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

Endangered Species Act Section 7(a)(2) Biological Opinion

Replacement of the Unalaska Marine Center Dock Positions III and IV and Associated Proposed Issuance of an Incidental Harassment Authorization in Dutch Harbor, Unalaska, Alaska

NMFS Consultation Number: AKR-2016-9588

Action Agencies: Alaska District, U.S. Army Corps of Engineers

Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, NOAA

Affected Species and Effects Determinations:

ESA-Listed Species	Status	Is the Action Likely To:			
		Adversely Affect:		Jeopardize the Species?	Destroy or Adversely Modify Critical Habitat?
		Species	CH		
Steller Sea Lion, Western DPS (*Eumetopias jubatus*)	Endangered	Yes	No	No	No
Humpback Whale, Western North Pacific DPS (*Megaptera novaeangliae*)	Endangered	Yes	N/A	No	N/A
Humpback Whale, Mexico DPS (*Megaptera novaeangliae*)	Threatened	Yes	N/A	No	N/A

Consultation Conducted by: Alaska Region, National Marine Fisheries Service, NOAA

Issued by: for James W. Balsiger, Ph.D.
Administrator, Alaska Region

Date: April 19, 2017

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Abbreviations	
COU	City of Unalaska
dB	decibel
DPS	distinct population segment
ESA	Endangered Species Act
ft	foot
HTL	High Tide Line
IHA	incidental harassment authorization
ITS	incidental take statement
kg	kilogram
kHz	kilohertz
kts	knots
lb	pound (weight)
MHWM	Mean High Water Mark
MMPA	Marine Mammal Protection Act
nm	nautical mile/s
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
Observer	protected species observer
OCSP	Open Cell Sheet Pile
Opinion	this biological opinion
Permits Division	NMFS Office of Protected Resources, Permits and Conservation
PR1	NMFS Office of Protected Resources, Permits and Conservation
PND	PND Engineers, Inc.
p-p	peak-to-peak
PTS	permanent threshold shift
rms	root mean square
TTS	temporary threshold shift
µPa	micropascal
0-p	Zero-to-peak
UMC	Unalaska Marine Center
USCG	U.S. Coast Guard

INTRODUCTION

Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1536(a)(2)), requires Federal agencies to insure that any action they authorize, fund, or carry 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. When a Federal agency's action may affect ESA-listed species or critical habitat, consultation with National Marine Fisheries Service (NMFS) and/or the U.S. Fish and Wildlife Service is required (50 CFR § 402.14(a)).

Section 7(b)(3) of the ESA requires that at the conclusion of consultation, NMFS and/or USFWS provide an opinion stating how the action will affect ESA-listed species and critical habitat under their jurisdiction (16 U.S.C. § 1536(b)(3)). If an incidental take is expected, section 7(b)(4) requires the consulting agency to provide an Incidental Take Statement (ITS) that specifies the impact of any incidental taking and includes reasonable and prudent measures to minimize such impacts and terms and conditions that must be complied with to implement those measures (16 U.S.C. § 1536(b)(4)).

The City of Unalaska (COU) is requesting a modification to its permit (POA-1989-324) for the proposed Unalaska Marine Center (UMC) Dock Positions III and IV Replacement Project under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act from the U.S. Army Corps of Engineers, Alaska District (Corps). The NMFS Office of Protected Resources, Permits and Conservation Division (hereafter referred to as "the Permits Division" or PR1), proposes to issue an incidental harassment authorization (IHA) pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act of 1972, as amended (MMPA) (16 U.S.C. §§ 1361-1407), to the City of Unalaska for harassment of marine mammals incidental to the UMC Dock replacement activities (81 FR 78969; Nov. 10, 2016).

The NMFS Alaska Region consulted with the Permits Division and the Corps on the proposed action. This document represents our biological opinion (Opinion) on the proposed action and effects on endangered and threatened species and designated critical habitat for those species.

The Opinion and Incidental Take Statement were prepared by NMFS Alaska Region in accordance with section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. §§ 1531-1544), and implementing regulations at 50 CFR Part 402. The Opinion and Incidental Take Statement 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 considers the effects to ESA-listed species from the proposed issuance of an IHA and Corps permit authorizing the proposed replacement of the UMC Dock Positions III and IV. PR1 and the Corps determined that this project will have no effect on fin whales (*Balaenoptera physalus*), sperm whales (*Physeter acrocephalus*), blue whales (*Balaenoptera musculus*), North Pacific right whales (*Eubalaena japonica*), sei whales (*Balaenoptera borealis*), or Western North Pacific gray whales (*Eschrichtius robustus*). The Corps and NMFS PR1 determined that the project is likely to adversely affect the endangered Western North Pacific Distinct Population Segment (DPS) humpback whale (*Megaptera novaeangliae*), the threatened Mexico DPS humpback whale (*Megaptera novaeangliae*), and the endangered western DPS Steller sea lion (*Eumetopias jubatus*). These action agencies further determined that the project may affect, but is not likely to adversely affect, designated critical habitat for Steller sea lions.

PND Engineers, Inc. (hereafter PND), is the designated non-federal representative for this project. This Opinion is based on information provided to us in the updated February 2017 IHA application (PND 2017); the November 2016 Biological Assessment (PND 2016a); the proposed IHA (81 FR 78969; Nov. 10, 2016); emails and telephone conversations between NMFS Alaska Region and NMFS Permits Division staff, Corps staff, and PND staff; and other sources of information. A complete record of this consultation is on file at NMFS's field office in Anchorage, Alaska.

1.2 Consultation History

Our communication about this consultation is summarized as follows:

- **October 14, 2015**: This office issued a letter of concurrence (LOC) (NMFS # AKR-2015-9482) to the Corps for the UMC Dock Positions III and IV replacement and expansion project. NMFS concurred with the Corps that with appropriate mitigation measures, the replacement and expansion of the UMC dock was not likely to adversely affect the endangered humpback whale, the endangered western DPS of the Steller sea lion, or Steller sea lion critical habitat.
- **March 22, 2016**: The COU recognized that they could not comply with the conditions required in the LOC; therefore, they applied for an MMPA permit (IHA) for take of marine mammals associated with the action.
- **August 8, 2016**: PND submitted an updated version of the IHA application to the Permits Division.
- **September 30, 2016**: Revision Two of the IHA application submitted.
- **October 19-21, 2016**: Subsequent revisions to the IHA application submitted to NMFS.
- **November 9, 2016**: The Permits Division submitted a consultation initiation package that included the September 30, 2016 version of the IHA application, and a draft of the proposed IHA Federal Register (FR) notice.
- **November 10, 2016**: The proposed IHA was published in the Federal Register (81 FR 78969).
- **November 15, 2016**: PND submitted a revised Biological Assessment.
- **November 18, 2016**: The Corps requested to be included on the formal consultation for their issuance of POA-1989-324-M-7 and POA-1989-324-M9[1])
- **December 20, 2016**: PND submitted Revision Three of the IHA application, which takes into account comments made by the Marine Mammal Commission (MMC) and the Permits Division after the publication of the proposed IHA.
- **January 18, 2017**: The Permits Division submitted the draft FR notice for the final UMC IHA, which included all the information requested by this office in order to initiate consultation pursuant to section 7 of the ESA. Consultation was initiated on this date.
- **February 15, 2017**: The Corps requested via phone and email that the COU proceed with the proposed action under the October 14, 2015 LOC (NMFS # AKR-2015-9482), until the formal consultation for this project is complete. However, the LOC is for the proposed action to begin in 2018. NMFS AKR concurred with the Corps that moving the UMC project POA-1989-324-M7 forward a year from 2018 to 2017, with no changes to the action, including mitigation measures, will not change the effects of the project on listed marine mammals.

[1] M7 and M9 (Modifications 7 and 9) to the Corps permit originally issued in 1989 include actions with potential effects to ESA-listed species, thus requiring ESA Section 7 consultation.

2.0. DESCRIPTION OF THE ACTION

"Action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies (50 CFR § 402.02). Interrelated actions are those that are part of a larger action and depend on the larger action for their justification (50 CFR § 402.02). Interdependent actions are those that have no independent utility apart from the action under consideration (50 CFR § 402.02).

The proposed action consists of the following:

- The proposed Modifications 7 and 9 of Corps permit POA-1989-324 for COU's replacement and expansion of an existing dock and pilings (UMC Dock Positions III and IV) in Dutch Harbor, Unalaska, Alaska, including discharge of a total of 110,000 cubic yards (CY) of shot rock and armor rock into 2.8 acres below the High Tide Line (HTL) and Mean High Water Mark (MHWM) of Dutch Harbor, creating a larger "upland" dock working area of 3.1 acres; and
- NMFS Permits Division's proposed issuance of authorization for non-lethal takes of marine mammals by Level B harassment only (as defined by the MMPA) incidental to the COU's proposed project (81 FR 78969; Nov. 10, 2016).

The IHA would extend from April 1, 2017, to March 31, 2018, and authorize the incidental harassment of 926 Steller sea lions and 176 humpback whales (all DPSs of humpbacks are combined in the IHA), incidental to all components of the COU's replacement and expansion of the UMC dock. Section 7 of this Opinion contains more information about the methods used to calculate take for Steller sea lions and humpback whales.

The IHA will incorporate the protected species mitigation and monitoring measures and reporting requirements from the COU's submitted Marine Mammal Monitoring Plan (MMP - See Appendix 1), which are included as part of the project action.

2.1. General Overview

In order to meet the increasing needs of the international shipping industry and to increase vessel berthing capacity, the COU is proposing a substantial upgrade of the UMC facilities. The existing pile-supported docks are aging structures in shallower water that no longer meet the needs of the Port of Dutch Harbor and that require increasing maintenance and monitoring costs. The proposed project will replace the existing docks located at the UMC Docks III and IV with a single modern high-capacity sheet pile bulkhead dock of a similar design and extending from the existing bulkhead Dock Position V to the U.S. Coast Guard (USCG) Dock (Figure 1a). The existing gap between Dock Position V and the USCG dock can be seen in Figure 1b. The proposed project will also enlarge the currently limited area available for offloading and loading operations (see inset, Figure 1a).

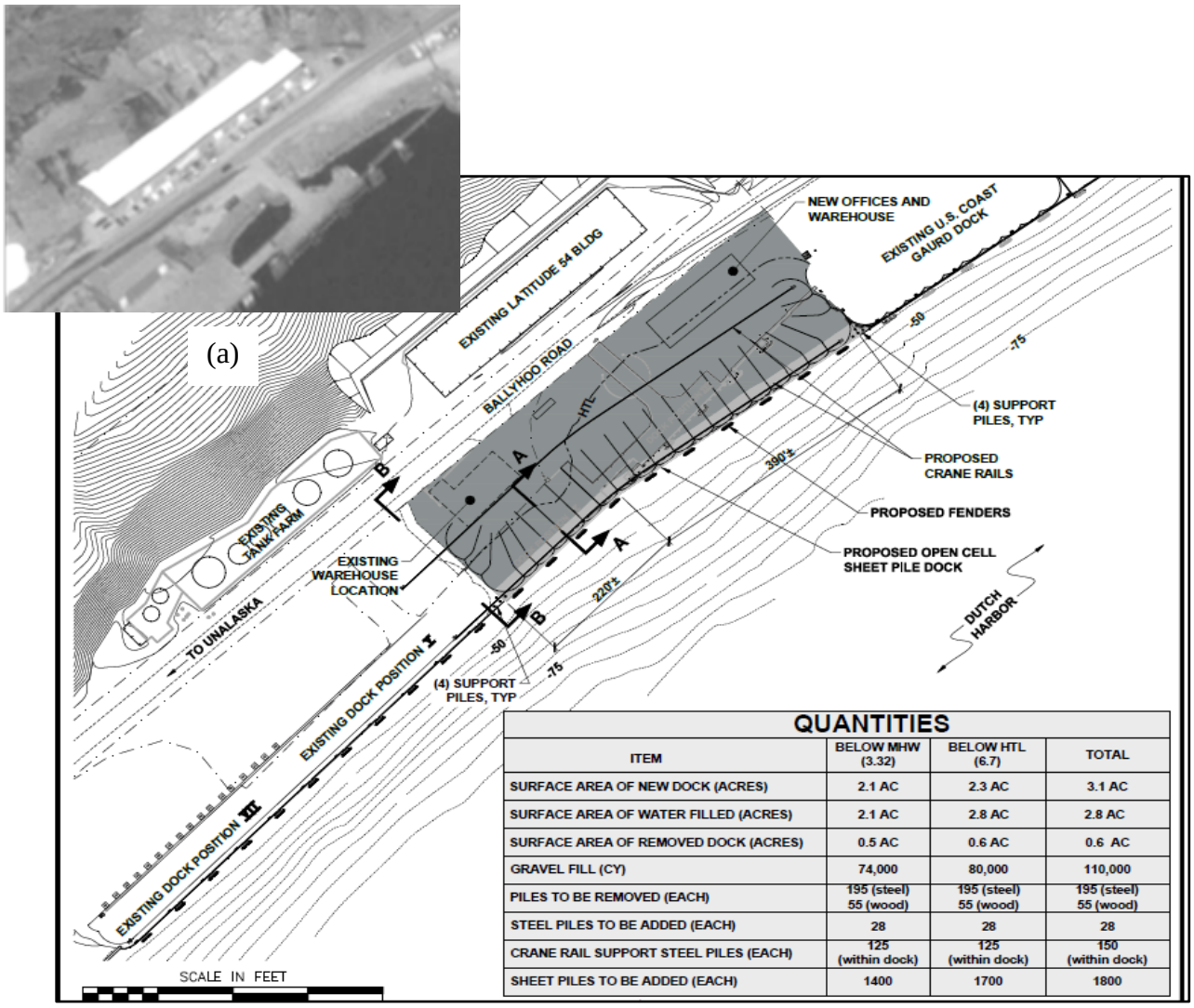
The COU proposes to install an OPEN CELL SHEET PILE™ (OCSP) dock at UMC Dock Positions III and IV, replacing the existing pile-supported structures. Table 1 shows the type and number of piles that will be installed and removed.

As shown in Table 1 (see also Figure 1), construction of the new dock positions includes:

- vibratory installation of approximately 1,800 PS31 flat sheet piles, some 100 of which will be above the HTL;
- vibratory installation of approximately two hundred 46 cm (18 inch) steel piles (H or round) -- These will be extracted, following sheet pile installation;

- installation of approximately 40 76 cm (30 inch) steel fender piles and transition platform support piles in water (via vibratory hammer/drill and potentially impact hammer);
- placing approximately 110,000 cubic yards of clean fill (that meets the Corps' definition and standards for clean fill) from a nearby quarry into 2.8 acres to create the new dock area of approximately 3.1 acres;
- installing approximately 150 steel crane rail support piles (Figure 1c) all driven into fill after it is placed (no in-water work); and
- installing approximately 30 miscellaneous steel support piles driven into fill after it is placed (no in-water work).

The PS31 piles are flat, interlocking sheets about 20 in (50 cm) wide and ½ in (1.27 cm) thick. These are usually driven in sets of two or more (Figure 2) and generally require 5 minutes or less vibratory driving time per set for installation (B. Hughes, PND Engineers, pers. comm. 03/10/2017).



QUANTITIES

ITEM	BELOW MHW (3.32)	BELOW HTL (6.7)	TOTAL
SURFACE AREA OF NEW DOCK (ACRES)	2.1 AC	2.3 AC	3.1 AC
SURFACE AREA OF WATER FILLED (ACRES)	2.1 AC	2.8 AC	2.8 AC
SURFACE AREA OF REMOVED DOCK (ACRES)	0.5 AC	0.6 AC	0.6 AC
GRAVEL FILL (CY)	74,000	80,000	110,000
PILES TO BE REMOVED (EACH)	195 (steel) 55 (wood)	195 (steel) 55 (wood)	195 (steel) 55 (wood)
STEEL PILES TO BE ADDED (EACH)	28	28	28
CRANE RAIL SUPPORT STEEL PILES (EACH)	125 (within dock)	125 (within dock)	150 (within dock)
SHEET PILES TO BE ADDED (EACH)	1400	1700	1800

Figure 1 (a) – Existing and proposed UMC Dock facilities, Dutch Harbor, Alaska. Dark gray indicates area to be filled. Positions of sheet piles, fenders, and crane rail and support piles are indicated. Inset: photograph showing current dock, with narrow offloading area.

(b)

Figure 1 (b) – Existing UMC Dock Position V with USCG dock in background. Current project would connect the gap between these with a dock of similar structure.

(c)

Figure 1 (c) – Example image of a crane used to load and unload vessels, which can move across dock area on rails.

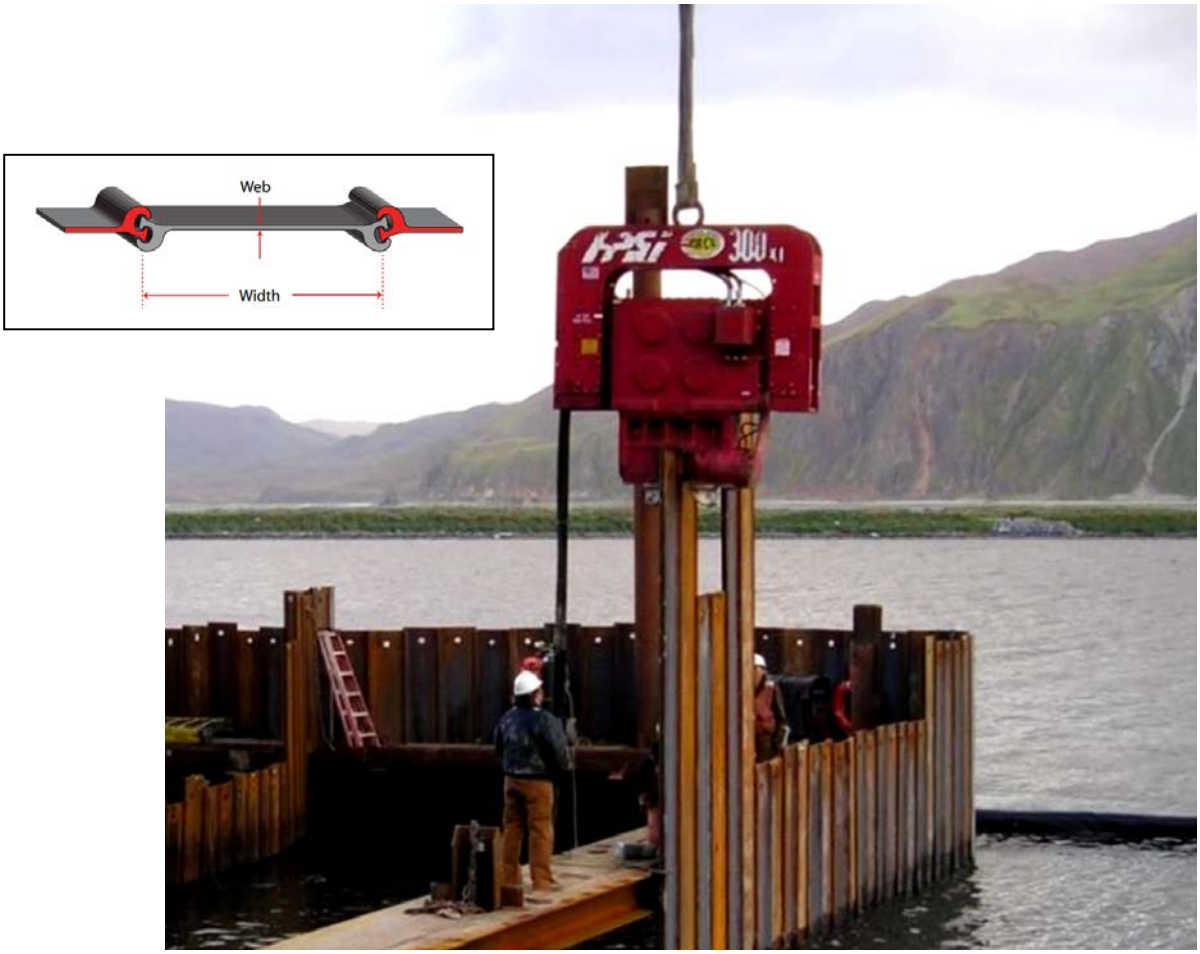


Figure 2. Installing sheet piles with a vibratory hammer.
Inset: cross-section of sheet pile, showing dimensions and interlocking design.

Table 1. Material, size, shape, and number of piles proposed to be removed and installed in water for the UMC Dock replacement project in Dutch Harbor, Unalaska, Alaska.

Activity Type and Pile Material	Pile Shape	Size (cm/in)	Number
Removal			
Steel (Vibratory)	Pipe	46/18	195
Timber (Vibratory)	Round	Unknown	55
Installation			
Steel (temporary; later removal)	Pipe (vibratory)	46/18	200
Steel	Pipe (vibe +/or impact)	76/30	220; only 40 in-water
	Sheet (vibratory)	N/A	1800; only 1700 in-water

Table adapted from PND (2016)

2.2. Details of Demolition and Construction Activities

The proposed project will include the following elements, with a construction sequence in the same general order:

Construction Phase 1 (2017):

- Mobilization of equipment and demolition of the existing Dock Positions III and IV and removal of any existing riprap/obstructions
- Development of the quarry for materials
- Installation (and later removal) of temporary support piles for Contractor's template structures and barge support
- Installation of the new sheet pile bulkhead dock. This includes driving sheet piles, placing fill within the cell to grade, and compaction of fill
- Installation of the 40 fender and platform support piles in the water adjacent to the dock; also installation of miscellaneous support piles within the fill in the completed sheet pile cells
- Installation of pre-assembled fender systems (energy absorbers, sleeve piles, steel framing, and fender panels)
- Installation of the crane support piles within the filled dock area
- Installation of temporary utilities and gravel surface to provide functional dock capability for the 2017/2018 season

Construction Phase 2 (2018):

- Installation of concrete grade beam for crane rails, utility infrastructure, and dock surfacing
- Installation of electrical, sewer, fuel, water, and storm drainage utilities

Additional details for each construction element are provided below.

2.2.1. Demolition of existing Dock (Positions III and IV) and removal of any existing riprap/obstructions

Demolition of the existing dock and removal of any existing riprap/obstructions will be performed with track excavators, loaders, cranes, barges, cutting equipment, and a vibratory hammer (for pile extraction). The existing dock (consisting of steel and timber support piles, steel superstructure, and concrete deck) will be completely removed by vibratory extraction.

Vibratory pile removal generally consists of clamping the "jaws" of the vibratory hammer to the pile and extracting it to the point where removal can be completed. The pile will then be hoisted with crane line rigging and placed on the ground or deck of the barge.

The contractor will be required to dispose of (or salvage) demolished items in accordance with all Federal, state, and local regulations. Dewatering (i.e. temporarily draining water from an area) will not be required, as all extraction will take place from the existing dock, from shore, and/or from a work barge.

2.2.2. Quarry Development

A materials source will be developed in the hillside adjacent to the UMC facility (Figure 3), to provide fill material for the dock and future projects. The quarry will be developed through blasting benches in the rock face, with each bench approximately 25 feet high and the total height approximately 125 feet. Material will be extracted from the quarry in a configuration that provides additional space for port operations. Flat upland areas will be used for COU port offices after the quarry is completed.

2.2.3. Temporary Support Piles

Temporary support piles for pile driving template structures will be installed with a vibratory hammer to aid with construction and will be removed after the permanent sheet piles or support piles have been installed. Temporary support piles will likely be 18-inch diameter or smaller steel H or round piles. Up to ten (10) temporary support piles will be used per cell during construction of the sheet pile structure, for a total of approximately 200 temporary support piles.

