BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XE988

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to a Dock Replacement Project in Unalaska, Alaska

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; issuance of an incidental harassment authorization

SUMMARY: In accordance with regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that NMFS has issued an Incidental Harassment Authorization (IHA) to the City of Unalaska (COU) to incidentally harass, by Level B harassment only, marine mammals during construction activities associated with a dock expansion project at the existing Unalaska Marine Center (UMC) Dock in Unalaska, Alaska.

DATES: Effective April 28, 2017 through April 27, 2018.

FOR FURTHER INFORMATION CONTACT: Jolie Harrison, Office of Protected Resources, NMFS, (301) 427-8401.

SUPPLEMENTARY INFORMATION:

Availability

An electronic copy of the COU's application and supporting documents, as well as a list of the references cited in this document, may be obtained by visiting the Internet at: *http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*. In case of problems accessing

these documents, please call the contact listed under **FOR FURTHER INFORMATION CONTACT**.

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq*.) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as: any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Summary of Request

On March 22, 2016, we received a request from the COU for authorization to take marine mammals incidental to pile driving and pile removal associated with construction activities that would expand the existing UMC Dock in Dutch Harbor in the City of Unalaska, on Amaknak Island, Alaska. The COU submitted a revised version of the request on July 30, 2016, which was deemed adequate and complete. In August 2016, NMFS released its Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (the Guidance, available at *http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm*) which provides technical guidance for assessing the effects of anthropogenic sound on the hearing of marine mammal species under the jurisdiction of NMFS. The Guidance establishes new thresholds for predicting auditory injury, which equates to Level A harassment under the MMPA. The COU was able to update relevant portions of their application to incorporate re-calculated Level A harassment zones for vibratory and impact pile driving activities based on the updated acoustic thresholds described in the Guidance. The results of those calculations (*i.e.*, revised distances to Level A harassment thresholds) were provided to NMFS by the COU in September 2016 and were included in the proposed IHA. NMFS published a notice in the **Federal Register** making preliminary determinations and proposing to issue an IHA on November 10, 2016 (81 FR 78969). The notice initiated a 30-day comment period.

The COU proposes to demolish portions of the existing UMC dock and install a new dock between April 2017 and November 2017. The use of both vibratory and impact pile driving during pile removal and installation is expected to produce underwater sound at levels that have the potential to result in behavioral harassment of marine mammals. Species with the expected potential to be present during all or a portion of the in-water work window include Steller sea

lion (*Eumetopias jubatus*), harbor seal (*Phoca vitulina*), humpback whale (*Megaptera novaeangliae*), and killer whale (*Orcinus orca*).

To account for potential unexpected delay in project time frame, the IHA issued to COU covers the period from April 28, 2017, to April 27, 2018, based on impact analysis.

Description of the Specified Activity

Overview

In order to meet the increasing needs of the international shipping industry and increase vessel berthing capacity, a substantial upgrade of aging UMC facilities is necessary. The proposed project will replace the existing pile supported docks located at UMC Dock Positions III and IV with a modern high-capacity sheet pile bulkhead dock that extends from the existing bulkhead dock at Position V to the U.S. Coast Guard (USCG) Dock.

COU port operations saw numerous factory trawler offloads occurring at Dock Positions III and IV in 2013. These operations require more length at the face of the dock and greater uplands area than is available with the current infrastructure. The existing pile-supported docks are aging structures in shallower water that no longer meet the needs of the Port and require increasing levels of maintenance and monitoring costs. Both docks are also severely constrained by the limited uplands area available for offloading and loading operations.

Dock Position III is a timber pile-supported dock with approximately 160 feet of dock face that was constructed in the 1960's by the U.S. Army Corps of Engineers (USACE). This dock has been used for the Alaska Marine Highway System, vessel moorage, and factory trawler offloads. However, use of this structure is severely limited due to the low load-carrying capacity of the dock. The bullrails, deck surface, and bollards have deteriorated with age and the entire structure is in need of replacement or extensive renovations.

