will be by Level B harassment only. However, Level A takes for WDPS Steller sea lion are anticipated. Further, NMFS anticipates that incidental take of sunflower sea stars may occur by harm through direct handling, however there are no take prohibitions proposed for the sunflower sea star (see more below).

The ESA does not prohibit the take of threatened species unless special regulations have been promulgated, pursuant to ESA section 4(d), to promote the conservation of the species. Federal regulations promulgated pursuant to section 4(d) of the ESA extend the section 9 prohibitions to the take of Mexico DPS humpback whales (50 C.F.R. § 223.213). ESA section 4(d) rules have not been proposed for the sunflower sea star at this time; therefore, ESA section 9 take prohibitions are not expected to apply to this species. We include numeric limits on the take of sunflower sea stars because specific amounts of take were analyzed in our jeopardy analysis as part of conference opinion. 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 conference opinion is exceeded. This ITS includes reasonable and prudent measures and terms and conditions designed to minimize and monitor take of these species.

Under the terms of section 7(b)(4) and section 7(o)(2) of the ESA, taking that is incidental to an otherwise lawful agency action is not considered to be prohibited taking under the ESA, provided that such taking is in compliance with the terms and conditions of an Incidental Take Statement (ITS).

Section 7(b)(4)(C) of the ESA provides that if an endangered or threatened marine mammal is involved, the taking must first be authorized by section 101(a)(5) of the MMPA. Accordingly, the terms of this incidental take statement and the exemption from section 9 of the ESA become effective only upon the issuance of MMPA authorization to take the marine mammals identified here. Absent such authorization, this incidental take statement is inoperative.

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. The USCG and NMFS Permit Division have a continuing duty to regulate the activities covered by this ITS. In order to monitor the impact of incidental take, USCG and NMFS Permit Division 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)). If the USCG or NMFS Permit

Division (1) fails to require the permit holder to adhere to the terms and conditions of the ITS through enforceable terms that are added to the authorization, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

10.1 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).

The taking of Mexico or Western North Pacific DPS humpback whales, fin whales, and WDPS Steller sea lions will be by incidental harassment only. The taking by serious injury or death is prohibited and will result in the modification, suspension, or revocation of the ITS. Table 18 lists the amount of authorized take (incidental take by harassment) for this action. The method for estimating the number of listed species exposed to sound levels expected to result in Level B harassment is described in Section 6.2. NMFS expects that three instances of Level B harassment of humpback whales may occur (two for Moorings Seward and one for Moorings Sitka). While we are only authorizing take of two Mexico and Western North Pacific DPS humpback whale under the ESA, we will consider the ESA-authorized take limit to be exceeded when the MMPA-authorized limit on Level B take of humpback whales is exceeded, as it is generally not practicable to distinguish between DPSs in the field. NMFS expects that three instances of Level B harassment of fin whales may occur for Moorings Seward and none for Moorings Sitka. NMFS also expects that 12 (10 for Moorings Seward and two for Moorings Sitka) Level A takes of WDPS Steller sea lions and 40 (34 for Moorings Seward and six for Moorings Sitka) Level B takes may occur.

Pile driving and DTH activities will be halted as soon as possible when it appears a humpback whale, fin whale, or Steller sea lion is approaching the Level A shutdown zone and before it reaches the Level A isopleth.

Sunflower sea stars may be impacted by direct human contact during pre-construction site inspections. If a sea star is found on a pile that will be removed, the sea star will be removed and relocated outside of the action area. For Moorings Seward, assuming a density of 0.040 sea stars/m^2, we estimate that a maximum of three sea stars could be impacted by direct human contact during the proposed activities with none affected at Moorings Sitka.

Table 18. Summary of instances of exposure associated with the proposed pile removal/installation resulting in incidental take of ESA-listed species by Level A and Level B harassment as well as the number of sunflower sea stars that may be handled directly from project activities.

Species	**Authorized Level A Takes (animals)**		**Authorized Level B Takes (animals)**		**Authorized Non-mammal Takes (animals)**	
	Moorings Seward	Moorings Sitka	Moorings Seward	Moorings Sitka	Moorings Seward	Moorings Sitka
Western DPS Steller sea lion (*Eumetopias jubatus*)	10	2	34	6	0	0
Mexico and Western North Pacific DPS Humpback whale (*Megaptera novaeangliae*)	0	0	2	1	0	0
Fin Whale (*Balaenoptera physalus*)	0	0	3	0	0	0
Sunflower sea star (*Pycnopodia helianthoides*)	0	0	0	0	3	0

10.2 Effect of the Take

In Section 9 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.

Although the biological significance of the expected behavioral responses of Western DPS Steller sea lions, Mexico DPS humpback whales, WNP DPS humpback whales, and fin whales, remains unknown, this consultation has assumed that exposure to disturbances associated with pile removal/installation activities might disrupt one or more behavioral patterns that are essential to an individual animal's life history. However, any behavioral responses of these whales and pinnipeds to major sound sources, and any associated disruptions, are not expected to measurably affect the reproduction, survival, or recovery of these species. The taking of Western DPS Steller sea lions, Mexico DPS humpback whales, WNP DPS humpback whales, and fin whales will be by incidental acoustic harassment only, causing MMPA Level B take via behavioral disturbance or temporary threshold shift in their hearing. Only Western DPS Steller sea lions may experience MMPA Level A take.

Mexico DPS humpback whales are estimated to account for ~11 percent and Western North Pacific DPS account for ~one percent of the humpback whales in the Gulf of Alaska. The current trend of these DPSs is unknown but thought to be declining from a population of ~3,264 individuals for the Mexico DPS and ~2,427 for the Western North Pacific DPS (Wade et al. 2016b). However, the proposed activities are only expected to cause harassment to one to two Mexico DPS individuals, which account for up to 0.0006 percent of the total DPS.