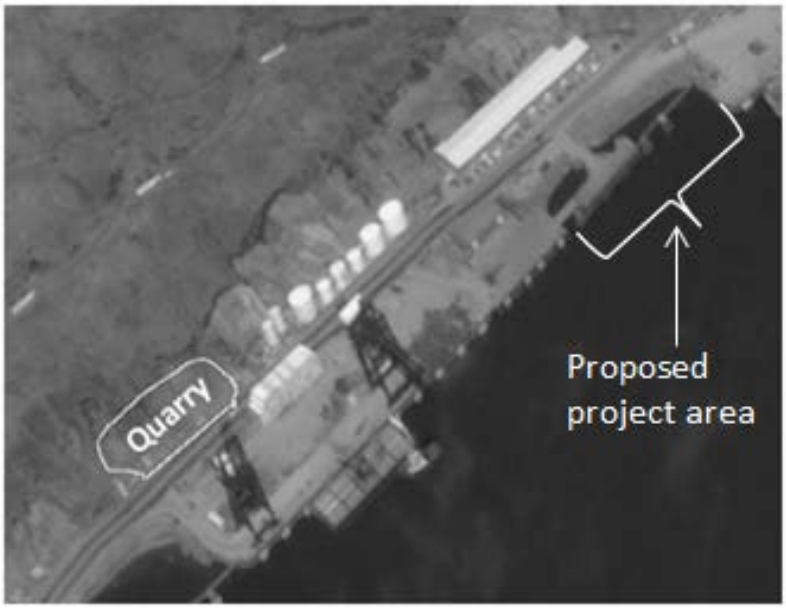


Figure 3. Approximate location of proposed quarry, relative to the project area.

2.2.4. Installation of New Sheet Pile Dock

The new sheet pile bulkhead dock consists of 22 OCSP cells. The sheet pile structures will be installed using a crane and vibratory hammer. It is anticipated that the largest size vibratory hammer used for the project will be an APE 200-6 (eccentric moment[2] of 6,600 inch-pounds) or comparable vibratory hammer from another manufacturer. As mentioned above, the PS31 sheets are relatively narrow and usually driven in one or more sets of two (Figure 2), generally requiring 5 minutes or less vibratory driving time per set (B. Hughes, PND Engineers, pers. comm. 03/10/2017).

After all the piles for a sheet pile cell have been installed, clean rock fill will be placed within the cell. This process will continue sequentially until all of the sheet pile cells are installed and backfilled.

2.2.5. Dock Fill Placement

Fill will be transported from the adjacent quarry to the project site using loaders, dump trucks, and dozers and may be temporarily stockpiled within the project footprint as needed. It will be placed within the cells from the shore (or occasionally a barge) using the same equipment, and will be finished using roller compactors, graders, or vibracompaction. Vibracompaction would be achieved through the repeated insertion and removal through vibratory hammering of an H-pile probe, causing fill materials to settle into place.

[2] See: http://www.iceusa.com/how-vibratory-pile-drivers-work/ for more information on the mechanics of vibratory hammers.

2.2.6. Fender and Platform Support Piles

Forty fender & platform support piles will be installed adjacent to (and offshore of) the sheet pile cells. The fender piles will first be driven with a vibratory hammer and, if necessary, driven with an impact hammer and/or vibratory drill until target depth (likely 20-feet) and capacity is reached. Pre-assembled fender systems (energy absorbers, sleeve piles, steel framing, and fender panels similar to those shown in Figure 1b) will be installed onto fender support piles via crane. In addition to the fender supports, miscellaneous piles needed to support the suspended concrete platform at the transitions between Positions II/III and IV/V will be installed within the filled dock area and cut to desired length. Installation methods for the miscellaneous support piles will be similar to those used for the fender support piles.

2.2.7. Miscellaneous Support Piles

Approximately thirty (30) steel support piles needed for upland utilities and other structures will be driven after sheet pile cells are filled and compacted; this will be upland pile driving.

2.2.8. Crane Rail Support Piles

Approximately 150 steel support piles will be driven to support the weight of a new crane rail and dock crane. Pile driving will be performed primarily within the completely filled and compacted sheet pile cells. A few of the support piles may be driven in the water.

2.2.9. Dock Surfacing and Other Concrete Elements

The newly created dock area will be surfaced with concrete pavement. The crane rail beam and utility vaults will be constructed from cast-in-place concrete. The surfacing and structures will be installed using forms and reinforcement steel. This work will take place at or near the surface of the dock and will be above water.

2.2.10. Utilities

Temporary utilities will be installed to provide functional dock capability for the 2017/2018 season. Typical utility installation equipment such as track excavators, wheel loaders, and compaction equipment will be used. Permanent electrical, water, and storm drainage utilities will be installed during Phase 2 to provide full dock capability. Installation methods will require equipment similar to that used to install the temporary utilities. All storm water (and any other wastewater) from the dock will be processed through the COU storm water system and necessary separator devices.

2.3. Dates and Duration

The in-water and over-water construction of Phase 1 is planned to occur between approximately April 1, 2017 and November 1, 2017. Phase 2 (no in- or over-water activity) is planned to occur between approximately May 1, 2018 and October 1, 2018. Total demolition and construction time (both Phase 1 and Phase 2) is expected to take no more than 245 days. Durations are conservative; the actual amount of time to install and remove piles may be less than estimated. In-water sound associated with the pile driving and removal activities will occur during approximately 50 percent of the total estimated project duration of 245 days (2,940 hours for 12-hour workdays). The remaining 50 percent of the project duration will be spent on activities that provide distinct periods without noise from pile driving or drilling such as installing templates and braces, moving equipment, threading sheet piles, pulling piles (without vibration), etc. In the summer months (April – September), 12-hour workdays in extended daylight are planned. In winter months (October – March), shorter 8-hour to 10-hour workdays are more likely. The daily construction window for pile driving or removal will begin no sooner than 30 minutes

after sunrise to allow for initial marine mammal monitoring to take place, and will end 30 minutes before sunset to allow for post-activity monitoring.

2.4. Mitigation Measures

2.4.1. Non-Acoustic Project Impacts

The following measures will be incorporated by the COU to minimize potential non-acoustic impacts from project activities:

- Clean fill, which meets the definition and standards set by the Corps, will be placed after the installation of the sheet piles is completed for each cell. The sheet piles will act as a silt curtain, containing the sediment.
- The dock will be maintained in a manner that does not introduce any pollutants or debris into the harbor or cause a migration barrier for fish.
- Fuels, lubricants, and other hazardous substances will not be stored below the ordinary high water mark.
- Properly sized equipment will be used to drive piles.
- Oil booms will be readily available for containment should any releases occur.
- The contractor will check for leaks regularly on any equipment, hoses, and fuel storage that occur at the project site.
- All chemicals and petroleum products will be properly stored to prevent spills.
- No petroleum products, cement, chemicals, or other deleterious materials will be allowed to enter surface waters.

2.4.2. Acoustic Project Impacts

PND (2016) presents a marine mammal monitoring plan, which is incorporated into the project design, to minimize potential acoustic impacts from project activities. This plan is presented in its entirety in Appendix 1 to this Biological Opinion. The plan includes:

- Required qualifications for protected species observers (observers);
- General methods by which observers will conduct monitoring activities;
- Equipment required by observers;
- Descriptions of the exclusion zones and areas that will be monitored;
- Locations of the observers;
- Monitoring techniques specific to pile-driving and removal and drilling activities; and
- Reporting requirements.

Full details about these Plan elements are presented in Appendix 1. Briefly, qualified observers will be on-site before, during, and after in-water construction activity at land-based sites (Figure 4) appropriate for monitoring harassment zones (as shown in Tables 3 and 4).

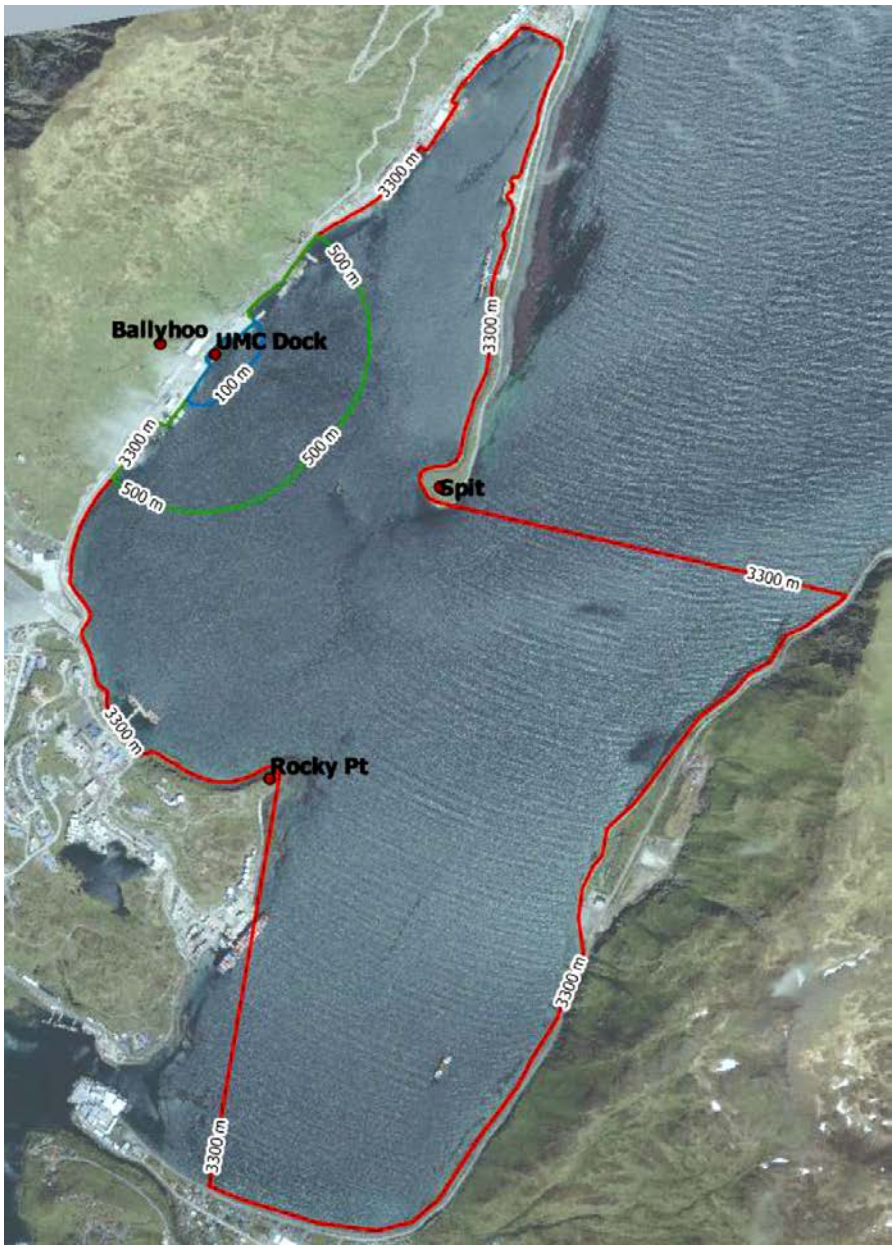


Figure 4. Proposed observer locations (red circles) and observation zones for the 120-dB isopleth (the Level B harassment zone, 3,300 m) during construction activities for the UMC Dock replacement project, Dutch Harbor, Unalaska, Alaska. 100 and 500m isopleths shown for reference.

Observers will work a maximum of four consecutive hours and no more than 12 hours in any 24 hour period and will collect data including:

- Environmental conditions (e.g., sea state, precipitation, and glare);
- Sightings and observations (e.g., species, numbers, location, behavior, and responses to construction activity) of all marine mammals observed within and outside the Level A and B harassment zones;
- Construction activity at the time of sighting;
- Implementation of mitigation measures, including:
    - Clearing of the exclusion zones;

  - Shutdown procedures; and
  - Recording of the number of marine mammal "taken" during project activities.
- Data forms and report findings will be completed in accordance with protocols reviewed and approved by NMFS.

2.4.3. Monitoring Zones

Level A Harassment Zone

In their latest draft documents, the applicant has revised their assessment of sound levels likely to cause injury – that is, permanent threshold shift (PTS) in hearing – to marine mammals (Level A harassment), in conformance with NMFS Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (81 FR 51694; Aug. 4, 2016). As indicated in this guidance (NMFS 2016b), the Level A harassment zone is influenced by a number of factors, including the duration of the activity, the sound exposure level produced by the source during one working day, and the effective hearing range of the receiving species. In the 2016 Technical Guidance, NMFS divides marine mammals into five groups and presents thresholds for underwater sounds that cause PTS in each group (Table 2).

Only the impact pile driving portion of the UMC Dock Project has the potential for resulting in injury (Level A harassment) to marine mammals, due to its high source level (190 dB at 10 m). Pile driving activities and calculated distances to *in-water* Level A harassment isopleths (PTS onset threshold using NMFS's new acoustic guidance) and Level A shutdown (exclusion) zones are presented in Table 3. As shown, injury zones differ, depending on the number of piles driven per day. The most practicable number of piles to drive in a day is 5, resulting in an injury (Level A harassment) zone of 396.9 m (rounded to an exclusion zone of 400 m) for low-frequency cetaceans, which includes humpback whales. However, PND and PR1 included shutdown radii for 10 and 20 piles per day, to provide contractor flexibility during construction. The applicant's Mitigation Plan (Appendix 1) indicates that impact hammering will shut down if any humpback whale (or other LF cetacean) or if any Steller sea lion (OW pinnipeds) appears likely to enter the exclusion zone (based on the number of piles driven) shown in Table 3.

The applicant's mitigation plan also includes calculations for radii that result if a bubble curtain[3] is used during impact pile installation. Although this is unlikely, should a bubble curtain be used, the radii presented in the Mitigation Plan (Appendix 1) will apply. Comparison of impact pile driving radii with and without a bubble curtain is shown in Figures 5 and 6 (see Appendix 1 of this Opinion for further description).

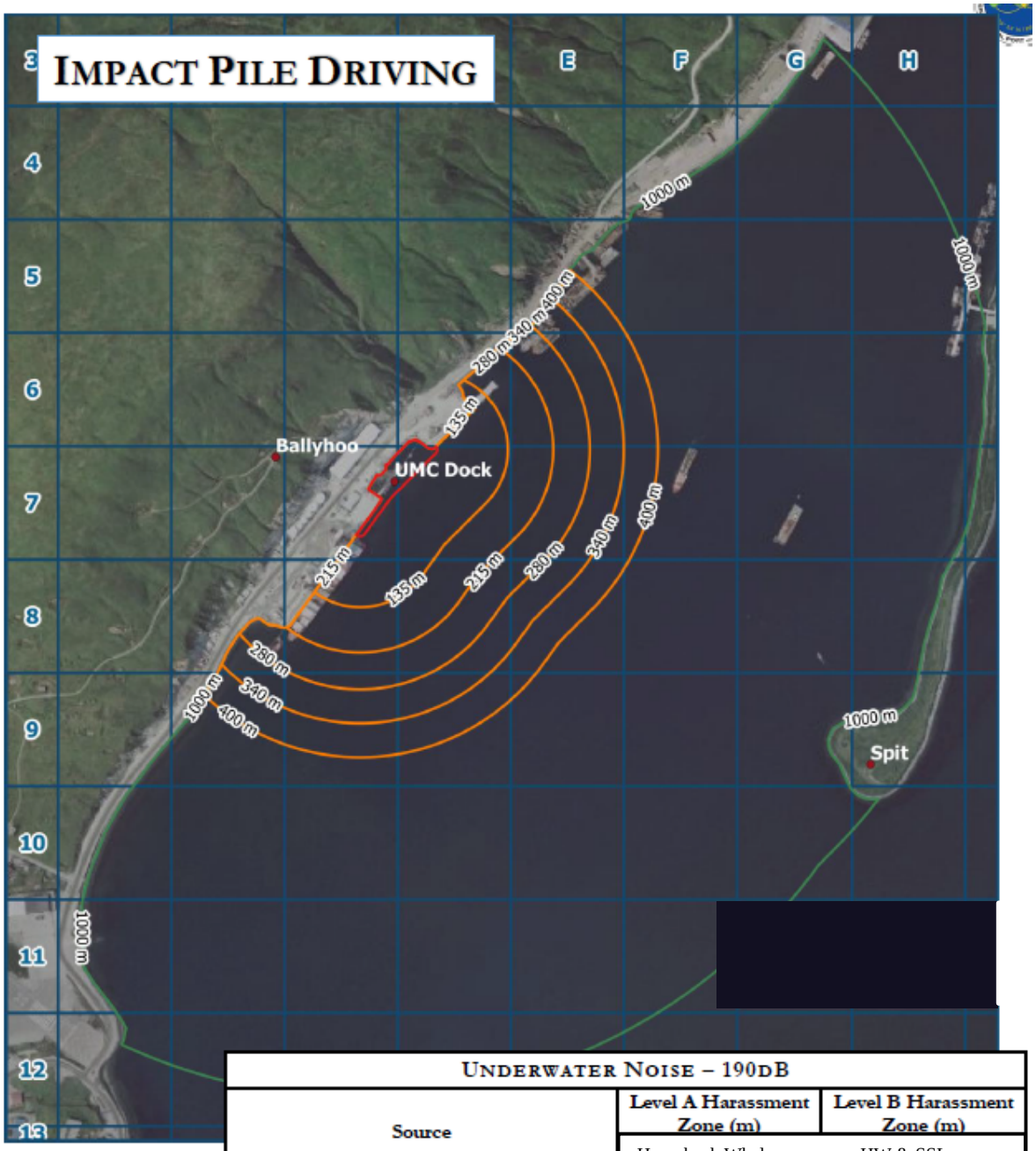
[3] For explanation of bubble curtain use in pile driving, see: http://onlinepubs.trb.org/onlinepubs/trnews/trnews262rpo.pdf

Table 2. PTS Onset thresholds for cetaceans and pinnipeds (from NMFS 2016b).

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	**Impulsive**	**Non-impulsive**
Low-Frequency (LF) Cetaceans	Lpk,flat: 219 dB L_E,LF,24h: 183 dB	L_E,LF,24h: 199 dB
Mid-Frequency (MF) Cetaceans	Lpk,flat: 230 dB L_E,MF,24h: 185 dB	LE,MF,24h: 198 dB
High-Frequency (HF) Cetaceans	Lpk,flat: 202 dB L_E,HF,24h: 155 dB	LE,HF,24h: 173 dB
Phocid Pinnipeds (PW) (Underwater)	Lpk,flat: 218 dB L_E,PW,24h: 185 dB	L_E,PW,24h: 201 dB
Otariid Pinnipeds (OW) (Underwater)	Lpk,flat: 232 dB L_E,OW,24h: 203 dB	LE,OW,24h: 219 dB

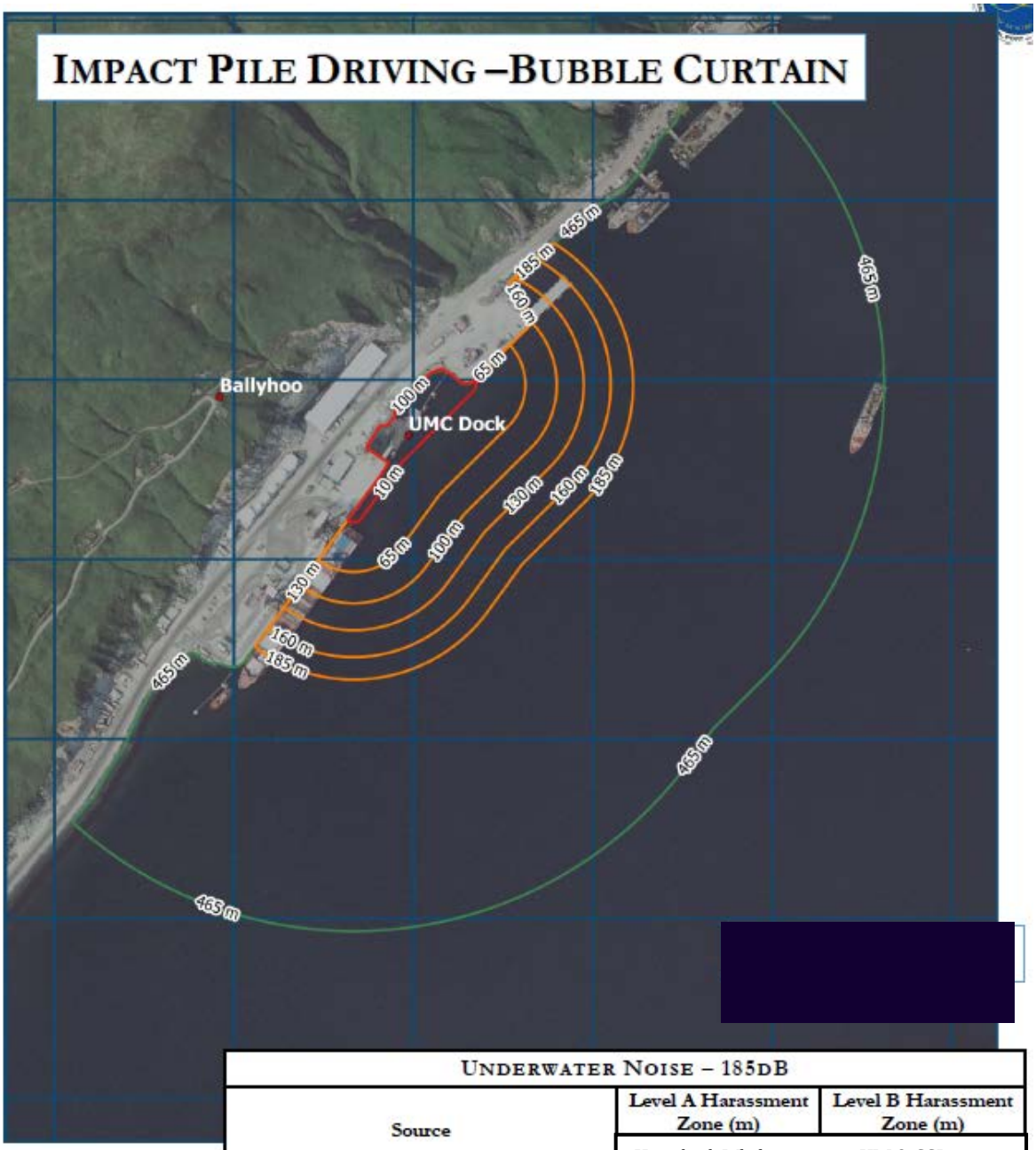
Table 3. Distances to Level A harassment isopleths and proposed shutdown (exclusion) zones (bold numbers), calculated per NMFS (2016b) and PND (2016b). Green shading indicates most likely impact driving operation.