Dock Position IV is a steel-pile-supported, concrete deck structure with an approximate length of 200 feet that was constructed in the 1980s by the State of Alaska. Similar to Dock Position III, use of this dock is limited due to the low load capacity of the structure. Erosion has damaged an abutment underneath the dock, which is very difficult to repair and has the potential for further damage to adjacent portions of the dock.

The dock face of Dock Positions III and IV does not align with the larger sections of the UMC facility, significantly limiting overall usable moorage space. The proposed project aligns the new dock structures with the adjacent facilities, eliminates two angle breaks, provides substantially more usable moorage, and provides much deeper water at the dock face. The sheet pile dock will encompass the area between Dock Position V and the adjacent USCG Dock, providing maximum use of the available berthing area and upland storage space. The new dock alignment will allow larger, deeper vessels as well as simultaneous use of the other UMC facilities.

Dates and Duration

In-water and over-water construction of Phase 1 (all sheet pile installation, all in-water pipe pile installation, most upland pipe pile installation, and fill placement) is planned to occur between approximately April 1, 2017 and November 1, 2017. Phase 2 is planned to occur between approximately May 1, 2018 and October 1, 2018. Some of the upland pipe pile for utilities may be driven in upland fill away from the dock face during Phase 2. The COU proposes to use the following general construction sequence, subject to adjustment by the construction contractor's means and methods:

Construction Phase 1 (2017):

- Mobilization of equipment and demolition of the existing dock Positions III and IV and removal of any existing riprap/obstructions (April – May 2017).
- 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 fender and platform support piles in the water adjacent to the dock and miscellaneous support piles within 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
- 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 vaults, and dock surfacing.
- Installation of electrical, sewer, fuel, water, and storm drainage utilities.

Pile removal and pile driving is expected to occur between April 1 and November 1, 2017. In the summer months (April – September), 12-hour workdays in extended daylight will likely be used. In winter months (October – March), shorter 8-hour to 10-hour workdays in available daylight will likely be achievable. Work windows may be extended or shortened if or when electrical lighting is used. 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 pre-activity monitoring. It is assumed that sound associated with the pile driving and removal activities will be put into the water 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. During this time, a much smaller area will be monitored to ensure that animals are not injured by equipment or materials.

Specific Geographic Region

The UMC Dock is located in Dutch Harbor in the City of Unalaska, on Amaknak Island, Alaska (see Figure 5 of the application). Dutch Harbor is separated from the adjacent Iliuliuk Bay by a spit. The dock is located in Section 35, Township 72 South, Range 118 West, of the Seward Meridian. Tidelands in this vicinity are owned by the COU. Some of the adjacent uplands are owned by the COU and some are leased by the COU from Ounalashka Corporation. Adjacent infrastructure includes Ballyhoo Road and the Latitude 54 Building in which the COU Department of Ports and Harbors offices and facilities are currently housed. Neighboring docks include the USCG Dock and the existing UMC OCSP dock positions. Other marine facilities within Dutch Harbor include Delta Western Fuel, the Resolve-Magone Dock, North Pacific Fuel, the Kloosterboer Dock, and the COU's Light Cargo Dock and Spit Dock facilities, as shown in Figure 5 of the application. APL Limited is located within Iliuliuk Bay, and the entrance channel to Iliuliuk Harbor is south of Dutch Harbor.

Detailed Description of Activities

The COU proposes to install an OPEN CELL SHEET PILE™ (OCSP) dock at UMC Dock Position III and IV, replacing the existing pile-supported structure and providing a smooth transition between the UMC facility and the USCG dock. The OCSP dock will be constructed of PS31 flat sheet piles (web thickness of 0.5 inches and width between interlocks of 19.69 inches). In order to replace the existing timber pile-supported dock, the dock construction would include installation of the following:

- Approximately forty (40) 30-inch diameter steel fender and transition platform support piles;
- Approximately thirty (30) 30-inch diameter miscellaneous steel support piles
- Approximately one hundred fifty (150) 30-inch diameter steel crane rail support piles (approximately 25 of which are above the high tide line (HTL));
- Approximately one hundred fifty (150) 18-inch steel piles (H or round) used for temporary support of the sheet pile during construction (to be removed prior to completion);
- Approximately 1,800 PS31 flat sheet piles (approximately 100 of which are above the high tide line (HTL)); and
- Placement of approximately 110,000 cubic yards of clean fill.