Estimates of fin whale abundance in the eastern Bering Sea and in the Gulf of Alaska in any given year cannot be considered representative of the entire Northeast Pacific stock because the geographic coverage of surveys was limited relative to the range of the stock. However, even though no data are available to compute correction factors, it is expected that these estimates are robust because previous studies have shown that these sources of bias are small for this species (Barlow 1997). The current minimum population estimate for the fin whales is 2,554 in Alaskan waters (Young et al. 2023). The estimated take of three fin whales by Level B harassment would account for up to 0.76 percent of the total population in Alaskan waters.

WDPS Steller sea lions are common in the proposed action areas and have been encountered often during previous projects (ABR Inc. 2016). The estimated take for the species is 13 by Level A harassment and 47 by Level B harassment for the two action areas. The estimated take constitutes an extremely small percent of the total DPS and occurs in an area with a large amount of human activities and associated sound.

We estimate that the proposed activities could adversely affect three sunflower sea stars as they are removed and relocated away from the piles that will be removed at the Moorings Seward project site. 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, 0.000018 percent of the population. Take prohibitions have not been proposed for this species.

10.3 Reasonable and Prudent Measures

"Reasonable and prudent measures" are measures that are necessary or appropriate to minimize the impact of the amount or extent of incidental take." (50 CFR 402.02). Failure to comply with RPMs (and the terms and conditions that implement them) may invalidate the take exemption and result in unauthorized take.

RPMs are distinct from the mitigation measures that are included in the proposed action (described in Section 2.2). We presume that the mitigation measures will be implemented as described in this 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 RPM included below, along with its implementing term and condition, is 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 Western DPS Steller sea lions, Mexico and WNP DPS humpback whales, fin whales, and sunflower sea stars[16] resulting from the proposed actions.

- The USCG and NMFS Permits Division must monitor and report the effectiveness of mitigation measures incorporated as part of the proposed authorization for the incidental taking of ESA-listed species pursuant to section 101(a)(5)(D) of the MMPA. In addition, they must submit a report to NMFS AKR that evaluates the mitigation measures and reports the results of the monitoring program.

10.4 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the Federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions. 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. The Action Agencies or any applicant 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))).

Any taking that is in compliance with the term and condition below is not prohibited under the ESA (50 CFR § 402.14(i)(5)). As such, partial compliance with the term and condition may invalidate this take exemption and result in unauthorized, prohibited take under the ESA. If the entity to whom a term and condition is directed does not comply with the following term and condition, protective coverage for the action may lapse.

This term and condition constitutes no more than a minor change to the proposed action because it is consistent with the basic design of the proposed action.

To carry out the RPM, USCG or NMFS Permits Division must provide NMFS AKR with written and photographic (if applicable) documentation of any effects of the proposed action on ESA listed marine mammals and proposed listed sunflower sea stars and implementation of the mitigation measures specified in Section 2.1.2 and 2.1.3 of the biological opinion.

This concludes the conference and biological opinion for the USCG Seward and Sitka Dock Construction Project. You may ask the Service to confirm the conference opinion portion for the

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[16] The prohibitions against taking species under section 9 of the ESA do not apply to the sunflower sea star, as it is proposed to be listed, and no section 4(d) regulations have been proposed at this time. However, NMFS AKR advises the PR1 and USCG to consider implementing the RPM for the sunflower sea star. If this conference opinion is adopted as a biological opinion following a listing, this measure, with its implementing terms and conditions, will be non-discretionary.

proposed sunflower sea star as a biological opinion issued through formal consultation if the sunflower sea star is listed. The request must be in writing. The incidental take statement provided in this conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the sunflower sea star has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take.

11 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).

NMFS recommends the following conservation recommendations to USCG:

1. Project vessel crews (construction and materials barges and tugs) should participate in the Whale Alert program to report real-time sightings of whales while transiting in the waters of Southeast Alaska and to minimize the risk of vessel strikes. More information is available at https://www.fisheries.noaa.gov/resource/tool-app/whale-alert

2. Without approaching whales, project vessel crews should attempt to photograph humpback whale flukes and record GPS coordinates of the sightings during transit. These data should be included in the final report submitted to NMFS AKR.

3. Without approaching whales, project vessel crews should attempt to photograph and/or video North Pacific right whales and record GPS coordinates of the sightings during transit. These data should be submitted to NMFS AKR as soon as possible.

4. Without approaching sea lions, project vessel crews should attempt to photograph Steller sea lions when brand numbers are visible and record GPS coordinates of the sightings during transit. These data should be included in the final report submitted to NMFS AKR.

5. USCG should ensure that the entities responsible for conducting the sunflower sea star surveys have experience and expertise with the methodology they use to conduct the survey, prior to conducting the actual surveys. In addition, USCG should invite PRD 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 PRD to better understand the efficacy of the selected methods and equipment.

6. USCG should publish, or make widely available, a report detailing the methodology used and results of the sunflower sea star surveys conducted as part of this proposed action. Those findings will aid other action agencies and future projects in developing protocols for future

surveys and will increase general understanding of sunflower sea star movements and densities across south-central and southeast Alaska.

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

12 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)).

13 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. They are 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.

13.1 Utility

This document records the results of an interagency consultation. The information presented in this document is useful to USCG and 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 way 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.

13.2 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.

13.3 Objectivity

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and 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 referenced in the literature cited 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, 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.

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