Source	**Estimated Duration**					**Level A Harassment Zone/Shutdown Zone [Bold] (m) (New Guidance)**			
	Number of in-Water Piles	**Piles Driven per Day**	**Hours per Day**	**Days of Effort**		**LF Cetaceans**	**MF Cetaceans**	**PW Pinnipeds**	**OW Pinnipeds**
Vibratory Installation Sheet	1,700	15	0.5	95		4.1/**10**	0.4/**10**	2.5/**10**	0.2/**10**
Vibratory Installation 18"	200	10	1.25	15		9.2/**10**	0.8/**10**	5.6/**10**	0.4/**10**
Vibratory Installation 30"	40	5	1	8		14.7/**15**	1.3/**10**	8.9/**10**	0.6/**10**
Vibratory Removal Steel 18" (Temp)	195	10	1.25	35		9.2/**10**	0.8/**10**	5.6/**10**	0.4/**10**
18"Vibratory Removal Steel	150	10	1.25	35		9.2/**10**	0.8/**10**	5.6/**10**	0.4/**10**
Vibratory Removal Timber	55	10	1.25	5.5		2.3/**10**	0.2/**10**	1.4/**10**	0.1/**10**
Impact Installation 30" (SEL Calc)*	**# Piles**	**Pulse Dura (s)**	5	**Strikes per pile**	8	396.9/**400**	14.1/**15**	212.8/**215**	15.5/**15**
			4		10	342.6/**340**	12.2/**15**	183.3/**185**	13.3/**15**
	40	0.05	3	200	14	282.8/**280**	10.1/**10**	151.4/**150**	11/**10**
			2		20	215.8/**215**	7.7/**10**	115.5/**115**	8.4/**10**
			1		40	136/**135**	4.8/**10**	72.8/**75**	5.3/**10**
			10		4	630.1/**630**	22.4/**25**	337.2/**340**	24.6/**25**
			20		2	1000.2/**1000**	35.6/**35**	535.3/**535**	39/**40**



UNDERWATER NOISE – 190DB		
Source	Level A Harassment Zone (m)	Level B Harassment Zone (m)
	Humpback Whales	HW & SSL
Impact Installation 30" (1 Pile)	135	1000
Impact Installation 30" (2 Piles)	215	
Impact Installation 30" (3 Piles)	280	
Impact Installation 30" (4 Piles)	340	
Impact Installation 30" (5 Piles)	400	

Figure 5. Calculated Level A (depending on number of piles) (for humpback whales) and Level B Harassment Zones (for humpback whales and Steller sea lions) for impact pile driving at UMC Dock project with no attenuation device (Level A zone for Steller sea lions is a maximum of 15 m for 5 piles).



UNDERWATER NOISE – 185DB		
Source	Level A Harassment Zone (m)	Level B Harassment Zone (m)
	Humpback Whales	HW & SSL
Impact Installation 30" (1 Pile)	65	465
Impact Installation 30" (2 Piles)	100	
Impact Installation 30" (3 Piles)	135	
Impact Installation 30" (4 Piles)	160	
Impact Installation 30" (5 Piles)	185	

Figure 6. Calculated Level A (depending on number of piles) (for humpback whales) and Level B Harassment Zones (for humpback whales and Steller sea lions) for impact pile driving at UMC Dock project using bubble curtain for sound attenuation.

Level B Harassment

Underwater - NMFS's updated acoustic guidance does not address Level B harassment, nor harassment from airborne noise. 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,[4] expressed in root mean square (rms),[5] 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 re 1 μPa_{rms}
- continuous sound: 120 dB re 1μPa_{rms}

NMFS currently uses a criterion of 100 dB re 20 µPa for in-air Level B harassment of pinnipeds other than harbor seals.[6]

For in-water sound transmission, the radius of the applicable Level B threshold is calculated by the equation:

$$RL = SL - TL\ (Log_{10}\ R)$$

where RL is the rms of received level of sound, SL is the rms source level, TL is the transmission loss coefficient, and R is the radius at which the source level will have attenuated to the desired (160, 120, or 100 dB) received level.

Table 4 presents the anticipated sound levels and resulting distances to the 160 or 120 dB Level B harassment thresholds calculated from the above formula.

As noted in Table 4, calculated harassment zones extend out to more than 11 kilometers (for vibratory driving of 76 cm (30-inch) piles. However, as illustrated in Figure 4, land masses in the project vicinity restrict actual in-water sound propagation to 3300 m (the greatest straight-line distance in water before encountering land). Thus, the mitigation plan and the IHA propose a maximum monitoring zone of 3300 m for all vibratory installation and removal of piles.

In-Air – During the installation of piles and blasting activities at the quarry, the project has the potential to increase airborne noise levels, which could result in disturbance to pinnipeds at the surface of the water or hauled out along the shoreline of Iliuliuk Bay or the Dutch Harbor spit. Due to the amount of boat traffic and human activity in the area, we expect that few to no animals will haul out in these locations. A spherical spreading loss model, equivalent to a transmission loss coefficient of 20, is appropriate for use with airborne sound. Therefore, PND (2016a) and PR1 used this model to estimate the distance to the airborne thresholds. Levels of in-air sounds generated by project components and resulting Level B harassment zones for Steller sea lions are presented in Table 5.

Proposed observer Level B monitoring locations are shown in Figure 4.

Table 4. In-water sound levels of project components, calculated Level B harassment zones, and proposed monitoring zones, assuming no attenuation device (bubble curtain) use.

[4] 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.

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

[6] http://www.westcoast.fisheries.noaa.gov/protected_species/marine_mammals/threshold_guidance.html.

	RMS Sound Pressure Level (at 10 m)	Level B In-Water Harassment Zone (m)		Effective Monitoring Zone (Level B)	
Vibratory Installation Sheet	160.7 dB_{rms}	**Humpback Whale**	**Steller Sea Lion**	**Humpback Whale**	**Steller Sea Lion**
		5168.1	5168.1	3300	3300
Vibratory Installation 18"	162 dB_{rms}	6309.6	6309.6	3300	3300
30"Vibratory Installation & Drilling	166 dB_{rms}	11,659.1	11659.1	3300	3300
Vibratory Removal Steel 18"	162 dB_{rms}	6309.6	6309.6	3300	3300
Vibratory Removal Steel 18"	162 dB_{rms}	6309.6	6309.6	3300	3300
Vibratory Removal Timber	153 dB_{rms}	1584.9	1584.9	3300	3300
Impact Installation 30"(5 Piles)	190 dB_{rms}	1000.0	1000.0	1000	1000

Table 5. In-air sound levels of project components and calculated Level B harassment zones.

Source	Sound Level (at 15 meters)	Level B Harassment & Monitoring Zone (m) for Steller Sea Lions
Vibratory Installation Sheet	96.4 dB_{L5seq}[a]	10
Vibratory Installation 18"	87.5 dB_{L5seq}	10
30" Vibratory Installation/Drilling	96.4 dB_{L5seq}	10
Vibratory Removal Steel	96.4 dB_{L5seq}	10
Vibratory Removal Timber	96.4 dB_{L5seq}	10
Impact Installation 30"	110 dB_{rms}	50
Quarry Blasting	66 dBA_{Lmax} at 609.6 m	15

[a] L5seq is the 5-minute average continuous sound level, which in this case is equivalent to rms (after Laughlin 2010, and Giroux 2009).

3.0. ACTION AREA

The project is located at the UMC Dock Positions III and IV in Dutch Harbor, Unalaska, on Amaknak Island, Alaska. Dutch Harbor is separated from the adjacent Iliuliuk Bay by a spit (Figure 4).

"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. The action area includes the area in which demolition and construction activities will take place (located at approximately 53.90264°N x 166.52832°W), and extends up to 3,300 m into Dutch Harbor and Iliuliuk Bay (Figure 4).

4.0. APPROACH TO THE ASSESSMENT

Section 7(a)(2) of the ESA requires Federal agencies, in consultation with NMFS, to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or adversely modify or destroy designated critical habitat (16 U.S.C. § 1536(a)(2)). The jeopardy analysis considers both survival and recovery of the species. The adverse modification analysis considers the impacts to the conservation value of the designated critical habitat.

"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).

Under NMFS's regulations, the destruction or adverse modification of critical habitat "means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species"; such "alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features" (50 CFR § 402.02).

The designation(s) of critical habitat for Steller sea lions uses the term primary constituent element (PCE) or essential features. The new critical habitat regulations (81 FR 7414; Feb. 11, 2016) replace this term with physical or biological features (PBFs). The shift in terminology does not change the approach used in conducting a "destruction or adverse modification" analysis, which is the same regardless of whether the original designation identified PCEs, PBFs, or essential features.

We used the following steps to determine whether the proposed actions described in Section 2 of this Opinion are likely to jeopardize listed species or destroy or adversely modify critical habitat:

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

2. Identify the rangewide status of the species and critical habitat likely to be adversely affected by the proposed action. This step (Section 5) describes the current status of each listed species and its critical habitat relative to the conditions needed for recovery.

3. Describe the environmental baseline including: past and present impacts of Federal, state, or private actions and other human activities *in the action area*. (Section 6 of this Opinion).

4. Analyze the effects of the proposed actions to listed species and critical habitat. Identify the listed species that are likely to co-occur with these effects in space and time (our *exposure analyses*). As available information allows, 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. Also evaluate the proposed action's effects on critical habitat features. The effects of the action are described in Section 7 of this Opinion with the exposure analysis described in Section 7.2 of this Opinion.

5. Examine the available scientific and commercial data to determine whether and how affected listed species are likely to respond given their exposure (our *response analyses*). (Section 7.3 of this Opinion.

6. Describe any cumulative effects, as defined in NMFS's implementing regulations (50 CFR § 402.02) (Section 8 of this Opinion).

7. Integrate and synthesize the above factors to assess the risk that the proposed action poses to species and critical habitat. In this step, NMFS assesses 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) reduce the value of designated or proposed critical habitat for the conservation of the species. Integration and synthesis with risk analyses occur in Section 9 of this Opinion.

8. Reach jeopardy and adverse modification conclusions, which flow from the logic and rationale presented in the Integration and Synthesis. Conclusions are presented in Section 10.

If, in completing the last step in the analysis, we determine that the action under consultation is likely to jeopardize the continued existence of ESA-listed species or destroy or adversely modify designated critical habitat, we try to identify a reasonable and prudent alternative to the action, which must not be likely to jeopardize the continued existence of ESA-listed species nor adversely modify their designated critical habitat and it must meet other regulatory requirements. For all analyses, we use the best available scientific and commercial data.

5.0. STATUS OF THE SPECIES AND CRITICAL HABITAT

Species the action agencies determined likely to be adversely affected by the action include the endangered western North Pacific DPS and threatened Mexico DPS humpback whale, the endangered western DPS Steller sea lion, and designated critical habitat for Steller sea lion.

5.1. Humpback Whale

We used information available in the most recent stock assessment (Allen and Angliss 2015), the most recent status review (Bettridge *et al*. 2015), the most recent global review (Fleming and Jackson 2011), and NMFS species information (NMFS 2016a, NMML 2016b) to summarize the status of the species, as follows.

5.1.1. Status

The humpback whale was listed as endangered under the Endangered Species Conservation Act (ESCA) on December 2, 1970 (35 FR 18319). Congress replaced the ESCA with the ESA in 1973, and humpback whales continued to be listed as endangered. NMFS recently conducted a global status review of humpback whales (Bettridge *et al.* 2015). After analysis and extensive public review, NMFS published a final rule on September 8, 2016 (81 FR 62260), recognizing 14 humpback whale DPSs, designating four of these as endangered and one as threatened, with the remaining nine not warranting ESA listing status. Wade *et al.* (2016) provides information on the basis for DPS designation and the status of each DPS in the North Pacific.

Based on an analysis of migration between winter mating/calving areas and summer feeding areas using photo-identification, Wade *et al.* (2016) concluded that whales feeding in Alaskan waters belong primarily to the Hawaii DPS (recovered), with small numbers of Western North Pacific DPS (endangered) and Mexico DPS (threatened) individuals. In the summer feedings areas (Aleutian Islands, Bering, Chukchi, and Beaufort Seas) that overlap with the action area of the UMC dock replacement project, Hawaii DPS individuals are estimated to comprise 86.5 percent of the humpback whales present, Mexico DPS individuals 11.3 percent, and Western North Pacific DPS individuals 4.4 percent (Table 6). Critical habitat has not been designated for the western North Pacific or Mexico DPSs of humpback whales.

Additional information on humpback whale biology and natural history is available at:
http://www.nmfs.noaa.gov/pr/species/mammals/whales/humpback-whale.html
http://alaskafisheries.noaa.gov/pr/humpback
http://www.fisheries.noaa.gov/pr/sars/pdf/stocks/alaska/2014/ak2014_humpback-wnp.pdf

Table 6. Probability of encountering humpback whales from each DPS in the North Pacific Ocean (columns) in various feeding areas (rows). Adapted from Wade *et al.* (2016) (See also NMFS 2016c).

	North Pacific Distinct Population Segments in Alaska		
Summer Feeding Areas	Western North Pacific DPS (endangered)	Hawaii DPS (not listed)	Mexico DPS (threatened)
Kamchatka	100%	0%	0%
Aleutian Islands, Bering, Chukchi, Beaufort	4.4%	86.5%	11.3%
Gulf of Alaska	0.5%	89.0%	10.5%
Southeast Alaska / Northern BC	0%	93.9%	6.1%

NOTE: For the ESA-listed DPSs, these percentages reflect the upper limit of the 95% confidence interval of the probability of occurrence in order to give the benefit of the doubt to the species and to reduce the chance of underestimating potential takes.

5.1.2. Description and Range

Humpbacks are classified in the cetacean suborder Mysticeti, whales characterized by having baleen plates for filtering food from water, rather than teeth like the toothed whales (Odontoceti). The

humpback whale is one of the larger baleen whales, weighing up to 25-40 tons (50,000-80,000 pounds; 22,000-36,000 kg) and up to 60 feet (18 m) long, with females larger than males. Newborns are about 15 feet (4.5 m) long and weigh about 1 ton (2,000 pounds; 900 kg). The species is well known for long pectoral fins, which can be up to 15 feet (4.6 m) long. The body coloration is primarily dark grey, but individuals have a variable amount of white on their pectoral fins and belly. This variation is so distinctive that tail fluke pigmentation patterns are used to identify individual whales, analogous to human fingerprints.

Humpbacks filter feed on tiny crustaceans (mostly krill), plankton, and small fish; they can consume up to 3,000 pounds (1,360 kg) of food per day. Several hunting methods involve using air bubbles to herd, corral, or disorient fish.

Humpback whales reach sexual maturity at 4-7 years, and their lifespan is probably around 50 years or more. The gestation period of humpback whales is 11 months, and calves are nursed for 12 months. The average calving interval is two to three years. Birthing occurs in low latitudes during winter months; feeding occurs primarily at high latitudes during summer months. Additional information on humpback whale biology and habitat is available at:
http://www.fisheries.noaa.gov/pr/species/mammals/whales/humpback-whale.html and
http://www.nmfs.noaa.gov/pr/sars/2013/ak2013_humpback-wnp.pdf.

5.1.3. Abundance

The worldwide population of all humpback whales is estimated to be approximately 75,000 individuals. The abundances of the western North Pacific, Hawaii, and Mexico DPSs are estimated to be 1,000, 12,000, and 6,000 - 7,000, respectively. The abundance estimate for humpback whales in the Bering Sea/Aleutian Islands area is estimated to be between 1,650 and 3,570 animals, which includes whales from the Hawaii DPS (86.5%), Mexico DPS (11.3%), and western North Pacific DPS (4.4%) (Wade *et al*. 2016, NMFS 2016c).

Population trends are not available for all humpback whale stocks or populations due to insufficient data, but populations appear to be growing in most areas. The growth rate for the western North Pacific DPS is estimated to be 6.9 percent, though humpback whales of this population remain rare in some parts of their former range. The growth rate of the Hawaii DPS is between 5.5 and 6.0 percent. The current growth rate of the Mexico DPS is unknown, although the population increased slightly between the 1990s and 2000s (Wade *et al*. 2016).

5.1.4. Distribution

General

Humpback whales are widely distributed in the Atlantic, Indian, Pacific, and Southern Oceans. Nearly all populations undertake seasonal migrations from their tropical calving and breeding grounds in winter to their high-latitude feeding grounds in summer. Humpbacks may be seen at any time of year in Alaska, but most animals winter in temperate or tropical waters near Mexico, Hawaii, and in the western Pacific near Japan. In the spring, the animals migrate back to Alaska where food is abundant. They tend to concentrate in several areas, including Southeast Alaska, Prince William Sound, Kodiak, the Barren Islands at the mouth of Cook Inlet, and along the Aleutian Islands. The Chukchi Sea is the northernmost area for humpbacks during their summer feeding, although, in 2007, humpbacks were seen in the Beaufort Sea east of Barrow, which would suggest a northward expansion of their feeding grounds (Zimmerman and Karpovich 2008).

In the Project Area

Both general and site-specific information indicate that humpback whales are present in the summer in the action area. Results of satellite tracking indicate that humpbacks frequently congregate in shallow, highly productive coastal areas of the North Pacific Ocean and Bering Sea. The waters surrounding the eastern Aleutian Islands are dominated by strong tidal currents, water-column mixing, and unique bathymetry; these factors are thought to concentrate the small fish and zooplankton that comprise the typical humpback diet in Alaska, creating a reliable and abundant food source for whales (Kennedy *et al*. 2014). Kennedy *et al.* (2014) tagged humpback whales in Unalaska Bay during August and September. Further, Unalaska Island is situated between Unimak and Umnak Passes, which are known to be important humpback whale migration routes and feeding areas (Kennedy *et al*. 2014).

Specific to the project area, UMC personnel and PND biologists conducted protected species surveys in the project vicinity in 2015 - 2016. Figure 7 presents the distribution of humpback whales documented in these protected species surveys (PND 2016).

Figure 7. Humpback whales observed in the proposed action area from August-September, 2015 to June-July, 2016 for the UMC Dock Positions III and IV replacement project, Dutch Harbor, Unalaska, Alaska (PND 2016). Also shows modeled radius of 120-dB isopleth (3,300 m) for vibratory pile-driving and removal and modeled radius of 160-dB isopleth (1,000 meters) for impact pile driving for the UMC Dock Positions III and IV replacement project, Dutch Harbor, Unalaska, Alaska.

5.1.5. Hearing Ability and Vocalizations

Because of the lack of captive subjects and logistical challenges of bringing experimental subjects into the laboratory, no direct measurements of mysticete hearing are available. Consequently, hearing in mysticetes is estimated based on other means such as vocalizations (Wartzok and Ketten, 1999), anatomy (Houser *et al*. 2001; Ketten 1997), behavioral responses to sound (Edds-Walton 1997), and nominal natural background noise conditions in their likely frequency ranges of hearing (Clark and Ellison 2004). The combined information from these and other sources strongly suggests that mysticetes are likely most sensitive to sound from perhaps tens of hertz to ~10 kHz. However, evidence suggests

that humpbacks can hear sounds as low as 7 Hz (Southall *et al*. (2007), up to 24 kHz, and possibly as high as 30 kHz (Au *et al.* 2006; Ketten 1997).

Humpback whales produce a variety of vocalizations ranging from 0.02 to 10 kHz (Winn *et al*. 1970, Tyack and Whitehead 1983, Payne and Payne 1985, Silber 1986, Thompson *et al*. 1986, Richardson *et al*. 1995, Au 2000, Frazer and Mercado III 2000, Erbe 2002, Au *et al*. 2006, Vu *et al*. 2012). NMFS categorizes humpback whales in the low-frequency cetacean functional hearing group. As a group, it is estimated that low-frequency cetaceans can hear frequencies between 0.007 and 25 kHz (NMFS 2016b).

5.1.6 Critical Habitat
There is no critical habitat designated for the humpback whale.

5.2. Steller Sea Lion (Western DPS)
We used information available in the most recent stock assessment (Allen and Angliss 2015), the recovery plan (NMFS 2008), NMFS species information (NMFS 2015c, NMML 2015), and recent biological opinions (NMFS 2015a, b) to summarize the status of the species, as follows.

5.2.1. Status
The Steller sea lion was listed as a threatened species under the ESA on November 26, 1990 (55 FR 49204). In 1997, NMFS reclassified Steller sea lions as two DPSs based on genetic studies and other information (62 FR 24345); at that time the eastern DPS was listed as threatened and the western DPS was listed as endangered. On November 4, 2013, the eastern DPS was removed from the endangered species list (78 FR 66139). Information on Steller sea lion biology, threats, and habitat (including critical habitat) is available online at: http://alaskafisheries.noaa.gov/protectedresources/stellers/default.htm and in the revised Steller Sea Lion Recovery Plan (NMFS 2008), which can be accessed at: http://alaskafisheries.noaa.gov/protectedresources/stellers/recovery/sslrpfinalrev030408.pdf.

5.2.2. Description and Range
Steller sea lions are the largest of the eared seals (Otariidae), though there is significant difference in size between males and females: males reach lengths of 3.3 m (10.8 ft) and can weigh up to 1,120 kg (2469 lb), and females reach lengths of 2.9 m (9.5 ft) and can weigh up to 350 kg (772 lb). Their fur is light buff to reddish brown and slightly darker on the chest and abdomen; their skin is black. Sexual maturity is reached and first breeding occurs between 3 and 8 years of age. Pupping occurs on rookeries in May and June, and females breed 11 days after giving birth. Implantation of the fertilized egg is delayed for about 3.5 months, and gestation occurs until the following May or June.

Most adult Steller sea lions occupy rookeries during pupping and breeding season. During the breeding season, most juvenile and non-breeding adults are at haulouts, though some may be present at or near rookeries. During the non-breeding season many Steller sea lions disperse from rookeries and increase their use of haulouts.

Steller sea lions are generalist predators. They eat a variety of fishes and cephalopods, and occasionally consume marine mammals and birds.

Steller sea lions are distributed throughout the northern Pacific Ocean, including coastal and inland waters in Russia (Kuril Islands and the Sea of Okhotsk), east to Alaska, and south to central California (Año Nuevo Island) (**Figure** 8). 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.

The western DPS includes Steller sea lions that reside primarily in the central and western Gulf of Alaska, Aleutian Islands, and those that inhabit and breed in the coastal waters of Asia (e.g., Japan and Russia). The eastern DPS includes sea lions living primarily in southeast Alaska, British Columbia, California, and Oregon. The action area considered in this Opinion occurs in the range of the western DPS Steller sea lion.

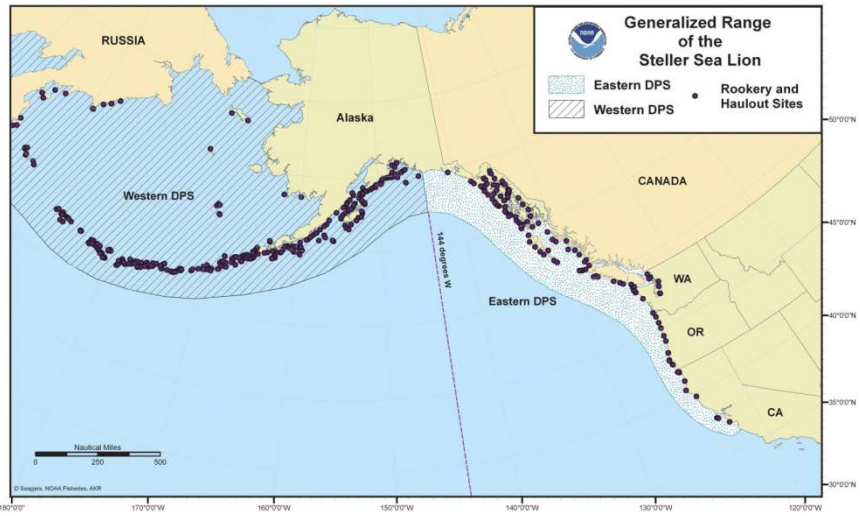


Figure 8. Generalized range of Steller sea lion, including rookery and haulout locations.

Steller sea lions are not known to migrate, but individuals may disperse widely outside the breeding season (late May to early July). At sea, Steller sea lions commonly occur near the 200-m (656-ft) depth contour, but have been seen from near shore to well beyond the continental shelf (Kajimura and Loughlin 1988).