The anticipated project quantities are shown in Table 1.

Concurrent with the dock construction, a material source will be developed in the hillside adjacent to Dock Position VII. The quarry will provide material for dock fill and other future projects, and the cleared area will be used for COU port offices and associated parking after the quarry is completed. The quarry will be developed through blasting benches in the rock face, with each bench being approximately 25 feet high, with the total height being approximately 125 feet. Quarry materials will be transported the short distance to the adjacent project site using heavy equipment.

Table 1. Total project quantities.

Item	Size and Type, Location	Below Mean High Water (MHW)	Below High Tide Line (HTL) (El. = 4.7)	Total
Surface Area of Dock (Acres)	-	2.1	2.3	**3.1**
Surface Area of Water Filled (Acres)	-	2.1	2.8	**2.8**
Gravel Fill (Cubic Yards)	Clean Fill; Within dock	74,000	80,000	**110,000**
Piles to be Removed (Each)	Steel	195	195	**195**
	Timber	55	55	**55**
Estimated Temporary Piles (Each)	18" Steel Pile; Within dock	150	150	**150**
Steel Piles - Fender and Platform Support (Each)	30" Steel; In front of bulkhead	40	40	**40**
Miscellaneous Support Piles (Each)	30" Steel; Within dock (not in-water)	30	30	**30**
Crane Rail Support Piles (Each)	30" Steel; Within dock (not in-water)	125	125	**150**
Proposed Sheet Piles (Each)	PS31 Sheet Pile; Dock face	1,400	1,700	**1,800**

The existing structure will be demolished by removing the concrete deck, steel superstructure, and attached appurtenances and structures and then extracting the existing steel support piles with a vibratory hammer. Sheet pile will also be installed with a vibratory hammer. Pile driving may occur from shore or from a stationary barge platform, depending on the Contractor's selected methods. After cells are completely enclosed, they will be incrementally

filled with clean material using bulldozers and wheel loaders. Fill will be placed primarily from shore, but some may be placed from the barge if needed. Fill will be compacted using vibratory compaction methods, described below. After all the sheet piles are installed and the cells are filled and compacted, fender piles, crane rail piles, mooring cleats, concrete surfacing, and other appurtenances will be installed.

As described, the project requires the removal and installation of various types and sizes of piles with the use of a vibratory hammer and impact hammer. These activities have the potential to result in Level B harassment (behavioral disruption) only, as a monitoring plan will be implemented to reduce the potential for exposure to Level A harassment (harassment resulting in injury). The rest of the in-water components of the project are provided here for completeness. Note that many of the support piles will be installed to an elevation below MHW or HTL; however, they will be installed within the enclosed fill of the sheet pile dock rather than in the water.

Utilities will be installed during Phase II, and include addition/extension of water, sewer, fuel, electrical, and storm drain. Authorization to construct the sewer and storm drain extension, as well as a letter of non-objection for the storm drain, will be obtained from the State of Alaska Department of Environmental Conservation (ADEC).

A detailed description of the proposed project is provided in the **Federal Register** notice for the proposed IHA (81 FR 78969; November 10, 2016). Since that time, no changes have been made to the planned project activities. Therefore, a detailed description is not provided here. Please refer to that **Federal Register** notice for the description of the specific activity.

Comments and Responses

A notice of NMFS's proposal to issue an IHA to the City was published in the **Federal Register** on November 10, 2016 (81 FR 78969). That notice described, in detail, the COU's activity, the marine mammal species that may be affected by the activity, and the anticipated effects on marine mammals. During the 30-day public comment period, NMFS received comments from the Marine Mammal Commission (Commission). Specific comments and responses are provided below. Comments are also posted at *http://www.nmfs.noaa.gov/pr/permits/incidental/*.