5.2.3. Abundance

The western DPS population declined approximately 75 percent from 1976 to 1990 (the year of ESA-listing). The western DPS population decreased another 40 percent between 1991 and 2000. The most recent comprehensive (pup and non-pup) abundance estimate for the western DPS is 82,516 sea lions. The minimum comprehensive population estimate of western DPS Steller sea lions in Alaska is 48,676 individuals. From 2000 to 2012, the western DPS population increased at an average rate of 1.7 percent annually for non-pups and 1.5 percent annually for pups, though considerable regional variation exists among populations; populations east of Samalga Pass are increasing at an average rate of 2.9 percent annually and populations west of Samalga Pass are decreasing at a rate of -1.5 percent annually (NMFS 2008). The action area for this project is located east of Samalga Pass.

5.2.4. Distribution in the Project Area

Both general and specific information indicates that Steller sea lions are present year-round in the action area. The area is generally attractive to Steller sea lions because potential prey are seasonally present in the Iliuliuk River, a coho, pink, and silver salmon and Dolly Varden-bearing waterbody that empties into Iliuliuk Harbor approximately 1.6 km (1.0 mi) from the action area (ADF&G 2014). Additionally, Steller sea lions are attracted to fishing vessels and fish processing facilities because of possible forage opportunities associated with offal. The Icicle Seafoods Gordon Jensen Pacific cod processing vessel and several fish processing plants and outfalls are located in Dutch Harbor approximately 1.6 km (1.0 mi) from the UMC Dock (ADEC 2014).

Previous surveys also document the presence of Steller sea lions in the project vicinity and action area. During surveys conducted by the National Marine Mammal Laboratory in June 2014, Steller sea lions were present at nine of the 16 sites within a 37-km radius around the UMC dock (Table 7). In June 2014, 105 non-pup Steller sea lions were counted at the Unalaska/Priest Rock haulout (Fritz *et al*. 2015), approximately 15 km (9.3 mi) from the project area. The presence of Steller sea lions in Dutch Harbor was also noted during Steller's eider surveys conducted by the Corps from November to March (i.e., the Steller sea lion non-breeding season) from 2003 to 2013 (NMFS 2016) and by PND 2015 to 2016 (Figure 9).

Figure 9. Steller sea lions observed in the action area from August-September, 2015 to June-July, 2016 (PND 2016). Also shows modeled radius of 120-dB isopleth (3,300 m) for vibratory pile-driving and removal and modeled radius of 160-dB isopleth (1,000 meters) for impact pile driving for the UMC Dock Positions III and IV replacement project, Dutch Harbor, Unalaska, Alaska.

5.2.5. Critical Habitat

NMFS designated critical habitat for Steller sea lions on August 27, 1993 (58 FR 45269). The following essential features were identified at the time of listing:

- Alaska rookeries, haulouts, and associated areas identified at 50 CFR § 226.202(a), including:
  - Terrestrial zones that extend 914 m (3,000 ft) landward;
  - Air zones that extend 914 m (3,000 ft) above the terrestrial zone;
  - Aquatic zones that extend 914 m (3,000 ft) seaward from each major rookery and major haulout east of 144° W. longitude; and
  - Aquatic zones that extend 37 km (23 mi) seaward from each major rookery

and major haulout west of 144° W. longitude; and

- Three special aquatic foraging areas identified at 50 CFR § 226.202(c):
  - Shelikof Strait
  - Bogoslof
  - Seguam Pass

NMFS defines Steller sea lion critical habitat by a 20-nautical mile (nm) radius (straight-line distance) encircling a major haul-out or rookery. The action area for this project is located within designated Steller sea lion critical habitat around one rookery and three haulouts. The three major haulouts within the 20-nm radius (Old Man Rocks, Unalaska/Cape Sedanka, and Akutan/Reef-Lava) are located approximately 16.7, 16.7, and 19nm (straight-line distance) from the action area. The closest rookery is Akutan/Cape Morgan, which is about 19 nm from the project area using straight-line distance over the mountains. Twelve additional haulouts occur within a 37-km (20-nm) radius of the UMC docks (Table 7). As shown in Figure 10, the action area is also located in the Bogoslof special aquatic foraging area.

Table 7. Steller sea lion sites, their approximate distances from the UMC docks, and the number of individuals present during June 2014 National Marine Mammal Laboratory surveys. Critical habitat shown in bold and also provided in nautical miles (nm) from project site.

Steller Sea Lion Site Name and Type	Distance from UMC Dock (km/nm)	Number of Individuals Present in June 2014	
		Non-pup	Pup
Rookeries			
Akutan/Cape Morgan	**35/19**	**1,127**	**748**
Haulouts			
Baby	34	0	0
Egg	33	0	0
Egg/SE Tip	33	10	0
Egg/West	32	0	0
Inner Signal	32	49	0
Old Man Rocks	**31/16.7**	**15**	**0**
Outer Signal	34	1	0
Akutan/Reef-Lava	**35/19**	**352**	**21**
Unalaska/Bishop Point	29	208	3
Unalaska/Brundage Head	24	0	0
Unalaska/Cape Sedanka	**3116.7**	**0**	**0**
Unalaska/Cape Wislow	20	0	0
Unalaska/Makushin Bay	36	47	0
Unalaska/Priest Rock	18	105	0
Unalaska/W of Makushin Bay	36	N/A	N/A

Steller sea lion counts from Fritz et al. (2015).

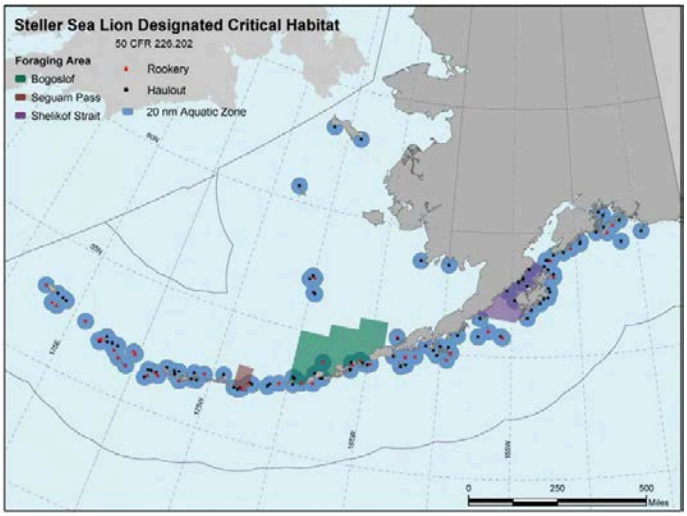


Figure 10. Designated critical habitat for western DPS Steller sea lions.

At the time of designation, the following human activities (and their generalized area of occurrence) were identified as having the potential to "disrupt the essential life functions" that occur in critical habitat (58 FR 45269; Aug. 27, 1993):

- Wildlife viewing (primarily south-central and southeastern Alaska and California)
- Boat and airplane traffic (throughout the range of the Steller sea lion)
- Research activities (on permitted sites and during specified times throughout the year)
- Commercial, recreational, and subsistence fisheries for groundfish, herring, salmon, and invertebrates, e.g., crab, shrimp, sea urchins/cucumbers (throughout the range of the Stellar sea lion)
- Timber harvest (primarily southeastern and south-central Alaska)
- Hard mineral extraction (primarily southeastern Alaska)
- Oil and gas exploration (primarily Bering Sea and Gulf of Alaska)
- Coastal development, including pollutant discharges (specific sites throughout range)
- Subsistence harvest (Alaska)

Threats to critical habitat in the action area are discussed further in Section 6 of this Opinion.

PND (2016) reports that the benthic habitat surveys using a remotely operated vehicle around the UMC Dock in 2014 noted various organisms including anemones, urchins, kelp, and sea stars. Throughout the action area, the habitat has characteristics that change with depth, forming distinct 'bio-bands.' Further information and photographs of the benthic habitat are presented in PND (2016).

5.2.6. Hearing Ability

The ability to detect sound and communicate underwater and in-air 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. As a group, it is estimated that otariid pinnipeds can hear frequencies between 0.1 and 48 kHz in water (NMFS 2016b). Southall *et al*. (2007) categorizes

Steller sea lion in the pinniped function hearing group[7] and estimated, as a group, that pinnipeds can hear frequencies between 0.075 to 30 kHz in air.

6.0. ENVIRONMENTAL BASELINE

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 area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR § 402.02).

A number of human activities have contributed to the current status of populations of ESA-listed humpback whales and Steller sea lions in the action area. Many of these factors apply to both species. The factors that have likely had the greatest impact are discussed in the sections below. For more information on all factors affecting the ESA-listed species considered in this Opinion, please refer to the following documents:

• "Alaska Marine Mammal Stock Assessments, 2014" (Allen and Angliss 2015). Available online at http://www.nmfs.noaa.gov/pr/sars/pdf/alaska2014_final.pdf.

• "Status Review of the Humpback Whale (Megaptera novaeangliae) under the Endangered Species Act" (Bettridge *et al*. 2015). Available online at http://www.nmfs.noaa.gov/pr/species/Status%20Reviews/humpback_whale_sr_2015.pdf.

• "Recovery plan for the Steller sea lion (Eumetopias jubatus). Revision." (NMFS 2008). Available online at https://alaskafisheries.noaa.gov/sites/default/files/sslrpfinalrev030408.pdf.

6.1. Humpback Whale

In the recent "Status Review of the Humpback Whale (*Megaptera novaeangliae*) under the Endangered Species Act," Bettridge *et al*. (2015) identified and described major threats to each DPS of ESA-listed humpback whales.

The main human activities known to have affected the status of the ESA-listed western North Pacific DPS and Mexico DPS humpback whales in the vicinity of the action area include whaling, climate change, entanglement (principally in commercial fishing gear), shipping, coastal development such as port expansion, oil and gas development, and harmful algal blooms (HABs) (Bettridge *et al*. 2015). With the exception of whaling (discussed below), these activities may also have impacts to Steller's sea lions.

6.1.1. Whaling

Historically, commercial whaling represented the greatest threat to every population of humpback whales and was ultimately responsible for listing humpback whales as an endangered species. From 1900 to 1965, nearly 30,000 whales were taken in modern whaling operations of the Pacific Ocean. Prior to that, an unknown number of humpback whales were taken (Perry *et al*. 1999). In 1965, the International Whaling Commission banned commercial hunting of humpback whales in the Pacific Ocean.

There are no reported takes of humpback whales from the western North Pacific or Mexico DPS by subsistence hunters in Alaska or Russia for the 2008-2012 period (Allen and Angliss 2015). However, on approximately May 12, 2016, a humpback whale was harvested, in violation of the Whaling

[7] Note that all pinnipeds (i.e., both otariid and phocid pinnipeds) are included in this functional hearing group.

Convention Act (WCA), near the Village of Toksook Bay, Alaska, which is about 400 miles north of Dutch Harbor. The whale was reported to have been in the bay and became a target of opportunity by Alaska Natives who may have been unaware of the WCA.

6.2. Steller Sea Lion

In the revised Steller sea lion recovery plan (NMFS 2008), the recovery team identified and described 11 factors that may be threats to the recovery of the species (NMFS 2008). Table 8 shows the age class and sex most vulnerable to, and the frequency of occurrence of, each threat; the amount of uncertainty about each threat's influence on Steller sea lion population dynamics; and the relative impact of each threat to the recovery of the species.

Table 8. Summary of threats to Steller sea lion recovery, including the ages and sexes most vulnerable, frequency of threat occurrence, uncertainty of threat impact to recovery, feasibility of threat mitigation, and relative impact of threat to recovery.

Threat	Age Class Most Vulnerable	Sex Most Vulnerable	Frequency of Occurrence of Threat	Uncertainty of Threat Impact to Recovery	Feasibility of Mitigation	Relative Impact to Recovery
Alaska Native subsistence harvest	Adult Juvenile	M	Medium	Low	High	Low
Competition with fisheries	Adult Juvenile	F M, F	High	High	High	Potentially high
Disease and parasites	Adult Pup	F M, F	High	Medium	Low	Low
Disturbance due to research activities	Pup	M, F	Medium	Low	High	Low
Disturbance from vessel traffic and tourism	Pup	M, F	Medium	Medium	High	Low
Entanglement in marine debris	Juvenile	M, F	Medium	Medium	Medium	Low
Environmental variability	Adult Juvenile	F M, F	High	High	Low	Potentially high
Illegal shooting	Juvenile Adult	M, F	Low	Medium	Medium	Low
Incidental take due to active fishing gear interactions	Juvenile	M, F	Medium	Medium	Medium	Low
Predation by killer whales	Juvenile Pup	M, F	High	High	Low	Potentially high
Toxic substances	Adult Pup	F M, F	High	High	Medium	Medium

Table adapted from NMFS (2008).

In addition to the threats shown in Table 8, it is likely that Steller sea lions in the action area have become conditioned to associate fishing vessels with easy access to food. The factors that have likely

had the greatest impact on western DPS Steller sea lions in the action area are discussed in the sections below. For more information on the threats and factors listed above, but not discussed in the sections below, please see the "Recovery Plan for the Steller Sea Lion" (NMFS 2008), available online at https://alaskafisheries.noaa.gov/pr/ssl-recovery-plan.

6.2.1. Fisheries – Competition

The potential impact of competition with fisheries, through localized reduction in the amount and quality of Steller sea lion prey species, has caused considerable debate among the scientific community. The primary issue of contention is whether fisheries reduce Steller sea lion prey biomass and quality at local and/or regional spatial scales that may lead to a reduction in Steller sea lion survival and reproduction, and if sustained, their recovery. The effect of fisheries on the distribution, abundance, and age structure of the Steller sea lion prey field, at the spatial scale of foraging sea lions and over short and long temporal scales, is largely unknown (NMFS 2008).

6.2.2 Fisheries – Conditioning and Habituation

Steller sea lions are likely drawn to the action area by the abundant and predictable sources of food provided by commercial fishing vessels and fish processing facilities. Sea lions are sighted more often when fishing boats are docked at facilities and are often observed foraging near fishing boats that are docked (NMFS 2016), suggesting sea lions in the Dutch Harbor area are habituated to the presence of fishing vessels and are likely conditioned to associating fishing boats with easy access to food (80 FR 79822; Dec. 23, 2015).

6.3 Factors Affecting Both Steller Sea Lions and Humpback Whales.

6.3.1. Climate Change

Climate change is a factor potentially affecting the range-wide status of all species (including humans) and is of particular relevance for Arctic species. The general discussion in this Section applies to all species addressed in this Opinion. Additional information may be found in the Environmental Baseline Section. We note that the duration of this action is less than one year. Over such a short project duration, climate change-driven changes to the effects of this action are expected to be de minimis.

Since the 1950s the atmosphere and oceans have warmed, snow and sea ice have diminished in both areal extent and volume, sea level has risen, and concentrations of greenhouse gases have increased. The time period 1983-2012 was likely the warmest 30-year period in the Northern Hemisphere in the last 1400 years (IPCC 2013). There has been strong scientific consensus over the past two decades that atmospheric temperatures are increasing, affecting many of the earth's climate-related processes (IPCC 1990; Houghton *et al*. 2001; Oreskes 2004; Frame and Stone 2013; NASA 2016). The overwhelming majority of climate scientists agree that human activities, especially the burning of fossil fuels (coal, oil, and gas), are responsible for most of the climate change currently being observed (NRC 2012).

Effects to marine ecosystems from increased atmospheric CO_2 and climate change include ocean acidification, expanded oligotrophic gyres, and shifts in temperature, circulation, stratification, and nutrient input (Doney *et al*. 2012). Altered oceanic circulation and warming cause reduced subsurface oxygen concentrations (Keeling *et al*. 2010). These large-scale shifts have the potential to disrupt existing trophic pathways as change cascades from primary producers to top level predators (Doney *et al*. 2012, Salinger *et al*. 2013). Effects to marine mammals could result from changes in the distribution

of temperatures suitable for rearing young, the distribution and abundance of prey, and the distribution and abundance of competitors or predators.

The potential impacts of climate and oceanographic change on whales and sea lions will likely affect habitat availability and food availability. Site selection for feeding, breeding, and whale migration may be influenced by factors such as ocean currents and water temperature. For example, there is some evidence from Pacific equatorial waters that sperm whale feeding success and, in turn, calf production rates are negatively affected by increases in sea surface temperature (Smith and Whitehead 1993, Whitehead 1997). Any changes in these factors could render currently used habitat areas unsuitable. Changes to climate and oceanographic processes may also lead to decreased prey productivity and different patterns of prey distribution and availability. Such changes could affect whales and sea lions that are dependent on those affected prey. Variations in sea-surface temperatures and the extent of sea-ice cover during the winter months have been linked to variations in the recruitment of krill (*Euphausia superba*) and the reproductive success of krill predators. Different species of whales will likely react to these changes differently. For example, range size, location, and whether or not specific range areas are used for different life history activities (e.g., feeding, breeding) are likely to affect how each species responds to climate change (Learmonth *et al*. 2006).

Climate change will affect pinnipeds on land where they rest and give birth to young, and at sea where they forage. On land, sea level rise and larger, more frequent storms may reduce or eliminate resting and birthing areas. (Learmonth *et al*. 2006; NPS 2016). Changes in ocean currents, ocean acidification, and other alterations in climate cycles such as changes in the frequency of El Nino events are likely to alter ocean food webs and affect the abundance and diversity of prey items. These changes may also affect susceptibility to diseases. Some changes may be positive. For example, new suitable habitats may become available for some species (Learmonth *et al*. 2006, NPS 2016).

The most pronounced warming is expected in the north, exceeding the estimate for mean global warming by a factor or 3, due in part to the "ice-albedo feedback loop." As the reflective areas of Arctic ice and snow retreat, the northern latitudes absorb more heat, exacerbating the warming (NRC 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 (NRC 2012).

6.3.2. Fisheries - Incidental Take and Entanglement

Commercial fisheries operate in and around Dutch Harbor. The nearby UniSea G1 facility in Illiuliuk Harbor has the capacity to process more than 2.5 million pounds of fish per day, and the G2 facility is "one of the most efficient, highest volume pollock processing facilities in the world" (Graham 2009).

Humpback Whales

Humpback whales are killed or injured during interactions with commercial fishing gear and other entanglements, although the available evidence suggests that these interactions may not have significant, adverse consequences for the listed humpback whale DPSs in the action area (Bettridge *et al*. 2015).

Along the Pacific coast of Canada, 40 humpback whales have been reported as entangled since 1980, four of which are known to have died (Ford *et al*. 2009, COSEWIC 2011). A photography study of humpback whales in southeastern Alaska in 2003 and 2004 found at least 53% of individuals showed some kind of scarring from entanglement (Neilson *et al*. 2005). However, very few stranding reports are

received from areas west of Kodiak where this proposed action is occurring. Between 2008 and 2012, there were two mortalities of humpback whales near Dutch Harbor in the Bering Sea/Aleutian Islands pollock trawl fishery, and one mortality in the Bering Sea/Aleutian Islands flatfish trawl (Allen and Angliss 2015). The mean annual human-caused mortality and serious injury rate for 2008-2012 based on fishery and gear entanglements reported in the NMFS Alaska Regional Office stranding database is 0.3 (Allen and Angliss 2015). These events have not been attributed to a specific fishery (76 FR 73912; Nov. 29, 2011). No observers have been assigned to several fisheries that are known to interact with these listed humpback stocks, making the estimated mortality rate unreliable.

Steller Sea Lions

The most recent minimum total annual incidental take of western DPS Steller sea lions associated with commercial fisheries is 31.5 individuals (Table 9).

Table 9. Summary of most recent data available for western DPS Steller sea lion incidental mortalities associated with commercial fisheries in Alaska.

Fishery Name	Year(s)	Mean Annual Mortality
Bering Sea/Aleutian Islands		
Atka mackerel trawl	2008 – 2012	0.2
Flatfish trawl	2008 – 2012	6.4
Pacific cod trawl	2008 – 2012	0.4
Pollock trawl	2008 – 2012	8.2
Gulf of Alaska		
Pacific cod longline	2008 – 2012	0.5
Pacific cod trawl	2008 – 2012	0.2
Sablefish longline	2008 – 2012	1.1
Prince William Sound		
Salmon drift gillnet	1990 – 1991	14.5
Salmon set gillnet	1990	0
Alaska Peninsula/Aleutian Islands		
Salmon drift gillnet	1990	0
Cook Inlet		
Salmon set gillnet	1999 – 2000	0
Salmon drift gillnet	1999 – 2000	0
Kodiak Island		
Salmon set gillnet	2002	0
MINIMUM TOTAL ANNUAL MORTALITY		**31.5**

Table adapted from Allen and Angliss (2015).

Take (in the form of serious injury or mortality) resulting from entanglement or hooking by fishing gear in the Bering Sea/Aleutian Islands groundfish fisheries, authorized from 2014 to 2016, was limited to a total of 42 Steller sea lions during that three-year period (NMFS 2014).

The most recent minimum total annual mortality of western DPS Steller sea lions reported to the NMFS stranding network is 4.2 individuals (Table 10). This estimate is considered a minimum because not all entangled animals strand and not all stranded animals are found or reported. Steller sea lions reported to the stranding network as having been shot are not included in this estimate, as they may result from animals struck and lost in the Alaska Native subsistence harvest.

Table 10. Summary of most recent mortalities of western DPS Steller sea lions reported to the NMFS stranding network in Alaska.

Cause of Injury	Year(s)	Mean Annual Mortality
Swallowed troll gear	2008 – 2012	1
Ring neck entanglement (packing band)	2008 – 2012	1.8
Ring neck entanglement (unknown marine debris/gear)	2008 – 2012	1.2
Swallowed unknown fishing gear	2008 – 2012	0.2
MINIMUM TOTAL ANNUAL MORTALITY		**4.2**

Table adapted from Allen and Angliss (2015).

6.3.3. Vessel Collision

Dutch Harbor is a busy industrial port that services Alaskan, U.S., and international shipping and fisheries. The number of vessels that make a port of call in Unalaska/Dutch Harbor annually is upward of 400, most of them fishing boats, with peak traffic from July to October (Nuka Research Planning Group, LLC and Cape International, Inc. 2006, Port of Dutch Harbor 2017) when humpbacks are most abundant in the area.

Vessel collisions with humpback whales remain a significant management concern, given the increasing abundance of humpback whales foraging in Alaska, as well as the growing presence of marine traffic in Alaska's coastal waters and in the Dutch Harbor area. Based on these factors, injury and mortality of humpback whales as a result of vessel strike may likely continue, or possibly increase, in the future (NMFS 2006b).

The mean annual human-caused mortality and serious injury rate for 2008-2012 due to vessel collisions reported in Alaska is 2.36 humpbacks. Most vessel collisions with humpbacks are reported from Southeast Alaska, and it is not known whether the difference in ship strike rates between Southeast Alaska and other portions of the humpback whale range in Alaska is due to differences in reporting, amount of vessel traffic, densities of animals, or other factors (Allen and Angliss 2015).

Although risk of ship strike has not been identified as a significant concern for Steller sea lions (Loughlin and York 2000), the recovery plan for this species states that Steller sea lions may be more susceptible to ship strike mortality or injury in harbors or in areas where animals are concentrated (e.g., near rookeries or haulouts; NMFS 2008). Additionally, sea lions are sighted more often when fishing boats are docked at facilities and are often observed foraging near fishing boats that are docked (NMFS 2016), suggesting sea lions in the Dutch Harbor area are habituated to the presence of fishing vessels and are likely conditioned to associating fishing boats with easy access to food (80 FR 79822; Dec. 23, 2015). Such habituation could potentially lead to greater risk of inadvertent contact with vessel hulls or rotors.

6.3.4. Oil and Gas Development

There have been proposals to open exploration and drilling near the action area in the southeastern Bering Sea, notably in the North Aleutian Basin. While in 2010 this region was removed from consideration for oil and gas lease sales, if such activity were authorized in the future, the potential for spills and resulting direct contamination and effects to feeding areas would represent additional threats to all marine mammals. While there are no current oil and gas leases or plans to sell any leases near the action area, activities associated with oil and gas in other ocean basins can have an impact in the Dutch Harbor area. For example, Shell Gulf of Mexico and Shell Offshore Inc. used Dutch Harbor as a base for its Chukchi Sea exploration activity in 2015. That activity included rigs docking in Dutch Harbor; off-shore supply vessels made approximately 30 trips total back and forth from Dutch Harbor to the drilling site in the Chukchi Sea for resupply.

NMFS conducted an incremental step consultation with BOEM and BSEE in 2015 on lease sale 193 oil and gas exploration activities in the Chukchi Sea, Alaska, over a nine-year period, from June 2015 to June 2024. As part of the 2015 ESA consultation on lease sale 193 oil and gas exploration activities in the Chukchi Sea, NMFS considered activities in and around Dutch Harbor associated with the transit to the Chukchi Sea. It concluded that ship interactions with Steller sea lions would be insignificant in their effect. Ship interactions with humpbacks were considered to be discountable (see NMFS 2015c).

6.3.5. Toxic Substances

Leaks and spills have been reported from fuel tanks and tank farms in the Unalaska area. The State of Alaska Department of Environmental Conservation (ADEC) listed Dutch Harbor as “impaired” on the 1990 Clean Water Act section 303(d) list of impaired waters due to non-attainment of water quality standard for petroleum hydrocarbons and petroleum products (i.e., oil and grease). In its 2010 (i.e., most recent) section 303(d) total maximum daily load assessment of the area, ADEC found that Dutch Harbor met applicable water quality standards and removed the waterbody from the 303(d) list. However, areas of Dutch Harbor are still considered impaired due to oil sheens in sediments (ADEC 2010). The 2010 report found that Dutch Harbor was among the most impacted areas within the areas reported in Unalaska, with contamination more likely to occur around active docks. The potential sources of this contamination include several previously contaminated sites nearby as well as many industrial sources that currently operate within the harbor area. OASIS (2006) provides more information on contaminants at Dutch Harbor.

6.3.6. Harmful Algal Blooms (HABs)

Naturally occurring biotoxins from dinoflagellates and other toxins are known to exist within the range of these DPSs. Although humpback whale and Steller sea lion mortality as a direct result of exposure to biotoxins has not been unequivocally documented in the Aleutians, it is possible that biotoxins played a role in the Unusual Mortality Event observed in the western Gulf of Alaska in 2015 (Desroches 2015; NOAA 2016). The occurrence of HABs in Alaska is expected to increase with the growth of various types of human- related activities, and with increasing water temperatures (Lefebvre *et al*. 2016). NOAA has reported that during 2014 and 2015, the North Pacific Ocean has been the warmest measured for such a long period of time, with sea surface temperatures as much as 5.4 degrees Fahrenheit higher than average. Increasing ocean temperatures are expected to exacerbate blooms of the Pseudo-nitzschia diatoms in Alaska waters. This marine phytoplankton produces the paralytic shellfish poisoning neurotoxin domoic acid (DA) which has been implicated in causing mortality of marine mammals. Lefebvre *et al*. (2016) found that, among 10 species of marine mammals, humpback whales accounted

for half of the individuals that tested positive for saxitoxin (STX), another paralytic shellfish poisoning neurotoxin. Lefebvre *et al*. (2016) also found that 38% of humpbacks tested positive for DA, which was a lower rate than harbor seals, walrus, and harbor porpoise but higher than 8 other marine mammal species. The highest DA and STX concentrations were found in a humpback that died from a ship strike, which may not be a coincidence because STX and DA intoxication have been suggested to be a factor in the loss of ability to avoid ships and to be a cause of stranding. The humpbacks that tested positive for HABs were all sampled in Southeast Alaska; no humpbacks were sampled near the action area. However, Steller sea lions, as well as other marine mammals from the Aleutians, did test positive for HABs. The number of species and the extensive geographic range in which DA and STX were detected in the Lefebvre *et al*. (2016) study demonstrates that HABs are present throughout the Alaskan marine environment; thus the potential for health effects due to exposure is a possible threat for humpback whales and Steller sea lions. A DA outbreak is the suspected agent in the current mortality event of sea lions and other pinnipeds in California (Ritchie 2017).

6.3.7. Anthropogenic Noise

Steller sea lions and humpback whales in the action area are exposed to numerous sources of natural and anthropogenic noise. Natural sources of underwater noise include sea ice, wind, waves, precipitation, and biological noise from marine mammals, fishes, and crustaceans. Anthropogenic sources of noise include noise generated by vessels (used for fishing, shipping, transportation and research), aircraft, and marine and coastal construction. Commercial ships that frequent the area can emit underwater sounds of over 120 dB re 1 μPa_{rms} at distances of 3 km (1.86 mi) (McKenna *et al*. 2012).

Because responses to anthropogenic noise vary among species and individuals within species, it is difficult to determine long-term effects. Habituation 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). Habitat abandonment due to anthropogenic noise exposure has been found in terrestrial species (Francis and Barber 2013). Clark *et al*. (2009) identified increasing levels of anthropogenic noise 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.

Steller sea lions are sighted more often when fishing boats are docked at the project site and are often observed foraging near fishing boats that are docked at the UMC facility, suggesting sea lions in Dutch Harbor area are habituated to the presence of fishing vessels and, presumably, to the presence of shipping vessels and noises associated with the industrial activities in and around Dutch Harbor (NMFS 2016).

Coastal development, which may include projects such as port expansion or waterfront development, is ongoing in the action area. Given continued human population growth in the region (Zador 2016), the threat can be expected to increase. Many of these developments generate noise at levels above NMFS harassment thresholds.

There has been an increase in dock construction and expansion in the action area in recent years. In addition to this proposed action, in 2015 UniSea proposed to construct a commercial fishing dock in Iliuliuk Harbor, and Offshore Systems, Inc. proposed to expand a dock in Captains Bay. In 2016 the City of Unalaska proposed to expand the existing Light Cargo Dock in Dutch Harbor, Northern Alaska

Contractors proposed to dredge and fill at an existing barge loading facility, Icicle Seafoods proposed reconstruction and expansion of their existing dock and reinstallation of an outfall line in Dutch Harbor, and Kloosterboer LLC proposed expanding their existing Dutch Harbor facilities. Coastal Transportation Inc. also has plans in Iliuliuk Harbor for a Coastal Mid-Channel Dock expansion in 2017.

6.4 Factors Affecting Steller Sea Lion Critical Habitat within the Action Area

The action area is located within designated critical habitat surrounding the Akutan/Cape Morgan rookery and the Old Man Rocks, Unalaska/Cape Sedanka, and Akutan/Reef-Lava haulouts and is located in the Bogoslof special aquatic foraging area (see Section 5.2.5 of this Opinion). However, the action area is also located in an industrialized port with ongoing disturbance. We expect the factors affecting the species discussed earlier in Section 6 of this Opinion have also contributed to the baseline condition of critical habitat in the action area, in particular the following factors:

- Climate change
- Anthropogenic noise
- Fisheries
- Toxic substances

7.0. EFFECTS OF THE ACTION

"Effects of the action" means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action that will be added to the environmental baseline. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR § 402.02).

The proposed activities of primary concern to ESA-listed humpback whales and Steller sea lions include exposure to sounds from pile driving, pile removal, drilling, and quarry blasting. Associated factors such as increased potential for vessel strike, pollution, and sedimentation during project construction are considered to have minimal effects, due to construction practices and mitigation measures incorporated into the project design.

In analyzing effects to species, we consider the action's timing, duration, nature of effect, and the frequency, intensity, and severity of disturbance. The timing of the activity likely will have no effect on breeding of Steller sea lions or humpback whales, since they do not breed in the immediate project vicinity (humpbacks in the area breed primarily in Hawaiian waters, and the nearest Steller sea lion rookery (Akutan/Cape Morgan) is about 19 nm from the project area using straight-line distance over land and water). The proposed action area represents a small portion of the geographic range of the species. Further, the project duration is one year, so any impacts in the project area likely will not have significant or long-term adverse impact on species' distribution. Therefore, we focus our analysis on the intensity and severity of effects to the species.

The proposed action is expected to result in non-lethal, non-injurious harassment of Steller sea lions and humpback whales. The ESA does not define harassment, and NMFS has not defined this term through regulation pursuant to the ESA. NMFS recently developed interim guidance interpreting "harass" under the ESA to mean: "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" (Weiting 2016). The MMPA defines Level B harassment as: "any act of pursuit, torment, or annoyance" which has "the potential to disturb a marine mammal or marine mammal stock in the

wild by causing [any] disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering" (16 U.S.C. § 1362(18)(A)(ii)).

7.1. Stressors

During the course of this consultation, we identified the following potential stressors from the proposed activities:

- In-air and underwater sounds from:
  - Vibratory pile-driving and removal
  - Impact pile-driving
  - Quarry blasting
- Direct contact with:
  - Piles, during placement
  - Sound attenuation devices, during placement and removal
  - Existing structures and riprap, during removal
- Disturbance of sediment
- Direct loss of critical habitat

Below we discuss each stressor's potential to affect ESA-listed species.

7.1.1. Stressors Not Likely to Adversely Affect ESA-Listed Species and Critical Habitat

Based on a review of available information, we determined which of the possible stressors may occur, but are discountable or insignificant and, therefore, need not be evaluated further in this Opinion.

Direct Contact

Though it is possible that western DPS Steller sea lions and humpback whales could come in direct contact with, and suffer injury from, piles and sound attenuation devices during their placement or existing structures or riprap during removal, it is unlikely. The Level A shutdown zones implemented during construction (Table 3) will make these activities extremely unlikely to impact Steller sea lions or humpback whales; therefore, we conclude the effects from this stressor are discountable.

Disturbance of Sediment

A small amount of sediment will be disturbed and may temporarily impact water quality during pile-driving and removal, drilling, and removal of existing structures and riprap. This will occur in the area immediately surrounding these activities. Suspended sediments are not expected to persist in the area for more than a few hours because tidal action will sufficiently disperse them to a point where their concentration in the water column is not detectably different from surrounding waters. Only clean fill will be placed below HTL. Fill will be placed in each cell after the installation of the sheet piles. The sheet piles will keep sediment contained behind each cell. For these reasons, we do not expect this project, which replaces an old dock with a new dock of similar dimensions and capacity, will affect water quality to any measurable degree during construction, nor is it likely to cause future impacts that are measurably different from the existing environmental baseline. Therefore, we conclude the effects from this stressor are insignificant.

Direct Loss of Critical Habitat

The project will result in the direct loss of 1.1 ha (2.8 ac) of critical habitat that will be filled by the installation of the sheet pile bulkhead dock. However, most of the area to be filled is already occupied by the existing dock structures (Figure 1), and it is not currently used by Steller sea lions. There is no other permanent loss of critical habitat associated with the proposed project. While the action area is located in critical habitat because it is within 20 nmi of a major rookery, and three major haulouts that are designated critical habitat, the project location is near the outer fringe of critical habitat; the UMC dock is 35.2 km (19.3 nmi) from the nearest rookery (i.e., Akutan/Cape Morgan) and it is 27.4-35.4 km (14.8-19.1 nmi) from the nearest major haulouts (i.e., Old Man Rocks, Unalaska/Cape Sedanka, and Akutan/Reef-Lava). Furthermore, the project is located within a highly industrialized port which does not currently function as high quality Steller sea lion habitat or foraging area. As shown in Figure 9, an intensive, year-long survey documented numerous Steller sea lions in the project vicinity, but none in the area to be filled (PND 2016). Although the area to be filled technically meets the distance criteria used to define Steller sea lion critical habitat, it provides few if any of the physical and biological features required by the species. Although the action area is within the Bogoslof special aquatic foraging area, the area in which the loss will occur is diminishingly small compared to the entire Bogoslof foraging area, and no measurable effects to the ecological functionality of this special foraging area are expected to result from this project. Even though the value of the critical habitat that will be lost due to this project is quite low due to the presence of the existing dock, the proportion of Steller sea lion critical habitat that will be lost due to this project is de minimus.

It is extremely unlikely that the small loss of ecologically compromised critical habitat in a highly industrialized area will diminish the role of that habitat for the survival and recovery of Steller sea lions, nor will that loss diminish the value of the entire area designated as critical habitat for Steller sea lions to any measurable degree; therefore, we conclude such effects from the loss of critical habitat to be insignificant in terms of the conservation value of Steller sea lion critical habitat.

Summary of Stressors Not Likely to Adversely Affect ESA-Listed Species

In conclusion, based on review of available information, we have determined that effects to western DPS Steller sea lions and western North Pacific and Mexico DPS humpback whales from direct contact, and physical injury from pile-driving and removal, drilling, and removal of existing structures and riprap are extremely unlikely to occur. We consider the effects to western DPS Steller sea lions and humpback whales from this stressor to be discountable.

We determined project-related disturbance of sediment will have insignificant effects on western DPS Steller sea lions and humpback whales and the direct loss of Steller sea lion critical habitat related to this project will have insignificant effects on designated critical habitat.

7.1.2. Stressors Likely to Adversely Affect ESA-Listed Species

The following sections analyze the stressor likely to adversely affect ESA-listed species:
sounds from vibratory pile-driving and removal, and impact pile-driving underwater. The in-air sounds associated with pile driving and quarry blasting may also have some limited effects on Steller sea lions. The frequencies emitted by vibratory and impact pile-driving are estimated to range from 0.01 to 1.5 kHz, therefore mostly within the expected hearing range of Steller sea lions and humpback whales (Table 11).

Table 11. Functional Marine Mammal Hearing Groups, Auditory Bandwidth[1].

Functional Hearing Group: ESA-Listed Species	Estimated Auditory Bandwidth

that May Occur in the Action Area	Southall *et al*. (2007)	Ciminello *et al*. (2012)
Low-frequency (LF) cetaceans: humpback whale	7 Hz to 22 kHz	5 Hz to 30 kHz
Otariid Pinnipeds (in air): Steller sea lion	75 Hz to 30 kHz	100 Hz to 30 kHz
Otariid Pinnipeds (in water): Steller sea lion	75 Hz to 75 kHz	100 Hz to 40 kHz

[1] Estimated Lower to Upper Frequency Hearing Cut-off

Injury (Level A Harassment)

The modeled radii for impact pile driving and the methods of their derivation are presented above, in Section 2.4.3 of this Opinion and in Appendix 1. The applicants indicate that if any marine mammal appears about to enter the Level A harassment (injury) zone, all pile driving will shut down immediately, until the animal has voluntarily left the Level A harassment zone. With this procedure incorporated into the project design (Table 3; see also Appendix 1), we anticipate no injury (Level A harassment) to western DPS Steller sea lions or western North Pacific or Mexico DPS humpback whales associated with this activity.

Behavioral Disturbance (Level B Harassment)

The modeled radii for vibratory pile-driving, removal, and drilling and the methods of their derivation are presented above, in Section 2.4.3 of this Opinion and in Appendix 1. As indicated in Table 4, the calculated radius of the 160 dB isopleth for impact pile driving is 1000 m. Calculated radii to the 120 dB isopleth for vibratory driving, removal, and drilling vary, but with one exception (removal of timber piles) they are all greater, some much greater, than the proposed 3300 m monitoring zone. However, as can be seen in Figure 4, 3300 m is the greatest distance that underwater sound can emanate from the UMC dock, due to the configuration of land masses surrounding Dutch Harbor.

7.2. Exposure

Our exposure analyses are designed to identify the ESA-listed resources that are likely to co-occur with the action's effects in space and time, as well as the nature of that co-occurrence. In this step of our analysis, we try to identify the number, age (or life stage), and sex of the individuals that are likely to be exposed to the action's effects and the population(s) or subpopulation(s) those individuals represent.

7.2.1. Underwater Sounds

The number of marine mammals expected to be taken by behavioral harassment is usually calculated by multiplying the expected densities of marine mammals in the survey area by the area ensonified in excess of 120 and 160 dB re 1 μPa_{rms}, though the method to calculate take may vary, depending on the information available. In the early stages of this consultation, we reviewed with the Permits Division the available marine mammal occurrence data in or near the action area. We agreed the data collected from marine mammal surveys in Dutch Harbor in 2015 and 2016 represent the best available scientific information on marine mammal occurrence in the action area. The Permits Division adopted COU calculated exposures of marine mammals from their IHA application (PND 2016 Appendix F) for use in the proposed IHA (81 FR 78969; Nov. 10, 2016) and we have adopted them for our exposure analysis here.

Take estimates for Steller sea lions and humpback whales (as well as harbor seals and killer whales in the action area, which are not listed under the ESA) were calculated using the following series of steps:

- The average hourly rate of animals observed during 2015-2016 marine mammal surveys at Dutch Harbor was calculated separately for both species ("Observation Rate").

- The 95 percent confidence interval was calculated for the data set, and the upper bound of the 95 percent confidence interval was added to the Observation Rate to account for variability of the small data set ("Exposure Rate").
- The total estimated hours of pile driving work over the entire project was calculated. "Duration" = total number of work days (245) X average active pile driving/removal hours per day (6) = total work hours for the project (1,470); and
- The estimated number of exposures was calculated by multiplying the "Duration" by the estimated "Exposure Rate" for each species.

Observation and exposure rates and estimated exposures as follows:

$$Observation\ Rate\ (OR) = \frac{No.of\ animals\ observed}{Hours\ of\ observation}$$

$$Exposure\ Rate\ (XR) = \mu_{OR} + CI_{95}$$

where: $\mu_{OR} = Average\ of\ Monthly\ Observation\ Rates$

$CI_{95} = 95\%\ Confidence\ Interval\ (Normal\ Distribution)$

$$CI_{95} = 1.96 \cdot \left(\frac{standard\ deviation}{sample\ size}\right)$$

$$Estimated\ Exposures = XR \times Duration\ (hours)$$

Table 12 shows the number of western DPS Steller sea lions and humpback whales observed in Dutch Harbor in 2015 and 2016 by month, the number of hours of observation per month, and the rate of Steller sea lions observed per hour.

Table 12. Monthly western DPS Steller sea lion and humpback whale observations in 2015 and 2016 in Dutch Harbor, Alaska.

Month	Hours of Observation	Individuals Observed		Monthly Observation Rates (OR)	
		Steller Sea	Humpback Whale	Steller Sea Lion	Humpback Whale
Apr-15	8	0	0	0.000	0.000
May-15	8.5	1	0	0.118	0.000
Jun-15	13.5	2	0	0.148	0.000
Jul-15	11.25	1	0	0.089	0.000
Aug-15	6.75	9	2	1.333	0.296
Sep-15	10.25	9	2	0.878	0.195
Oct-15	3	1	0	0.333	0.000
Nov-15	4.5	0	0	0.000	0.000
Dec-15	3	4	0	1.333	0.000
Jan-16	2.25	0	0	0.000	0.000
Feb-16	2	0	0	0.000	0.000

Mar-16	1.5	1	0	0.667	0.000
Apr-16	37.25	13	0	0.349	0.000
May-16	21.25	13	0	0.612	0.000
Jun-16	17.25	0	7	0.000	0.406
Jul-16	30.75	18	1	0.585	0.033
Average of monthly observation rates (μOR)				**0.40**	**0.06**
Standard Deviation				**0.46**	**0.13**
95% Confidence Interval (Normal Distribution) (CI_{95})				**0.23**	**0.06**
Exposure Rate (XR)				**0.63**	**0.12**
Estimated Exposures				**926**	**176**

Based on this information, the following exposure estimates were calculated:
Steller sea lion:
μOR = 0.40 animals/hour + CI_{95} = 0.23 animals/hour = XR = 0.63 animals/hour
Estimated Exposures = 0.63 animals/hour * 1,470 hours = **926 exposures**

Humpback Whale:
μOR = 0.06 animals/hour + CI_{95} = 0.06 animals/hour = XR = 0.12 animals/hour
Estimated exposures = 0.12 animals/hour * 1,470 hours = **176 exposures**

Due to the project location, it is virtually certain that all estimated Steller sea lion exposures will be to individuals of the western DPS. Of the estimated 176 humpback whale exposures, given the probabilities calculated by Wade *et al.*(2016) and NMFS (2016c), we would expect 4.4%, or 7.7 (rounded to 8) exposures of endangered western North Pacific DPS humpback whales and 11.3%, or 19.9 (rounded to 20) exposures of threatened Mexico DPS humpback whales.

These are considered reasonable estimates of the number of ESA-listed marine mammal exposures to sound above the Level B harassment threshold that are likely to occur over the course of the project. However, they do not necessarily reflect the number of different animals exposed. For instance, because Steller sea lions likely associate fishing boats in Dutch Harbor with reliable sources of food, there will almost certainly be some overlap in individuals present (and exposed) day-to-day. However each instance of exposure for these individuals will be recorded as a separate, additional take. Moreover, because we anticipate that marine mammal observers will typically be unable to determine from field observations whether the same or different individuals are being exposed over the course of a workday, each observation of a marine mammal will be recorded as a new take, although an individual theoretically would only be considered as taken once in a given day.

Unlike Steller sea lions, humpback whales are less likely to frequent the action area. Therefore, no assumptions can be made about the number of individual humpback whales represented in the exposure estimates for western North Pacific or Mexico DPS humpback whales.

We expect exposures to all marine mammals will be limited to Level B harassment. Mitigation measures require that observers must be able to see the entirety of the Level A shutdown and Level B harassment

zones, or pile-driving will not begin. Additionally, any Steller sea lions or humpback whales observed within the Level B zones will be monitored to ensure they do not enter the Level A zones, and pile-driving operations will be shut down if they appear likely to enter the Level A zones.

7.2.2. In-Air Sounds

Because data for sound generated by the 30 inch (76 cm) piles to be used at the UMC dock are not available, PND and PR1 agreed to use airborne sound pressure levels measured during vibratory pile driving at the Explosive Handling Wharf project, Naval Base Kitsap in Hood Canal, Washington (Illingworth & Rodkin Inc. 2013). The Transmission Loss Coefficient (see Section 2.4.3 of this Opinion) for spherical spreading (in air) is 20.

Based on the spherical spreading loss equation, the calculated airborne Level B harassment zones for Steller sea lions would extend out to the following distances:

- For the vibratory installation of 18-inch steel piles: 3.6 meters;
- For the vibratory installation of 30-inch steel piles: 10.1 meters;
- For the impact installation of 24-inch steel piles: 48.2 meters; and
- For quarry blasting: 12.2 meters.

Table 5 presents the in-air Level B harassment and monitoring zones that have been incorporated into the project design.

Steller sea lions do not haul out in Dutch Harbor; therefore, individuals entering the underwater Level B harassment zones for vibratory and impact pile-driving will have already been exposed to more intense (i.e., louder) underwater sounds by the time they reach an area in which in-air noise may rise to the point of Level B harassment. In other words, no individual western DPS Steller sea lion will be taken by Level B harassment due solely to exposure to in-air sounds.