Comment 1: The Commission recommends that NMFS (1) compile all in-situ source level pile-driving and pile-removal measurements from past and future projects in a central database, (2) require each action proponent to specify the sediment composition, water depth (in terms of hydrophone placement and bathymetry), duration over which the pressure was averaged for SPL_{rms} metrics, and median values in all future hydroacoustic monitoring reports, (3) ensure consistency regarding integration timeframes used for SPL_{rms} measurements (e.g., 1-second averages, maximum over 10 seconds, or maximum over 30 seconds) in all future hydroacoustic monitoring reports, (4) require each action proponent to use median proxy source levels from all relevant sources when in-situ data are unavailable, and (5) require each action proponent to use the upper 90th percentile rather than the best-fit regression to inform the range to effects in all future hydroacoustic monitoring reports.

Response: NMFS understands the importance of taking a consistent approach when disseminating data for impact analyses, and is currently working on a guidance on in-water pile driving assessment, which will be supplemented by a compilation of in-situ source levels from pile driving and pile removal measurements from the past. The guidance will also include language that requires future sound source verifications (SSVs) to include information on

sediment composition and water depth. Many of the standardized practices for SSVs such as hydrophone depth and integration time for impact and vibratory sound sources are provided in NMFS 2012 pile driving guidance. NMFS will refer applicants to this guidance in the future, and will also refer to these documents in the guidance that is being developed.

While NMFS is striving to achieve consistency in marine mammal impact analyses, including developing standard and acceptable methodologies and metrics for measuring and quantifying underwater noise sources, considerations are also given to action proponents with limited resources. In the case of data treatment whether percentile or regression to be used would depend on how measurements are conducted and how many data points an action proponent collected. For example, if an SSV is conducted using a shipboard hydrophone that collected acoustic data at various distances from the source, the amount of data at each location may be limited, not necessarily allowing us to perform a statistical treatment to obtain the percentile. Therefore, NMFS accepts a single data point at the received distance, or a distance derived using best-fit regression from a set of data that is available.

Comment 2: The Commission recommends that NMFS require each action proponent to (1) use a consistent source level reduction factor when sound attenuation devices would be used during impact pile driving and in-situ data are unavailable and (2) conduct bubble curtain testing (for air pressure and flow prior to impact hammer use) and place the bubble curtain device on the substrate in all relevant incidental take authorizations.

Response: The effectiveness of noise attenuation devices often depends on oceanographic conditions such as currents and tides, thus should be evaluated in a case by case fashion. For example, for pile driving activities being conducted in Puget Sound where local currents are strong, NMFS worked with the action proponent and recommend 0 dB reduction when

calculating ensonified zones, while in other locations it has been shown in the past that an attenuation of 10 dB or more can be achieved. Regarding the second point from the Commission's comment, NMFS believes that the requirement for bubble curtain testing and design should also be considered in a case by case situation, as some of the action proponents may have limited resources to conduct such test or design a bubble curtain device that meets certain specifications.

In this case, no noise reduction is included in the calculation because the project proponent is not required to implement bubble curtain.

Comment 3: The Commission recommends that NMFS require each action proponent to implement a 100- rather than 50-msec pulse duration consistently when using NMFS's user spreadsheet and SPL_{rms}-based source levels to determine ranges to the various Level A harassment SEL_{cum} thresholds for impact pile driving.

Response: NMFS agrees with the Commission and will require each action proponent to implement a 100-msec pulse duration when using NMFS's optional spreadsheet and SPL_{rms}-based source level to determine ranges to Level A harassment zones. Consequently, 100-msec is the pulse duration we used for calculating Level A ensonified zones.

Comment 4: The Commission recommends that NMFS specify whether source levels based on SPL_{rms} or SEL_{s-s} are more appropriate for action proponents to use when both are available and require each action proponent to use that metric consistently to determine the ranges to the various Level A harassment SEL_{cum} thresholds.

Response: NMFS considers SEL_{s-s} provides a more accurate metric to calculate Level A harassment SEL_{cum} when using NMFS optional spread. Therefore, NMFS recommended action

proponents to use that metric when both SPL_{rms} and SEL_{s-s} are available. In the case of issuance an IHA to COU, SEL_{s-s} metric was used.