7.3. Response

Loud underwater sounds can result in physical effects on the marine environment that can affect marine organisms. Possible responses by western DPS Steller sea lions, western North Pacific DPS humpback whales, and Mexico DPS humpback whales to the impulsive sound produced by impact pile-driving and continuous sound produced by vibratory pile-driving and removal and drilling considered in this analysis are:

- Threshold shifts
- Auditory interference (masking)
- Behavioral responses
- Non-auditory physical or physiological effects

This analysis also considers information on the potential effects on prey of western DPS Steller sea lions and western North Pacific DPS and Mexico DPS humpback whales.

7.3.1. Threshold Shifts

Exposure of marine mammals to very strong sounds can result in physical effects, such as changes to sensory hairs in the auditory system, which may temporarily or permanently impair hearing. Temporary threshold shift (TTS) is a temporary hearing change and its severity is dependent upon the duration, frequency, sound pressure, and rise time of a sound (Finneran and Schlundt 2013). TTSs can last minutes to days. Full recovery is expected, and this condition is not considered a physical injury. At

higher received levels, or in frequency ranges where animals are more sensitive, permanent threshold shift (PTS) can occur. When PTS occurs, auditory sensitivity is unrecoverable (i.e., permanent hearing loss). Both TTS and PTS can result from a single pulse or from accumulated effects of multiple pulses from an impulsive sound source (i.e., impact pile-driving) or from accumulated effects of non-pulsed sound from a continuous sound source (i.e., vibratory pile-driving and removal and drilling). In the case of exposure to multiple pulses, each pulse need not be as loud as a single pulse to have the same accumulated effect. TTS and PTS occur only in the sound frequencies to which an animal is exposed.

Data are lacking on effects to pinnipeds exposed to impulsive sounds (Southall *et al*. 2007, NMFS 2016b), and the energy levels required to induce TTS or PTS in pinnipeds are not known. Finneran *et al*. (2003) exposed two California sea lions to single underwater pulses up to 183 dB re 1 μPa_{p-p}[8] and found no measurable TTS following exposure. Southall *et al*. (2007) estimated TTS will occur in pinnipeds exposed to a single pulse of sound at 212 dB re 1 μPa_{0-p}[9] and PTS will occur at 218 dB re 1 μPa_{0-p}. Kastak *et al*. (2005) indicated pinnipeds exposed to continuous sounds in water experienced the onset of TTS from 152 to 174 dB re 1 μPa_{rms}.[10] Southall *et al*. (2007) estimated PTS will occur in pinnipeds exposed to continuous sound pressure levels of 218 dB re: 1 μPa_{0-p}.

It is possible that western DPS Steller sea lions that remain in the Level B harassment zones (i.e., the areas ensonified to at least 160, but less than 190, dB re 1 μPa_{rms} during impact pile-driving and at least 120, but less than 180, dB re 1 μPa_{rms} during vibratory pile-driving and drilling) may experience TTS during project activities. However, we expect it is highly unlikely that western DPS Steller sea lions or any humpback whales will experience PTS during project activities because of the incorporation of shutdown measures if these species are seen entering or appear likely to enter the Level A harassment zones (i.e., the areas ensonified to at least 190 dB re 1 μPa_{rms} during impact pile-driving and at least 180 dB re 1 μPa_{rms} during vibratory pile-driving and drilling).

7.3.2. Auditory Interference (Masking)

Auditory interference, or masking, occurs when an interfering noise is similar in frequency and intensity, or is louder than, the auditory signal received by an animal while it is processing echolocation signals or listening for acoustic information from other animals (Francis and Barber 2013). Masking can interfere with an animal's ability to gather acoustic information about its environment, such as predators, prey, conspecifics, and other environmental cues (Francis and Barber 2013).

There are overlaps in frequencies between vibratory and impact pile-driving sounds and the expected hearing range of Steller sea lions and humpback whales. The proposed activities could mask vocalizations or other important acoustic information. This could affect communication among individuals or affect their ability to receive information from their environment. However, the project activities will occur in an industrialized port, an environment where masking from vessel sounds and dock activity likely occurs frequently. We expect any additional impacts that project activities may have to masking in the environment would be very small relative to the existing conditions.

7.3.3. Behavioral Responses

Steller sea lions and humpback whales may exhibit a variety of behavioral changes in response to underwater sound, which can be generally summarized as:

[8] Peak-to-peak.
[9] Zero-t-peak.
[10] Values originally reported as sound exposure level of 183 to 206 dB re 1 μPa^2-s.

- Modifying or stopping vocalizations
- Changing from one behavioral state to another
- Movement out of feeding or breeding areas

In cases where response is brief (i.e., changing from one behavior to another, relocating a short distance, or ceasing vocalization), effects are very unlikely to be significant at the population level, but could rise to the level of take by harassment of individual sea lions or humpback whales.

Marine mammal responses to anthropogenic sound vary by species, state of maturity, prior exposure, current activity, reproductive state, time of day, and other factors (Ellison *et al*. 2012). This is reflected in a variety of aquatic, aerial, and terrestrial animal responses to anthropogenic noise that may ultimately have fitness consequences (Francis and Barber 2013).

The most likely response of humpback whales to noise disturbance would be to avoid the area where pile installation and extraction noise is occurring (Malme *et al*. 1988; Richardson *et al*. 1995). A whale passing through the area might be momentarily disturbed and could exhibit a short-term change in movement or feeding behavior; however, any such response is expected to be temporary. We do not expect that western North Pacific or Mexico DPS humpback whale response to construction sounds from this project will result in any long-term impacts to feeding, vocalization, or reproductive behavior. NMFS does not propose to authorize Level A take for humpback whales due to incorporation of Level A shutdown zones for humpback whales into the project design.

Information on behavioral reactions of pinnipeds to in-water "impulsive" sound sources (multiple pulses) is known from exposures to small explosives used in fisheries interactions, impact pile driving, and seismic surveys. In general, exposure of pinnipeds in water to multiple pulses of sound pressure levels ranging from approximately 150 to 180 dB re 1µPa_{rms} has limited potential to induce avoidance behavior (Southall *et al*. 2007).

Less information is available on behavioral reactions of pinnipeds in water to continuous sounds. Using data from pinniped exposures to acoustic harassment devices, a research tomography source, and underwater data communication sources, Southall *et al*. (2007) suggested that exposure to continuous sound sources with sound pressure levels between approximately 90 to 140 dB re 1 µPa have limited potential to induce strong behavioral responses in pinnipeds.

It is difficult to estimate the behavioral responses, if any, that western DPS Steller sea lions or humpback whales in the action area may exhibit in response to project activities. As we discussed in Sections 5 and 6 of this Opinion, it appears that western DPS Steller sea lions in Dutch Harbor have become habituated to the presence of shipping and fishing vessels in an industrialized harbor. Though the sounds that will be produced during project activities may not greatly exceed levels that Steller sea lions or humpback whales already experience in the industrialized harbor, the sources proposed for use in this project (pile-drivers and drills) are not among sound sources to which they are commonly exposed. Some Steller sea lions or humpback whales may find sounds produced by the project activities to be of greater annoyance than others and move out of the area or change from one behavioral state to another, while others may exhibit no apparent behavioral changes at all. Due to the level of existing anthropogenic activity in the area and the relatively short project duration, we do not expect project activities will significantly impact feeding, breeding, or resting opportunities for these species.

As noted above, Southall *et al.* (2007) report that sound levels up to 180 dB for impulsive sounds or 140 dB for continuous sounds had limited potential to induce avoidance behavior in pinnipeds. If used, these higher disturbance thresholds would result in disturbance isopleths greatly reduced from those provided in Table 4 and a resulting lower take estimate for Steller sea lions. However, for the purposes of this Opinion, we will consider 'take" pursuant to the ESA as equivalent to Level B harassment as defined by the MMPA, for both Steller sea lions and humpback whales.

7.3.4. Physical and Physiological Effects

Individuals exposed to noise can experience stress and distress, where stress is an adaptive response that does not normally place an animal at risk, and distress is a stress response resulting in a biological consequence to the individual. Both stress and distress can affect survival and productivity (Curry and Edwards 1998, Cowan and Curry 2002, Herráez *et al*. 2007, Cowan and Curry 2008). Mammalian stress levels can vary by age, sex, season, and health status (St. Aubin *et al*. 1996, Gardiner and Hall 1997, Hunt *et al*. 2006, Keay *et al*. 2006, Romero *et al*. 2008).

Loud noises generally increase stress indicators in mammals (Kight and Swaddle 2011). During the time following September 11, 2001, shipping traffic and associated ocean noise decreased along the northeastern U.S. This decrease in ocean noise was associated with 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 levels 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).

Steller sea lions and humpback whales use hearing as a primary way to gather information about their environment and for communication; therefore, we assume that limiting these abilities is stressful. Stress responses may also occur at levels lower than those required for TTS (NMFS 2006a); therefore, exposure to levels sufficient to trigger onset of PTS or TTS are expected to be accompanied by physiological stress responses (National Research Council 2003, NMFS 2006a).

As discussed in the previous sections, we expect that Steller sea lion and humpback whale individuals are not likely to experience PTS, but may experience TTS or masking, and may exhibit behavioral responses. They may also experience physiological changes in stress hormone levels from project activities. We expect that any project-related stress response will dissipate shortly after pile-driving or drilling activity ceases. We do not expect that potential occurrence of TTS or changes to stress hormone levels will result in harm to individuals.

7.3.5. Marine Mammal Prey

Anthropogenic noises may also have indirect, adverse effects on prey availability through lethal or sub-lethal damage, stress responses, or alterations in their behavior or distribution. Species-specific information about prey of Steller sea lions and humpback whales in the action area is not available; however, we expect their prey will react to anthropogenic noise in manners similar to the fish and invertebrates described below.

Effects from exposure to high-intensity sound sources have been documented in fish and invertebrates, including stress (Santulli *et al*. 1999), injury (McCauley *et al*. 2003), TTS (Popper *et al*. 2005), and changes in balance (Dalen and Knutsen 1986). In general, we expect fish will be capable of moving

away from project activities if they experience discomfort. We expect the area in which stress, injury, TTS, or changes in balance, of prey species could occur will be limited to a few meters directly around the pile-drivers and drill. Prey species may startle and disperse when exposed to sounds from project activities, but we expect any disruptions will be temporary. Further, while both Steller sea lions and humpback whales are known to occur in Iliuliuk Bay, the area is not known to provide an unusually high level of marine prey species, and it represents a relatively small portion of both species' range. We do not expect effects to prey species from the UMC Dock project will be sufficient to affect western DPS Steller sea lions nor western North Pacific DPS or Mexico DPS humpback whales.

7.3.6. Response Summary

Though project activities may cause TTS, brief interruptions in communications (masking), avoidance of the action area, and stress associated with these disruptions, we expect all effects to western DPS Steller sea lions, western North Pacific DPS humpback whales, and Mexico DPS humpback whales will be temporary. Prey species may experience stress, injury, TTS, or changes in balance in a small radius directly around the pile-drivers and drill or startle and disperse when exposed to sounds from project activities, but we do not expect these effects to prey species will be sufficient to affect western DPS Steller sea lions nor western North Pacific DPS or Mexico DPS humpback whales.

8.0. 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, per section 7 of the ESA.

We searched for information on non-Federal actions reasonably certain to occur in the action area. Any future dock or harbor projects would require permits from the U.S. Army Corps of Engineers, and possibly Incidental Harassment Authorizations from NMFS as well. We did not find any information about non-Federal actions other than what has already been described in the Environmental Baseline (Section 6 of this Opinion). We expect climate change, noise, fisheries, and toxic substances will continue to be the primary factors impacting western DPS Steller sea lions, western North Pacific DPS humpback whales, and Mexico DPS humpback whales in the action area.

9.0. INTEGRATION AND SYNTHESIS OF EFFECTS

The narrative that follows integrates and synthesizes the information contained in the Status of the Species (Section 5), the Environmental Baseline (Section 6), and the Effects of the Action (Section 7) sections of this Opinion to assess the risk that the proposed activities pose to western DPS Steller sea lions and to the Mexico and western North Pacific DPSs of humpback whales.

The survival and recovery of western DPS Steller sea lions, western North Pacific DPS humpback whales, and Mexico DPS humpback whales within the action area may be affected by:

- Climate change
  - Prey distribution
- Anthropogenic noise
- Fisheries interactions
  - Incidental take and entanglement
  - Conditioning and habituation to presence of commercial fishing vessels and processors
- Toxic substances

- Petroleum hydrocarbons in water and sediment

Despite these pressures, available trend information indicates western DPS Steller sea lions populations east of Samalga Pass are increasing and the western North Pacific and Mexico DPS humpback whale DPSs appear to be stable or increasing.

We concluded in the Effects of the Action (Section 7 of this Opinion) that western DPS Steller sea lions, western North Pacific DPS humpback whales, and Mexico DPS humpback whales may be harassed by the proposed activities. We expect a maximum of 926 instances in which Steller sea lions will be exposed to sounds of at least 160 dB re 1 μPa_{rms} from impact pile-driving, and sounds of at least 120 dB re 1 μPa_{rms} from vibratory pile-driving, removal, and drilling (i.e., will be exposed to Level B harassment). We also expect a maximum of 8 instances in which western North Pacific DPS humpback whales, and 20 instances in which Mexico DPS humpback whales may be exposed to these sound levels.

We note this number does not reflect the maximum number of individuals that will be exposed. Instead, we expect some smaller number of individual Steller sea lions will be exposed to harassment multiple times over the duration of the project. The same may hold true for any humpback whales that remain in the action area during project construction.

We expect these exposures may cause TTS, interruptions in communication (i.e., masking), and avoidance of the action area. We expect low-level stress responses will accompany behavioral responses. As indicated in Section 7 of this Opinion, we do not expect western DPS Steller sea lions or humpback whales from the Mexico or western North Pacific DPSs exposed to these sounds will experience a reduction in numbers, reproduction, or distribution.

Prey species may experience stress, injury, TTS, or changes in balance in a radius of several meters directly around the pile-drivers and drill, or they may startle and disperse when exposed to sounds from project activities. We do not expect these effects will limit prey available to western DPS Steller sea lions and western North Pacific DPS or Mexico DPS humpback whales.

We concluded in "Stressors Not Likely to Adversely Affect ESA-listed Species and Critical Habitat" (Section 7.1.1 of this Opinion) that the effect of the direct loss of 1.1 ha (2.8 ac) of Steller sea lion critical habitat is insignificant.

In summary, we do not expect exposure to any of the stressors related to the proposed project to reduce fitness in any individual western DPS Steller sea lion or ESA-listed humpback whales. Therefore, we do not expect fitness consequences to western DPS Steller sea lions or ESA-listed humpback whales at the population or species level.

10.0. CONCLUSION

After reviewing the current status of western DPS Steller sea lions, western North Pacific DPS humpback whales, and Mexico DPS humpback whales, the environmental baseline for the action area, the anticipated effects of the proposed activities, and the possible cumulative effects, it is NMFS's biological opinion that the proposed issuance of Corps permit POA-1989-324-M7 to the City of Unalaska to replace their existing dock in Dutch Harbor, Unalaska, Alaska, and the Permits Division's proposed related action of issuing an IHA to the City of Unalaska are not likely to jeopardize the continued existence of western DPS Steller sea lions, western North Pacific DPS humpback whales, or

Mexico DPS humpback whales, or destroy or adversely modify designated Steller sea lion critical habitat.

11.0. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA prohibits the take of endangered species without 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). "Incidental take" is defined as "take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity" (50 CFR § 402.02). Under the terms of sections 7(b)(4) and 7(o)(2), taking that is incidental and not intended as part of the 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 this Incidental Take Statement.

Section 7(b)(4)(C) of the ESA specifies that in order to provide an Incidental Take Statement for an endangered or threatened species of marine mammal, the taking must be authorized under 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.

The Terms and Conditions described below are nondiscretionary, and must be undertaken by the Corps and Permits Division so that they become binding conditions for the exemption in section 7(o)(2) to apply. Section 7(b)(4) of the ESA requires that when a proposed agency action is found to be consistent with section 7(a)(2) of the ESA and the proposed action may incidentally take individuals of ESA-listed species, NMFS will issue a statement that specifies the impact of any incidental taking of endangered or threatened species.

11.1. Amount or Extent of Take

NMFS anticipates the proposed UMC Dock replacement project in Dutch Harbor, Unalaska, Alaska, may result in the incidental take of ESA-listed species by behavioral disturbance (MMPA Level B harassment). MMPA Level A take (sufficient to cause injury or death) is not authorized. As discussed in Section 2.0 and 7.2.1 of this Opinion, the proposed action is expected to take, by Level B harassment, **926 western DPS Steller sea lions, 8 endangered western North Pacific DPS humpback whales, and 20 threatened Mexico DPS humpback whales.**

These numbers do not represent the take of individuals; rather they represent the number of instances of take, possibly with repeated take of some individuals in a given day or over multiple days during the project.

If unauthorized take occurs, (i.e., authorized Level B take exceeded or Level B take of any ESA-listed species other than western DPS Steller sea lions, western North Pacific DPS humpback whales, or Mexico DPS humpback whales, or Level A take of any ESA-listed species), it must be reported to NMFS Alaska Region within one business day to the contact listed in Item 3, below, and the Corps and Permits Division must immediately request reinitiation of section 7 consultation.

Level B harassment will occur by exposure to impulsive sound sources (i.e., impact pile-driving) with received sound levels of least 160 dB re 1 μPa_{rms} and exposure to continuous sound sources (i.e., vibratory pile-driving and removal and drilling) with received sound levels of at least 120 dB re 1 μPa_{rms}. The take estimate is based on the best available information of western DPS Steller sea lion and humpback whale occurrence in Dutch Harbor, not density; therefore, we do not provide separate

estimates for take from impulsive and continuous sound sources. Incidental take will result from exposure to acoustic energy from pile-driving and drilling and will be in the form of harassment. Death or injury is not expected for any individual western DPS Steller sea lions or humpback whales exposed to these sounds.

Harassment of these listed marine mammals is not expected when they are exposed to received sound level less than 160 dB re 1 μPa_{rms} during impact pile-driving or received sound levels less than 120 dB re 1 μPa_{rms} during vibratory pile-driving and removal or drilling; however, if overt reactions (e.g., strong startle responses or rapid departures from the area) by individuals occur at these received sound pressure levels, this may constitute take that is not covered in this Incidental Take Statement. As specified below, in the event of such reactions by listed species, the Corps and/or the Permits Division must contact NMFS Alaska Region to determine whether reinitiation of consultation is required.

Listed marine mammals observed within the Level A or B harassment zones identified in Table 2 during pile driving and/or drilling will be considered to be taken, regardless of subsequent shut-downs, or lack of observed behavioral reactions.

Any incidental take authorized in this consultation is restricted to the action as proposed. If the actual incidental take exceeds the predicted level or type, the Corps and NMFS Permits Division must reinitiate consultation. Likewise, if the action deviates from what is described in section 2 of this Opinion, the Corps and NMFS Permits Division must reinitiate consultation. All anticipated takes will be by harassment, as described previously, involving temporary changes in behavior. Take causing injury or death is not authorized.

11.2. Effect of the Take

In this Opinion, NMFS has determined that the level of incidental take is not likely to jeopardize the continued existence of any ESA-listed species.

11.3. Reasonable and Prudent Measures

Reasonable and prudent measures" are nondiscretionary measures to minimize the amount or extent of incidental take (50 CFR § 402.02). NMFS concludes the reasonable and prudent measure described below, along with its implementing terms and conditions, is necessary and appropriate to minimize and/or to monitor the amount of incidental take of western DPS Steller sea lions, Mexico DPS humpback whales, and western North Pacific DPS humpback whales resulting from the proposed actions.

- The Corps and Permits Division must require the City of Unalaska to implement and monitor the effectiveness of mitigation measures presented in the Marine Mammal Monitoring Plan (Appendix D to the IHA Application (revised 2/2/2017) and Appendix 1 to this Opinion), as specified below.

11.4. Terms and Conditions

Terms and conditions" implement the reasonable and prudent measures (50 CFR § 402.14(i)(1)(iv) and (i)(2)). These must be carried out for the exemption in section 7(o)(2) to apply.

To be exempt from the prohibitions of section 9 of the ESA, the Corps and Permits Division must require the City of Unalaska to comply with the following terms and conditions, which implement the reasonable and prudent measure described above and the mitigation measures set forth in this Opinion

(Appendix 1). These terms and conditions are non-discretionary. The Corps and NMFS Permits Division have 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(3)). If the Corps or Permits Division: (1) fail to require the authorization holder to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the authorization, and/or (2) fail to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

To implement the reasonable and prudent measure, the Corps and Permits Division shall ensure that the City of Unalaska adheres to all portions of the description of the action (Section 2 of this Opinion), including mitigation and monitoring measures described in Sections 2.4 and Appendix 1 of this Opinion.[11]

As stated in the Marine Mammal Monitoring Plan (Appendix 1), the following terms and conditions must apply:

1. COU must collect sighting data and behaviors of marine mammal species that are observed in the shutdown and monitoring zones (Section 2.4 of this Opinion) during periods of construction.
2. All observers must be qualified and trained in marine mammal identification and behaviors.
3. Observers must have no other construction-related tasks while conducting monitoring.
4. Observation necessitates that daylight is sufficient for observers to visualize the entirety of the monitoring zones, so observations must only commence and complete during daylight hours.
5. Monitoring of shutdown and observation zones must take place from 30 minutes prior to initiation through 30 minutes post-completion of all pile driving and removal activities.
6. Pre-Activity Monitoring

The following survey methodology must be implemented prior to commencing permitted activities:

- 6.1. Prior to the start of permitted activities, observers must monitor the shutdown and monitoring zones for at least 30 minutes. They must ensure that no listed marine mammals are present within shutdown zone before permitted activities begin.
- 6.2. The shutdown zone will only be considered cleared when marine mammals have not been observed within that zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, a soft-start must not proceed until the animal has left the zone on its own accord or has not been observed within the zone for 15 minutes (for pinnipeds) and 30 minutes (for cetaceans).
- 6.3. When all applicable zones have been cleared, the observers will indicate to the monitoring coordinator that the zone is clear of marine mammals.
- 6.4. Permitted activities must not commence until the monitoring coordinator receives verbal confirmation that the zones applicable to the upcoming construction activity are clear.
- 6.5. If permitted species are present within the monitoring zone, work will not be delayed, but observers must monitor and document the behavior of individuals that remain in the monitoring zone.
- 6.6. In case of fog or reduced visibility, observers must be able to see the entirety of shutdown and monitoring zones before permitted activities can be initiated.

7. Soft Start Procedures

- 7.1. Soft start procedures must be used at the start of the work day or when pile removal, pile installation, and in-water fill placement activities have been stopped for longer than a 30-minute period, to allow marine mammals to leave the area prior to exposure to maximum noise levels.

[11] Some of these terms and conditions are in addition to reporting requirements required by the Permits Division.

7.2. For vibratory hammers, contractor shall drive a pile for no more than 30 seconds followed by a quiet period of at least 60 seconds without vibratory driving. The process shall be repeated twice more within 10 minutes before beginning vibratory driving operations that last longer than 30 seconds.

7.3. For impact hammers, the soft start technique must initiate approximately three strikes at a reduced energy level, followed by a 30-second waiting period. This procedure would also be repeated two additional times.

7.4. Equipment used for fill placement must be operated at idle near the waterside edge of the fill area for 15 minutes prior to performing in-water fill placement.

7.5. If work ceases for more than 30 minutes, soft start procedures must recommence prior to performing additional work.

8. During-Activity Monitoring

The following survey methodology must be implemented during permitted activities:

8.1. If permitted species are observed within the monitoring zone during permitted activities, an exposure (an instance of take) must be recorded for each individual so taken, and behaviors documented. Work need not stop unless an animal enters or appears likely to enter the shutdown zone.

8.2. If the Level B harassment zone has been monitored throughout the pre-activity period and non-permitted species are not present within the zone, soft start procedures can commence and work can continue even if visibility becomes impaired within the Level B zone.

8.3. If the Level B zone is not visible while work continues, exposures must be recorded at the estimated exposure rate for each permitted species. If work ceases for more than 30 minutes, the pre-activity monitoring of both zones must recommence.

8.4. If the Level A zone is not fully visible, in-water work must stop.

9. Shutdown

If a marine mammal enters or appears likely to enter the shutdown zone:

9.1. The observers must immediately radio or call to alert the monitoring coordinator.

9.2. All noise-producing construction activities must be immediately halted.

9.3. In the event of a shutdown of pile installation or removal operations, permitted activities may resume only when:

o The animal(s) within or approaching the shutdown zone has been visually confirmed beyond the shutdown zone, or 15 minutes (for pinnipeds) or 30 minutes (for cetaceans) have passed without re-detection of the animal;

o Observers may then radio or call the monitoring coordinator indicating that activities can re-commence.

10. Breaks in Work

During an in-water construction delay, the shutdown and monitoring zones must continue to be monitored. No exposures will be recorded for permitted species in the monitoring zone if there are no concurrent permitted construction activities.

10.1. If permitted activities cease for more than 30 minutes and monitoring has not continued, pre-activity monitoring and soft start procedures must recommence. This includes breaks due to scheduled or unforeseen construction practices or breaks due to permit-required shutdown.

10.2. Following 30 minutes of monitoring, work can begin according to the pre-activity monitoring protocols. Work must not begin if an animal is within the shutdown zone or if visibility is not clear throughout the shutdown and monitoring zones.

11. Post-Activity Monitoring

11.1. Monitoring of the shutdown and monitoring zones must continue for 30 minutes following completion of pile driving activities. A post-monitoring period is not required for other in-water construction. These surveys must record observations and must focus on observing and reporting unusual or abnormal behavior of marine mammals. Observation Record forms must be used to document observed behavior.

12. Reporting

12.1 Modifications - In the event that COU needs to modify terms of this MMMP, the NMFS representative will be promptly contacted for discussion of the requested modification.

12.2 Injured or Dead Marine Mammal - If COU finds an injured, sick, or dead marine mammal, a COU representative must notify NMFS and provide:

- the species or description of the animal(s),
- condition of the animal or carcass,
- location, date and time of first discovery,
- observed behaviors (if alive), and
- photo or video (if available).

12.2.1. If marine mammal's condition is a direct result of the project, NMFS must be notified, and work must stop until NMFS is able to review the circumstances of the prohibited take.

12.2.2. If the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), COU must report the incident within 24 hours of the discovery.

12.2.3. Construction activities may continue while NMFS reviews the circumstances of the incident and makes a final determination on the cause of the reported injury or death.

12.2.4. If cause of death is unclear, COU must immediately report the incident to NMFS. Construction activities may continue while NMFS reviews the circumstances of the incident and makes a final determination as to the cause of the reported injury or death. NMFS will work with COU to determine whether additional mitigation measures or modifications to the activities are appropriate.

12.2.5. Care must be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death.

12.2.6. In preservation of biological materials from a dead animal, the finder (i.e. marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

12.2.7. Reports will be made to the Office of Protected Resources: Anchorage: (907) 271-5006 or Juneau: (907) 586-7235 during business hours (M-F 8:00-4:00) or to the Alaska Regional 24 Hour Stranding Hotline: (877) 925-7773 or (877) 9-AKR-PRD.

12.3. Monthly and Final Reports - Monthly observer reports, a final technical report, and completed listed marine mammal observation record forms (developed by PND) must be provided during the project.

12.3.1. Observation records for ESA-listed marine mammals taken in a manner or to the extent described in Section 11.1 of this Opinion must include all reporting information specified below and must clearly summarize:

- Number of listed animals taken
- Date and time of each take
- Cause of the take (e.g., Steller sea lion or humpback whale observed within Level B zone during vibratory and impact pile driving)

- Time the animal(s) entered the zone, and, if known, the time it exited the zone
- Mitigation measures implemented prior to and after the animal entered the zone

12.3.2. Monthly Reports

The reporting period for each monthly observer report will be the entire calendar month, and reports must be submitted by close of business on the 5th business day of the month following the end of the reporting period (e.g., The monthly report covering May 1 through 31, 2017, will be submitted to NMFS Alaska Region by close of business (i.e., 5:00 pm local time) on June 7, 2017). Completed listed marine mammal observation record forms, in electronic format, will be provided to NMFS Alaska Region in monthly reports. Observer report data will include the following for each listed marine mammal observation (or "sighting event" if repeated sightings are made of the same animal[s]):

a. Species, date, and time for each sighting event
b. Number of animals per sighting event and number of adults/juveniles/calves/pups per sighting event
c. Primary, and, if observed, secondary behaviors of the listed marine mammals in each sighting event, focusing on behavioral reactions just prior to, or during, soft-start and shutdown procedures
d. Geographic coordinates for the observed animals, with the position recorded by using the most precise geographic coordinates practicable (coordinates must be recorded in decimal degrees, or similar defined coordinate convention)
e. Time of most recent pile-driving or other project activity prior to listed marine mammal observation
f. Any shut-downs that occurred due to listed species presence,
g. Environmental conditions as they existed during each sighting event, including, but not limited to:
    - Beaufort Sea State
    - Weather conditions
    - Visibility (km/mi)
    - Lighting conditions
    - Percentage of ice cover

12.3.3. Final Technical Report

A final technical report must be submitted to NMFS Alaska Region within 90 days after the final pile has been driven, removed, or drilled for the project. The report must summarize all pile-driving and other project activities and results of listed marine mammal monitoring conducted during project activities. The final technical report must include all elements from Items 1-11 above, as well as:

1. Summaries that include monitoring effort (e.g., total hours, total distances, and listed marine mammal distribution through the study period)
2. Analyses of the effects from various factors that influences detectability of marine mammals (e.g., sea state, number of observers, fog, glare, etc.)
3. Species composition, occurrence, and distribution of listed marine mammal sightings, including date, water depth, numbers, age/size/sex categories (if determinable), group sizes, and ice cover
4. Species composition, occurrence, and distribution of listed marine mammal takes, including date, water depth, numbers, age/size/sex categories (if determinable), group sizes, and ice cover
5. Analyses of effects of project activities on listed marine mammals

6. Number of Steller sea lions and humpback whales observed (and taken) during periods with and without project activities
7. Other variables that could affect detectability, such as:
    - Initial sighting distances versus project activity at time of sighting
    - Observed behaviors and movement types versus project activity at time of sighting
    - Numbers of sightings/individuals seen versus project activity at time of sighting
    - Listed marine mammal distribution around the action area versus project activity at time of sighting

13. NMFS Contacts:

Monthly and final reports and reports of unauthorized take must be submitted to:
NMFS Alaska Region, Protected Resources Division
Verena Gill
verena.gill@noaa.gov
907-271-1937 or 907-271-5006

12.0. 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 endangered and threatened species (16 U.S.C. § 1536(a)(1)). Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on ESA-listed species or critical habitat, help implement recovery plans, or develop information (50 CFR § 402.02).

We offer the following conservation recommendation, which will provide information for future consultations involving the issuance of permits that may affect western DPS Steller sea lions, Mexico DPS humpback whales, or western North Pacific DPS humpback whales:

- Behavioral responses of listed marine mammals: We recommend that the Permits Division summarize findings from past IHA holders about behavioral responses of ESA-listed species to sounds from pile-driving, drilling, and other sounds related to dock construction activities. Better understanding of how ESA-listed species have responded to sounds from past projects will inform our exposure and response analyses in the future.

In order for the NMFS Alaska Region to be kept informed of actions minimizing or avoiding adverse effects on, or benefiting, ESA-listed species or their habitats, the Permits Division should notify the NMFS Alaska Region of any conservation recommendations it implements.

13.0. REINITIATION NOTICE

This concludes formal consultation on the proposed issuance of Corps permit POA-1989-324-M7 and the NMFS Permits Division's proposed issuance of an IHA to the City of Unalaska for the UMC Dock Positions III and IV replacement project in Dutch Harbor, Unalaska, Alaska. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if:

- The amount or extent of proposed take is exceeded.
- New information reveals effects of the agency action that may affect ESA-listed species or critical habitat in a manner, or to an extent, not considered in this opinion.

- The agency action is subsequently modified in a manner that causes an effect to the ESA-listed species or critical habitat not considered in this opinion.
- A new species is ESA-listed or critical habitat designated that may be affected by the action.

If the amount or extent of authorized take and/or effects to critical habitat is exceeded, the Corps and Permits Division must immediately request reinitiation of section 7 consultation.

14.0. 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.

14.1. Utility

This document records the results of an interagency consultation. The information presented in this document is useful to NMFS, the Corps, and the general public. These consultations help to fulfill multiple legal obligations of the named agencies. The information is also useful and of interest to the general public as it describes the manner in which public trust resources are being managed and conserved. The information presented in these documents and used in the underlying consultations represents the best available scientific and commercial information and has been improved through interaction with the consulting agency.

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

14.2. 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.

14.3. 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 Part 402.

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 Alaska Region ESA quality control and assurance processes.

15.0. LITERATURE CITED

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Marine Mammal Monitoring Plan

- For the

Unalaska Marine Center Dock Positions III and IV Replacement Project

- **City of Unalaska**

Revised 3/14/2017
(DRAFT Pending receipt of final permits)

Submitted to:

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Introduction

The purpose of this Marine Mammal Monitoring Plan (MMMP) is to provide a protocol for monitoring of affected species during the proposed construction of the Unalaska Marine Center (UMC) Dock Positions III and IV Replacement Project in Dutch Harbor, Unalaska. This plan was developed to support the Incidental Harassment Authorization (IHA) document for Marine Mammal Protection Act, Section 101(a)(5)(D) permitting. The IHA application provides a more in-depth discussion on the calculations for the project.

A marine mammal monitoring program will be implemented at the start of construction and will follow the protocols outlined in this MMMP. The primary goals of the monitoring program are:

To monitor the proposed shutdown and monitoring zones, to estimate the number of marine mammals exposed to noise at established thresholds, and to document animal responses;

To minimize impacts to the marine mammal species present in the project area by implementing mitigation measures including monitoring, clearing the zones, soft start, and shutdown procedures; and

To collect data on the occurrence and behavior of marine mammal species in the project area and any potential impacts from the project.

Figure 1. Project location within Dutch Harbor, AK

Project Description

The City of Unalaska (COU) proposes to install an OPEN CELL SHEET PILE™ (OCSP) dock at UMC Dock Positions III and IV, replacing the existing pile-supported structure and providing a smooth transition between the current UMC facility and the U.S. Coast Guard dock. A complete description of the region, project tasks, project materials, dates and duration, affected species, and anticipated impacts are included in the IHA application to which this document is a companion. In general terms, the project will consist of

demolition of the existing dock, installation of sheet pile cells and supporting round piles, and placement of fill within the completed cells.

The proposed project requires the removal and installation of various types and sizes of piles using a vibratory hammer, an impact hammer, and drilling equipment. These activities are anticipated to result in Level B harassment (behavioral disruption) only, as an MMMP will be implemented to reduce the potential for exposure to Level A harassment (harassment resulting in injury).

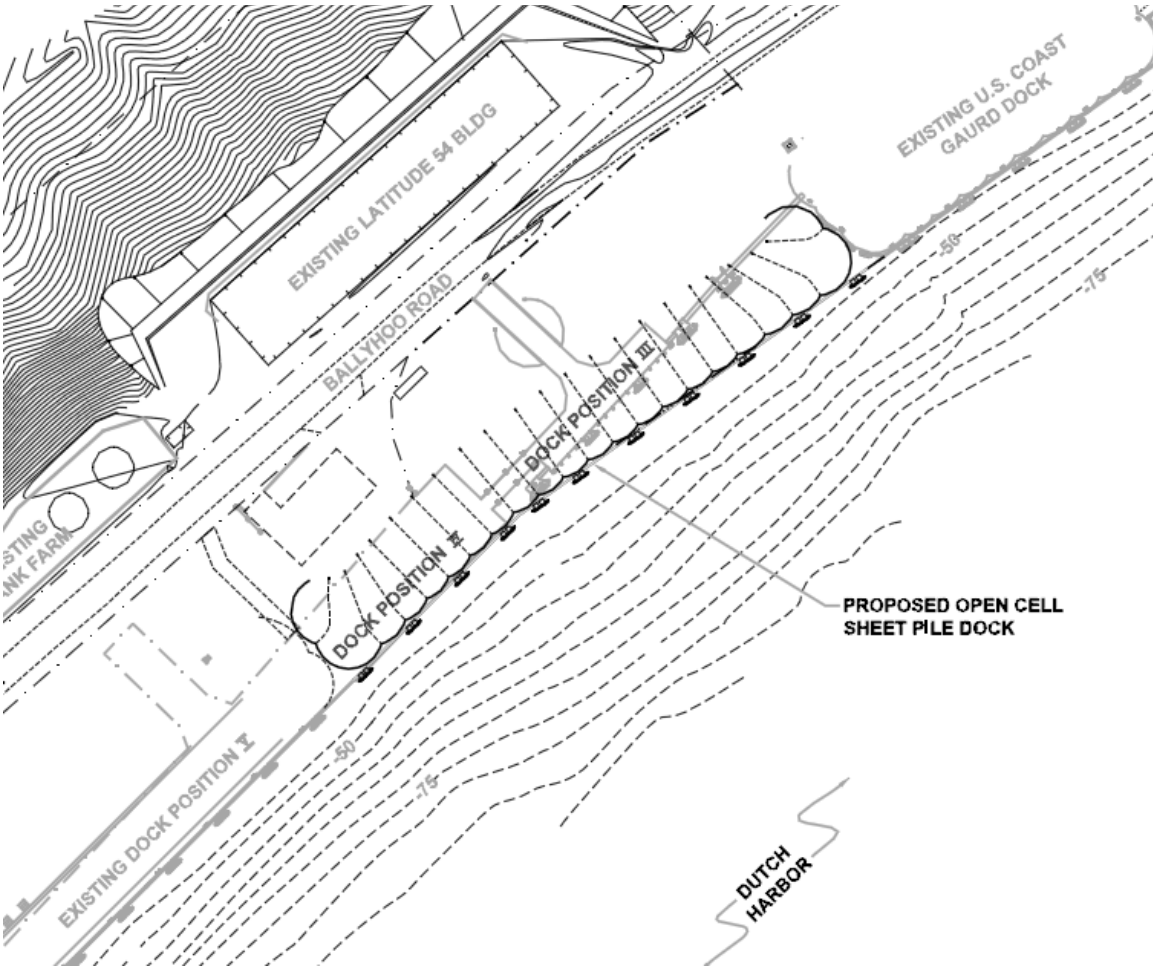

Figure 2. Proposed dock plan view

Methods

Land-based trained observers will be located on-site before, during, and after in-water construction activity at sites appropriate for monitoring marine mammals within and approaching the Level A and Level B harassment zones (Section 0).

During observation periods, observers will continuously scan the area for marine mammals using binoculars and the naked eye. Observers will work shifts of a maximum of four consecutive hours followed by an observer rotation or a 1-hour break and will work no more than 12 hours in any 24-hour period. Observers will collect data including, but not limited to, environmental conditions (*e.g.*, sea state, precipitation, glare, etc.), marine mammal sightings (e.g., species, numbers, location, behavior, responses to construction activity,

etc.), construction activity at the time of sighting, and number of marine mammal exposures. Observers will conduct observations, meet training requirements, fill out data forms, and report findings in accordance with this MMMP.

Observers will implement mitigation measures including monitoring of the proposed shutdown and monitoring zones, clearing of the zones, and shutdown procedures. They will be in continuous contact with the construction personnel via two-way radio. A cellular phone with local service will be use as back-up communications and for safety purposes.

An employee of the construction contractor will be identified as the main point of contact for observers at the start of each construction day. Observers will report directly to the monitoring coordinator when a shutdown is deemed necessary due to marine mammals approaching the relevant shutdown zones during a potentially hazardous construction activity.

Observer Qualifications

Monitoring will be conducted by qualified, trained marine mammal observers (hereafter, "observers"). In order for observers to be considered qualified, the following requirements must be met:

Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance;

Physical capability of performing essential duties, including sitting or standing for periods of up to four hours, using binoculars or other field aid, and documenting observations;

Experience and ability to conduct field observations and collect data according to assigned protocols;

Experience or training in the field identification of marine mammals and marine mammal behavior, including the ability to accurately identify marine mammals in Alaskan waters to species;

Sufficient training, orientation or experience with the construction operation to provide for identification of concurrent activities and for personal safety during observations;

Writing skills sufficient to prepare reports of observations; and

Ability to communicate orally, by radio and in person, with project personnel to provide real-time information on marine mammals observed in the area and the appropriate mitigation response for the circumstances.

Data Collection

Observers will use a National Marine Fisheries Service (NMFS)-approved Observation Record (Appendix A) which will be completed by each observer for each survey day and location. Observation Records will be used by observers to record the following:

Date and time that permitted construction activity begins or ends;

Weather parameters (e.g. percent cloud cover, percent glare, visibility) and sea state. (The Beaufort Wind Force Scale (Appendix C) will be used to determine sea-state.)

Species, numbers, and, if possible, sex and age class of observed marine mammals;

Construction activities occurring during each sighting;

Marine mammal behavior patterns observed, including bearing and direction of travel;

Specific focus should be paid to behavioral reactions just prior to, or during, soft-start and shutdown procedures;

Location of marine mammal, distance from observer to the marine mammal, and distance from pile driving activities to marine mammals;

Record of whether an observation required the implementation of mitigation measures, including shutdown procedures and the duration of each shutdown; and

Other human activity in the area. Record the hull numbers of fishing vessels if possible.

Equipment

The following equipment will be required to conduct observations for this project:

Appropriate Personal Protective Equipment;

Portable radios and headsets for the observers to communicate with the monitoring coordinator and other observers;

Cellular phone for backup for radio communication

Contact information for the other observers, monitoring coordinator, and NMFS point of contact;

Daily tide tables for the project area;

Watch or chronometer;

Binoculars (quality 7 x 50 or better) with built-in rangefinder or reticles (rangefinder may be provided separately);

Hand-held GPS unit, map and compass, or grid map to record locations of marine mammals;

Copies of MMMP, IHA, and/or other relevant permit requirement specifications in sealed clear plastic cover; and

Notebook with pre-standardized monitoring Observation Record forms on waterproof paper.

Level A and Level B Harassment Zones

COU has established Level A harassment zones to delineate areas in which marine mammals may be exposed to injurious underwater sound levels due to pile driving. Work which could cause noise levels to reach those above the Level A Harassment thresholds will shut down if marine mammals are approaching the Level A harassment zones. Marine mammal monitoring will also occur in in areas where animals could be subjected to noise levels above the Level B harassment thresholds. The Level A and Level B harassment zones are discussed below, summarized in Section 5 of the IHA and shown in Appendix B.

Species with permitted "take" (Level B harassment) under the IHA include two cetacean species (Humpback whales (*Megaptera novaeangliae*) and killer whales (*Orcinus orca*)) and two pinniped species (Steller sea lion (*Eumetopias jubatus*) and harbor seals (*Phoca vitulina richardsi*). Take of any other marine mammal is not permitted under the IHA.

Determination of harassment radii is discussed fully in the Section 5 of the project's revised IHA application, based on NOAA Technical Memorandum NMFS-OPR-55. The effective radii are summarized in the tables below. Selection of the appropriate observation radius depends on the concurrent work activities and planned duration, as well as whether or not a bubble curtain is in use.. If additional acoustic data collection determines that smaller radii are appropriate, the table(s) will be updated accordingly. This is discussed further in the revised IHA Application.

Table 1. Effective Level A and Level B Harassment Zones - Vibratory.

Underwater Noise						
Source	**Level A Harassment Zone (m)**				**Level B Harassment Zone (m)**	
	Humpback whales	**Killer whales**	**Harbor seals**	**Steller sea lions**	**Cetaceans**	**Pinnipeds**
Vibratory Installation Sheet /18" Pile	10	10	10	10	3300	
Vibratory Installation 30" Pile	15					
Vibratory Removal / Steel	10				3300	
Vibratory Removal / Timber					1600	

Underwater Level B Harassment zones adjusted for land features (see figures in MMMP).

Table 2. Effective Level A and Level B Harassment Zones – Impact (190 dB).

Underwater Noise						
Source	**Level A Harassment Zone (m)**				**Level B Harassment Zone (m)**	
	Humpback whales	**Killer whales**	**Harbor seals**	**Steller sea lions**	**Cetaceans**	**Pinnipeds**
Impact Installation 30" (1 Pile per day)	135	10	75	10	1000	

Underwater Noise						
Source	**Level A Harassment Zone (m)**				**Level B Harassment Zone (m)**	
	Humpback whales	**Killer whales**	**Harbor seals**	**Steller sea lions**	**Cetaceans**	**Pinnipeds**
Impact Installation 30" (2 Piles per day)	215		115			
Impact Installation 30" (3 Piles per day)	280		150			
Impact Installation 30" (4 Piles per day)	340	15	185	15		
Impact Installation 30" (5 Piles per day)	400		215			
Impact Installation 30" (10 Piles per day)	630	25	340	25		
Impact Installation 30" (20 Piles per day)	1000	35	535	40		
Impact Installation 30" (PEAK Calc)	10					

*Table 3. Effective Level A and Level B Harassment Zones – Impact (185 dB **with bubble curtain**).*

Underwater Noise						
Source	**Level A Harassment Zone (m)**				**Level B Harassment Zone (m)**	
	Humpback whales	**Killer whales**	**Harbor seals**	**Steller sea lions**	**Cetaceans**	**Pinnipeds**
Impact Installation 30" (1 Pile per day)	65	10	35	10	465	
Impact Installation 30" (2 Piles per day)	100		55			
Impact Installation 30" (3 Piles per day)	130		70			

Underwater Noise						
Source	**Level A Harassment Zone (m)**				**Level B Harassment Zone (m)**	
	Humpback whales	**Killer whales**	**Harbor seals**	**Steller sea lions**	**Cetaceans**	**Pinnipeds**
Impact Installation 30" (4 Piles per day)	160		85			
Impact Installation 30" (5 Piles per day)	185		100			
Impact Installation 30" (10 Piles per day)	295		155	15		
Impact Installation 30" (20 Piles per day)	465	20	250	20		
Impact Installation 30" (PEAK Calc)	10					

Airborne Noise		
Source	**Level B Harassment Zone (m)**	
	Harbor Seals	**Other Pinnipeds**
Vibratory Installation Sheet	35	10
Vibratory Installation 18"	15	10
Vibratory Installation 30"	35	10
Vibratory Removal Steel	35	10
Vibratory Removal Timber	35	10
Impact Installation 30"	150	50
Quarry Blasting	40	15

During **vibratory** pile driving/removal, a **shutdown zone** shall include all areas where the underwater SPLs are anticipated to equal or exceed the Level A harassment thresholds for permitted species (summarized in Table 1) *or where the Level B harassment threshold would be exceeded for a marine mammal not included in the IHA.*

During **impact** pile driving, a **shutdown zone** will be determined by the number of piles to be driven that day as follows: If five (5) piles are to be driven that day, shutdown during the first driven pile will occur if a permitted marine mammal enters the '5-Pile' radius. After the first pile is driven, if no marine mammals have been within the '5-Pile'radius, the '4-Pile' radius will become the shutdown radius. This pattern will continue unless an animal is observed to remain outside the previous radius, at which time the most recent shutdown radius will remain in effect for the rest of the workday. Impact driving radii are summarized in Table 2.