Description of Marine Mammals in the Area of the Specified Activity

Marine waters near Unalaska Island support many species of marine mammals, including pinnipeds and cetaceans; however, the number of species regularly occurring within Dutch Harbor, including near the project location is limited due to the high volume of vessel traffic in and around the harbor. Due to this, Steller sea lion, harbor seal, humpback whale, and killer whale are the only species within NMFS jurisdiction that are being included in the COA's IHA request. Sightings of other marine mammals within Dutch Harbor are extremely rare, and therefore, no further descriptions of the other marine mammals were included in the COA's application or in the notice of proposed authorization.

We have reviewed COA's species descriptions—which summarize available information regarding status and trends, distribution and habitat preferences, behavior and life history, and auditory capabilities of the potentially affected species—for accuracy and completeness and refer the reader to Sections 3 and 4 of the application. Please also refer to NMFS' website (*www.nmfs.noaa.gov/pr/species/mammals/*) for generalized species accounts.

Table 2 lists the marine mammal species with the potential for occurrence in the vicinity of the project during the project timeframe and summarizes key information regarding stock status and abundance. A detailed description of the species likely to be affected by the project, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the **Federal Register** notice for the proposed IHA (81 FR 78969; November 10, 2016). Since that time, we are not aware of any changes in the status of these species and stocks;

therefore, detailed descriptions are not provided here. Please refer to that **Federal Register** notice for these descriptions. Please also refer to NMFS' website (*www.nmfs.noaa.gov/pr/species/mammals/*) for generalized species accounts.

Table 2. Marine mammals potentially present in the vicinity of the project location.

Species	Stock	MMPA Status	ESA Status	Occurrence In/Near Project	Seasonality	Abundance
Harbor seal (*Phoca vitulina richardsi*)	Aleutian Islands	Protected	-	Common	Year-round	5,772
Steller sea lion (*Eumetopias jubatus*)	Western Distinct Population Segment (DPS)	Depleted, Strategic	Endangered	Common	Year-round	49,497
Killer whale (*Orcinus orca*)	Eastern North Pacific, Alaska Resident	Protected	-	Unknown	Summer, Fall	2,347
Killer whale (*Orcinus orca*)	Gulf of Alaska, Aleutian Islands, and Bering Sea Transient	Protected	-	Unknown	Year-round	587
Humpback whale (*Megaptera novaeangliae*)	Central North Pacific	Depleted, Strategic	n/a*	Seasonal	Summer	10,103
Humpback whale (*Megaptera novaeangliae*)	Western North Pacific	Depleted, Strategic	n/a*	Seasonal	Summer	1,107

*The newly defined DPSs (81 FR 62259) do not currently align with the stocks under the MMPA.

Potential Effects of the Specified Activity on Marine Mammals

The effects of underwater noise from construction activities for the project have the potential to result in behavioral harassment of marine mammals in the vicinity of the action area. The **Federal Register** notice for the proposed IHA (81 FR 78969; November 10, 2016) included a discussion of the effects of anthropogenic noise on marine mammals, therefore that information is not repeated here. Please refer to the **Federal Register** notice for that information.

Effects on Marine Mammal Habitat

The proposed activities at Dutch Harbor would not result in permanent impacts to habitats used directly by marine mammals, such as haul-out sites, but may have potential short-term impacts to food sources such as forage fish and salmonids. There are no rookeries or haulout sites within the modeled zone of influence for impact or vibratory pile driving associated with the project, or ocean bottom structure of significant biological importance to marine mammals that may be present in the waters in the vicinity of the project area. The project location receives heavy use by vessel moorage and factory trawler offloads, and experiences frequent vessel traffic because of these activities, thus the area is already relatively industrialized and not a pristine habitat for marine mammals. As such, the main impact associated with the proposed activity would be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously in this document. The most likely impact to marine mammal habitat occurs from pile driving effects on likely marine mammal prey (*i.e.*, fish) near the project location, and minor impacts to the immediate substrate during installation and removal of piles during the dock construction project.

The potential effects on marine mammal habitat are discussed in detail in the **Federal Register** notice for the proposed IHA (81 FR 78969; November 10, 2016), therefore that information is not repeated here; please refer to that **Federal Register** notice for that information.