If a **bubble curtain** is utilized, the reduced radii shown in Table 3 may be used.

During **impact** pile driving, **immediate shutdown** will occur if a marine mammal approaches the 10-meter **Peak SPL threshold**, regardless of how much cumulative exposure the animal has received. Immediate shutdown will also occur if the *Level B* threshold would be exceeded for animals not included in the IHA.

During **vibratory** pile driving and removal, the **monitoring** zone shall include all areas where the underwater SPLs are anticipated to equal or exceed the Level B harassment thresholds for *permitted* marine mammals during vibratory pile driving (120 dB isopleth).

During **impact** pile driving, the **monitoring** zone shall include all areas where the underwater SPLs are anticipated to equal or exceed the Level B harassment thresholds for *permitted* marine mammals during impact pile driving (160 dB isopleth).

During ***upland*** vibratory pile driving and vibratory compaction, the **monitoring** zone shall include all areas where the SPLs are anticipated to equal or exceed the Level B harassment thresholds for **airborne** activities for harbor seals (90 dB isopleth) and Steller sea lions (100dB isopleth).

The harassment zones will be monitored throughout the time required to drive or remove a pile.

If a marine mammal enters the monitoring zone, an exposure will be recorded and animal behaviors documented. However, pile driving would continue without cessation, unless the animal approaches or enters the shutdown zone (or the species not included in the IHA).

If a marine mammal approaches or enters the shutdown zone, all pile driving/removal activities will be immediately halted.

Take, in the form of Level A or Level B harassment, of marine mammals other than permitted species is **not authorized** and will be avoided by shutting down pile driving/removal activities before individuals of these species enter the Level B harassment zone.

During in-water or over-water construction activities having the potential to affect marine mammals, but not involving a pile driver, a shutdown zone of 10 meters will be monitored to ensure that marine mammals are not endangered by physical interaction with construction equipment. These activities could include, but are not limited to, the positioning of the pile on the substrate via a crane ("stabbing" the pile) or the removal of the pile from the water column/substrate via a crane ("deadpull"), or the slinging of construction materials via crane.

Table 4. Summary of anticipated shutdown and monitoring zones by species

	Species	Effective Shutdown Zones (m)			Effective Monitoring Zones (m)				
		In/ Over Water Work	Vibratory /Removal /Drilling	Impact	Vibratory /Removal /Drilling	Impact	Upland Vibratory	Upland Impact	Quarry Blasting
Cetaceans	**Humpback Whales**	10	10 - 15	10 - 400	1600 - 3300	465 - 1000	N/A	N/A	N/A
Cetaceans	**Killer Whales**	10	10	10 - 15	1600 - 3300	465 - 1000	N/A	N/A	N/A
Pinnipeds	**Steller sea lion**	10	10	10 - 15	1600 - 3300	465 - 1000	10	50	15
Pinnipeds	**Harbor seal**	10	10 - 15	10 - 215	1600 - 3300	465 - 1000	15 - 35	150	40
	Other NMFS mammals	10	1600 / 3300	1000	N/A*				

**Level B Harassment is not authorized for these species, so there are no monitoring zones.*

Observer Monitoring Locations

In order to monitor the Level A and Level B harassment zones effectively, marine mammal observers will be positioned at the best practicable vantage points, taking into consideration security, safety, access, and space limitations. Observers will be stationed at locations that provide adequate visual coverage for the Level A and Level B harassment zones. *Potential* observation locations are depicted in Figure 3, with sites marked with red dots.

One observer will be placed at a suitable location on or near the UMC facilities in order to observe the Level A harassment zones. This observer's monitoring will be primarily dedicated to observing Level A harassment zones; however, this observer will also record all marine mammal sightings beyond the radius of the Level A harassment zone, provided it does not interfere with their effectiveness at carrying out the shutdown procedures. If this observer is required to monitor beyond the Level A zone, a vantage point (tower or other perch) will be provided to facilitate full visibility of the observation zone.

An additional observer will be situated so as to provide complete visibility of the observation zone. If visibility does not allow for full clearance of the observation zone, additional stations or vantage points will be sought

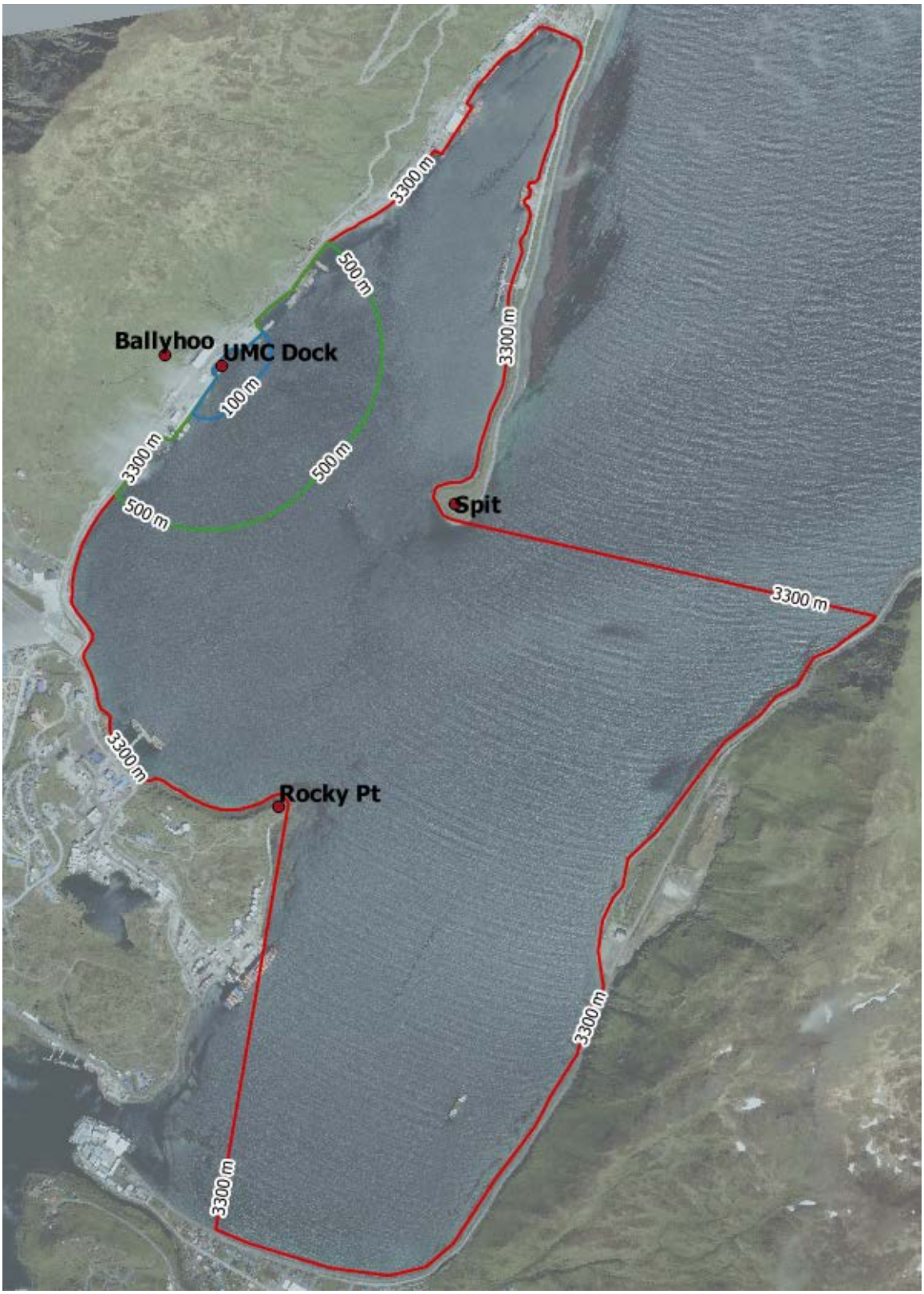

Figure 3. Potential observer monitoring locations.

Monitoring Techniques

COU will collect sighting data and behaviors of marine mammal species that are observed in the shutdown and monitoring zones during periods of construction. All observers will be qualified and trained in marine mammal identification and behaviors, as described in Section 3.1. NMFS requires that the observers have no other construction-related tasks while conducting monitoring. Observation necessitates that daylight is sufficient for observers to visualize the entirety of the monitoring zones, so observations will commence and complete during daylight hours. Monitoring of shutdown and observation zones will take place from 30 minutes prior to initiation through 30 minutes post-completion of all pile driving and removal activities.

Pre-Activity Monitoring

The following survey methodology will be implemented prior to commencing permitted activities:

Prior to the start of permitted activities, observers will monitor the shutdown and monitoring zones for 30 minutes. They will ensure that no marine mammals are present within shutdown zone before permitted activities begin.

The shutdown zone will be cleared when marine mammals have not been observed within zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes (for pinnipeds) and 30 minutes (for cetaceans).

When all applicable zones have been cleared, the observers will radio the monitoring coordinator. Permitted activities will not commence until the monitoring coordinator receives verbal confirmation the zones are clear.

If permitted species are present within the monitoring zone, work will not be delayed, but observers will monitor and document the behavior of individuals that remain in the monitoring zone.

In case of fog or reduced visibility, observers must be able to see the entirety of shutdown and monitoring zones before permitted activities can be initiated.

Soft Start Procedures

Soft start procedures will be used prior to periods of pile removal, pile installation, and in-water fill placement to allow marine mammals to leave the area prior to exposure to maximum noise levels.

For vibratory hammers, the soft start technique will initiate noise from the hammer for short periods at a reduced energy level, followed by a brief waiting period and repeating the procedure two additional times.

For impact hammers, the soft start technique will initiate several strikes at a reduced energy level, followed by a brief waiting period. This procedure would also be repeated two additional times.

Equipment used for fill placement will be idled near the waterside edge of the fill area for 15 minutes prior to performing in-water fill placement.

If work ceases for more than 30 minutes, soft start procedures must recommence prior to performing additional work.

Bubble Curtain

Should the City's contractor determine that the effective shutdown radii for impact driving summarized in Table 2 are too restrictive to complete construction, they will optionally use an unconfined bubble curtain during impact pile driving and the shutdown radii listed in Table 3. If a bubble curtain is deemed to be cost prohibitive, construction will be completed using the more conservative shutdown and monitoring zones summarized in Table 2.

During-Activity Monitoring

The following survey methodology will be implemented during permitted activities:

If permitted species are observed within the monitoring zone during permitted activities, an exposure would be recorded and behaviors documented. Work will not stop unless an animal enters or appears likely to enter the shutdown zone.

If the Level B harassment zone has been observed for the pre-activity period and non-permitted species are not present within the zone, soft start procedures can commence and work can continue even if visibility becomes impaired within the Level B zone.

If the Level B zone is not visible while work continues, exposures will be recorded at the estimated exposure rate for each permitted species. If work ceases for more than 30 minutes, the pre-activity monitoring of both zones must recommence.

If the Level A zone is not fully visible, work cannot continue.

Shutdown

If a marine mammal enters or appears likely to enter the shutdown zone:

The observers shall immediately radio or call to alert the monitoring coordinator.

All permitted activities will be immediately halted.

In the event of a shutdown of pile installation or removal operations, permitted activities may resume only when:

The animal(s) within or approaching the shutdown zone has been visually confirmed beyond the shutdown zone, or 15 minutes (for pinnipeds) or 30 minutes (for cetaceans) have passed without re-detection of the animal;

Observers will then radio or call the monitoring coordinator that activities can re-commence.

Breaks in Work

During an in-water construction delay, the shutdown and monitoring zones will continue to be monitored. No exposures will be recorded for permitted species in the monitoring zone if there are no concurrent permitted construction activities.

If permitted activities cease for more than 30 minutes and monitoring has not continued, pre-activity monitoring and soft start procedures must recommence. This includes breaks due to scheduled or unforeseen construction practices or breaks due to permit-required shutdown. Following 30 minutes of monitoring, work

can begin according to the pre-activity monitoring protocols. Work cannot begin if an animal is within the shutdown zone or if visibility is not clear throughout the shutdown and monitoring zones.

Post-Activity Monitoring

Monitoring of the shutdown and monitoring zones will continue for 30 minutes following completion of pile-driving activities. A post-monitoring period is not required for other in-water construction. These surveys will record observations and will focus on observing and reporting unusual or abnormal behavior of marine mammals. Observation Record forms will be used to document observed behavior.

Reporting

Modifications

In the event that COU needs to modify terms of this MMMP, the NMFS representative will be promptly contacted for discussion of the requested modification.

Unauthorized Exposure without Injury

If an unauthorized exposure without injury (as described below) occurs, observers will initiate shutdown, observe the animal leaving the shutdown zone, and resume work according to the directions in Section 3.6.5.

A Level A exposure (without injury) in which a Steller sea lion or harbor seal entered a shutdown zone prior to shut-down during in-water or over-water work without the potential for noise, and/or

A Level A or B exposure (without injury) in which any other ESA-listed species entered a shutdown zone prior to shut-down during in-water or over-water work without the potential for noise.

If this occurs, report of the exposure will be made to NMFS Alaska Region within one business day.

Injured or Dead Marine Mammal

If COU finds an injured, sick, or dead marine mammal, a COU representative will notify NMFS and provide the species or description of the animal(s), condition of the animal or carcass, location, date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

If marine mammal's condition is a direct result of the project, notification will be made and work will stop until NMFS is able to review the circumstances of the prohibited take.

If the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (e.g., previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), COU shall report the incident within 24 hours of the discovery. Construction activities may continue while NMFS reviews the circumstances of the incident and makes a final determination on the cause of the reported injury or death.

If cause of death is unclear, COU shall immediately report the incident. Construction activities may continue while NMFS reviews the circumstances of the incident and makes a final determination on the cause of the reported injury or death. NMFS will work with UniSea to determine whether additional mitigation measures or modifications to the activities are appropriate.

Care should be taken in handling dead specimens to preserve biological materials in the best possible state for later analysis of cause of death, if that occurs. In preservation of biological materials from a dead animal, the finder (i.e. marine mammal observer) has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed.

Reports will be made to the Office of Protected Resources and the Alaska Regional Stranding Coordinator.

Annual Report

A comprehensive annual marine mammal monitoring report documenting marine mammal observations will be submitted to NMFS at the end of the in-water work season. The draft comprehensive marine mammal monitoring report will be submitted to NMFS within 90 calendar days of the end of the in-water work period. The report will include marine mammal observations (pre-activity, during-activity, and post-activity) during pile driving days. A final comprehensive report will be prepared and submitted to NMFS within 30 calendar days following resolution of comments on the draft report from NMFS.

The reports shall include at a minimum:

General data:

Date and time of activity

Water conditions (e.g., sea-state)

Weather conditions (e.g., percent cover, percent glare, visibility)

Specific pile driving data:

Description of the pile driving activity being conducted (pile locations, pile size and type), and times (onset and completion) when pile driving occurs.

The construction contractor and/or marine mammal monitoring staff will coordinate to ensure that pile driving times and strike counts are accurately recorded. The duration of soft start procedures should be noted as separate from the full power driving duration.

Description of in-water construction activity not involving pile driving (location, type of activity, onset and completion times)

Pre-activity observational survey-specific data:

Date and time survey is initiated and terminated

Description of any observable marine mammals and their behavior in the immediate area during monitoring

Times when pile driving or other in-water construction is delayed due to presence of marine mammals within shutdown zones.

During-activity observational survey-specific data:

Description of any observable marine mammal behavior within monitoring zones or in the immediate area surrounding the monitoring zones, including the following:

Distance from animal to pile driving sound source.

Reason why/why not shutdown implemented.

If a shutdown was implemented, behavioral reactions noted and if they occurred before or after implementation of the shutdown.

If a shutdown was implemented, the distance from animal to sound source at the time of the shutdown.

Behavioral reactions noted during soft starts and if they occurred before or after implementation of the soft start.

Distance to the animal from the sound source during soft start.

Post-activity observational survey-specific data:

Results, which include the detections and behavioral reactions of marine mammals, the species and numbers observed, sighting rates and distances,

Refined exposure estimate based on the number of marine mammals observed. This may be reported as a rate of take (number of marine mammals per hour or per day), or using some other appropriate metric.

Appendix A. Marine Mammal Observation Record

Time	Visibility	Glare	Weather Condition	Wave Height	BSS	Wind	Swell
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W
:	B – P – M – G – E	%	S – PC – L – R – F – OC – SN – HR	Lt/Mod/Hvy		N S E W	N S E W

MARINE MAMMAL OBSERVATION RECORD

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Project Name: UMC Dock Positions III and IV

Monitoring Location: ______________________

Date: ______________

Time Effort Initiated: ______________________

Time Effort Completed: ______________________

Page ___ of ______

Event Code	Sight # (1 or 1.1 if re-sight)	Time/Dur (Start/End time if cont.)	WP/ Grid #/ DIR of travel	Zone/ Radius/ Impact Pile #?	Obs.	Sighting Cue	Species	Group Size	Behavior Code (see code sheet)	Construction Type	Mitigation Type	Exposure? (Y/N)	Behavior Change/ Response to Activity/Comments/Human Activity/Vessel Hull # or Name/ Visibility Notes
E ON PRE/POST CON S M OR E OFF		: :	______ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	______ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	______ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	______ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	______ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	______ Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		

E ON PRE/POST CON S M OR E OFF		: :	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		
E ON PRE/POST CON S M OR E OFF		: :	Grid N or S W or E			BL BO BR DF SA OTHER		Min: Max: Best:	Beh code(s): ________	SSV SSI V DR I DP ST OWC NOWC / NONE	SS/BC DE SD None		

- **Marine Mammal Observation Record – Sighting Codes**

Behavior Codes

Code	Behavior	Definition
BR	Breaching	Leaps clear of water
CD	Change Direction	Suddenly changes direction of travel
CH	Chuff	Makes loud, forceful exhalation of air at surface
DI	Dive	Forward dives below surface
DE	Dead	Shows decomposition or is confirmed as dead by investigation
DS	Disorientation	An individual displaying multiple behaviors that have no clear direction or purpose
FI	Fight	Agonistic interactions between two or more individuals
FO	Foraging	Confirmed by food seen in mouth
MI	Milling	Moving slowly at surface, changing direction often, not moving in any particular direction
PL	Play	Behavior that does not seem to be directed towards a particular goal; may involve one, two or more individuals
PO	Porpoising	Moving rapidly with body breaking surface of water
SL	Slap	Vigorously slaps surface of water with body, flippers, tail etc.
SP	Spyhopping	Rises vertically in the water to "look" above the water
SW	Swimming	General progress in a direction. Note general direction of travel when last seen [Example: "SW (N)" for swimming north]
TR	Traveling	Traveling in an obvious direction. Note direction of travel when last seen [Example: "TR (N)" for traveling north]
UN	Unknown	Behavior of animal undetermined, does not fit into another behavior
AWA	Approach Work	
LWA	Leave Work Area	
Pinniped only		
EW	Enter Water (from haul out)	Enters water from a haul-out for no obvious reason
FL	Flush (from haul out)	Enters water in response to disturbance
HO	Haul out (from water)	Hauls out on land
RE	Resting	Resting onshore or on surface of water
LO	Look	Is upright in water "looking" in several directions or at a single focus
SI	Sink	Sinks out of sight below surface without obvious effort (usually from an upright position)
VO	Vocalizing	Animal emits barks, squeals, etc.
Cetacean only		
LG	Logging	Resting on surface of water with no obvious signs of movement

Sea State and Wave Height: Use Beaufort Sea State Scale for Sea State Code located in Appendix C. This refers to the surface layer and whether it is glassy in appearance or full of white caps. In the open ocean, it also takes into account the wave height or swell, but in inland waters the wave height (swells) may never reach the levels that correspond to the correct surface white cap number. Therefore, include wave height for clarity.

Glare: Percent glare should be the total glare of observers' area of responsibility. Determine if observer coverage is covering 90 degrees or 180 degrees and document daily. Then assess total glare for that area. This will provide needed information on what percentage of the field of view was poor due to glare.

Swell Direction: Swell direction should be where the swell is coming from (S for coming from the south). If possible, record direction relative to fixed location (pier). Choose this location at beginning of monitoring project.

Wind Direction: Wind direction should also be where the wind is coming from.

Event

Code	Activity Type
E ON	Effort On
E OFF	Effort Off
PRE	Pre-Construction Watch
POST	Post-Construction Watch
CON	Construction (see types)
S	Sighting
M	Mitigation (see types)
OR	Observer Rotation

Sighting Cues

Code	Distance Visible
BL	Blow
BO	Body
BR	Breach
DF	Dorsal Fin
SA	Surface Activity
OTHR	Other

Marine Mammal Species

Code	Marine Mammal Species
HSEA	Harbor Seal
STSL	Steller Sea Lion
HPBK	Humpback Whale
OTT	Sea Otter
STEID	Steller's Eider
OTHR	Other

Construction Type

Code	Activity Type
V	Vibratory Pile Driving (installation and extraction)
I	Impact Pile Driving
DP	Dead pull
ST	Stabbing
DR	Drilling
OWC	Over-Water Construction
NOWC	No Over-Water Construction
NONE	No Construction

Mitigation Codes

Code	Activity Type
SS	Soft Start
BC	Bubble Curtain
DE	Delay onset of In-Water Work
SD	Shut down In-Water Work

Visibility

Code	Distance Visible
B	Bad (<0.5km)
P	Poor (0.5 – 0.9km)
M	Moderate (0.9 – 3km)
G	Good (3 - 10km)
E	Excellent (>10km)

Weather Conditions

Code	Weather Condition
S	Sunny
PC	Partly Cloudy
L	Light Rain
R	Steady Rain
F	Fog
OC	Overcast
SN	Snow
HR	Heavy Rain

Wave Height

Code	Wave Height
Light	0 – 3 ft
Moderate	4 – 6 ft
Heavy	>6 ft

Appendix B. Level A and Level B Harassment Zones Figures (*see attached pdf document*)

Appendix C. Beaufort Wind Force Scale

Beaufort Number (Wind Force)	Wind Velocity (Knots)	Wind Description	Sea Conditions	Height of Waves (Feet)	Photographic examples of Beaufort Wind Force Scale
0	<1	Calm	Sea surface smooth and mirror like	0	
1	1-3	Light Air	Scaly ripples, no foam crests	0-1	
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	1-2	
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	2-3.5	
4	11-16	Moderate Breeze	Small waves, becoming longer, numerous whitecaps	1-4	

5	17-21	Fresh Breeze	Moderate waves, taking longer form, many whitecaps, some spray	4-8	
6	22-27	Strong Breeze	Larger waves, whitecaps common, more spray	8-13	
7	28-33	Near Gale	Sea heaps up, white foam streaks off breakers	13-19	
8	34-40	Gale	Moderately high, waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	18-25	
9	41-47	Strong Gale	High waves, sea begins to roll, dense streaks of foam, spray may reduce visibility	23-32	
10	48-55	Storm	Very high waves, with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	29-41	

11	56-63	Violent Storm	Exceptionally high waves, foam patches cover sea, visibility more reduced	37-52	
12	64+	Hurricane	Air filled with foam, sea completely white with driving spray, visibility greatly reduced	45+	

*Images from the National Weather Service, retrieved from Wikipedia Commons