Mitigation

In order to issue an IHA under section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to

rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses.

The COU's calculation of the Level A harassment zones utilized the methods presented in Appendix D of NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (the Guidance, available at *http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm*), and the accompanying User Spreadsheet[1]. The Guidance provides updated PTS onset thresholds using the cumulative SEL (SEL_{cum}) metric, which incorporates marine mammal auditory weighting functions, to identify the received levels, or acoustic thresholds, at which individual marine mammals are predicted to experience changes in their hearing sensitivity for acute, incidental exposure to all underwater anthropogenic sound sources. The Guidance (Appendix D) and its companion User Spreadsheet provide alternative methodology for incorporating these more complex thresholds and associated weighting functions.

The User Spreadsheet accounts for effective hearing ranges using Weighting Factor Adjustments (WFAs), and the COU's application uses the recommended values for vibratory and impact driving therein. NMFS' new acoustic thresholds use dual metrics of SEL_{cum} and peak sound level (PK) for impulsive sounds (*e.g.*, impact pile driving) and SEL_{cum} for non-impulsive sounds (*e.g.*, vibratory pile driving) (Table 3). The COU used proxy source level measurements taken from similar pile driving events (as described in "Estimated Take by Incidental Harassment"), and using the User Spreadsheet, applied the updated PTS onset thresholds for impulsive PK and SEL_{cum} in the new acoustic guidance to determine distance to the isopleths for

[1] For most recent version of the NMFS User Spreadsheet, see: *http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm*

PTS onset for impact pile driving. For vibratory pile driving, the COU used the User Spreadsheet to determine isopleth estimates for PTS onset using the cumulative sound exposure level metric (L_E) (*http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm*). In determining the cumulative sound exposure levels, the Guidance considers 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 case of the duel metric acoustic thresholds (L_{pk} and L_E) for impulsive sound, the larger of the two isopleths for calculating PTS onset is used. These values were then used to develop mitigation measures for proposed pile driving activities. The exclusion zone effectively represents the mitigation zone that would be established around each pile to prevent Level A harassment (PTS onset) to marine mammals (Table 4), while the zones of influence (ZOI) provide estimates of the areas within which Level B harassment might occur for impact/vibratory pile driving and quarry blasting (Table 5).

As discussed below, some of the proxy source levels, and the resulting PTS isopleth and harassment zone calculations, have been modified since the FR notice for the proposed IHA was published.

Table 3. Summary of PTS onset acoustic thresholds.

	PTS Onset Acoustic Thresholds* (Received Level)	
Hearing Group	**Impulsive**	**Non-impulsive**
Low-Frequency (LF) Cetaceans	*Cell 1* Lpk,flat*:* 219 dB L_E,LF,24h*:* 183 dB	*Cell 2* L_E,LF,24h*:* 199 dB
Mid-Frequency (MF) Cetaceans	*Cell 3* Lpk,flat: 230 dB L_E,MF,24h: 185 dB	*Cell 4* LE,MF,24h: 198 dB

High-Frequency (HF) Cetaceans	*Cell 5* Lpk,flat: 202 dB L_E,HF,24h: 155 dB	*Cell 6* LE,HF,24h: 173 dB
Phocid Pinnipeds (PW) (Underwater)	*Cell 7* Lpk,flat: 218 dB L_E,PW,24h: 185 dB	*Cell 8* L_E,PW,24h: 201 dB
Otariid Pinnipeds (OW) (Underwater)	*Cell 9* Lpk,flat: 232 dB L_E,OW,24h: 203 dB	*Cell 10* LE,OW,24h: 219 dB

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS onset. If a non-impulsive sound has the potential of exceeding the peak sound pressure level thresholds associated with impulsive sounds, these thresholds should also be considered.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa^{2}s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.*, varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Monitoring and Shutdown for Pile Driving

The following measures would apply to the COU's mitigation through the exclusion zone and zone of influence:

Exclusion Zone – For all pile driving activities, the COU will establish an exclusion zone intended to contain the area in which Level A harassment thresholds are exceeded. The purpose of the exclusion zone is to define an area within which shutdown of construction activity would occur upon sighting of a marine mammal within that area (or in anticipation of an animal entering the defined area), thus preventing potential injury of marine mammals. Calculated distances to the updated PTS onset acoustic thresholds are shown in Table 4. Some of these

distances have changed since the publication of the FR notice for the proposed IHA, as NMFS has incorporated more appropriate proxy source levels (see *Underwater Sound*) for some of the pile sizes based on Caltrans 2014 and 2015, as well as source levels used for recent Navy pile driving construction IHAs (79 FR 43429; 81 FR 66628; Navy, 2014). The greatest calculated distance to the Level A harassment threshold during impact pile driving, assuming a targeted maximum of 5 piles driven per day, is 397.6 m for low-frequency cetaceans (humpback whale). For mid-frequency cetaceans (killer whale), phocid pinnipeds (harbor seal), and otariid pinnipeds (Steller sea lion), the distances are 14.1 m, 212.8 m, and 15.5 m, respectively (Table 4). Calculated distances to the PTS onset threshold during vibratory pile driving range from a maximum of 14.7 m for low-frequency cetaceans to 0.6 m for otariids—depending on the specific type of piles/sheets that are installed or removed (Table 4).

Table 4. Pile driving activities and calculated distances to Level A harassment isopleths (onset PTS threshold using NMFS' new acoustic guidance) and Level A shutdown (exclusion) zones.

Source	Estimated Duration				Level A Harassment Zone/Shutdown Zone (m)** (New Guidance)			
	Number of 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"	150	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"	195	10	1.25	35	9.2/10	0.8/10	5.6/10	0.4/10
Vibratory Removal Steel 18"	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
	Number of Piles	**Piles Driven per Day**	**Strikes per Pile**	**Days of Effort**	**LF Cetaceans**	**MF Cetaceans**	**PW Pinnipeds**	**OW Pinnipeds**
Impact Installation 30" (SEL Calc)*	40	5	200	8	397.6/400	14.1/15	212.8/215	15.5/15
		4		10	342.6/340	12.2/15	183.3/185	13.3/15
		3		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

*Distances to the Level A harassment (PTS onset) isopleth are based on the cumulative sound exposure level (L_E) acoustic threshold; the modeled distances to the PTS onset isopleth were smaller using the Lpk metric (see Table 8 in the application), and therefore, not used to establish shutdown zones.
**Calculated distances to the Level A harassment zones do assume additional sound reductions that may result from implementation of certain types of sound attenuation devices (e.g., air bubble curtains).

The established shutdown zones corresponding to the Level A harassment zones for each activity are shown in Table 4 and are as follows:

- For all vibratory pile driving activities except vibratory installation of 30" steel pile, a 10-m radius shutdown zone will be employed for all species observed. For vibratory installation of 30" steel pile a 15-m radius shutdown zone will be employed.
- During impact pile driving, a shutdown zone will be determined by the number of piles to be driven that day as follows: If a maximum of five piles are to be driven that day, shutdown during the first driven pile will occur if a marine mammal enters the '5-pile' radius. After the first pile is driven, if no marine mammals have been observed within the '5-pile'radius, the '4-pile' radius will become the shutdown radius. This pattern will continue unless an animal is observed within the most recent shutdown radius, at which time that shutdown radius will remain in effect for the rest of the workday. Shutdown radii for each species, depending on number of piles driven, are as follows:
    - 5-pile radius: humpback whale, 400 m; killer whale, 15 m; harbor seal, 215 m; Steller sea lion, 15 m
    - 4-pile radius: humpback whale, 340 m; killer whale, 15 m; harbor seal, 185 m; Steller sea lion, 15 m

- 3-pile radius: humpback whale, 280 m; killer whale, 10 m; harbor seal, 150 m; Steller sea lion, 10 m
- 2-pile radius: humpback whale, 215 m; killer whale, 10 m; harbor seal, 115 m; Steller sea lion, 10 m
- 1-pile radius: humpback whale, 135 m; killer whale, 10 m; harbor seal, 75 m; Steller sea lion, 10 m

A shutdown will occur prior to a marine mammal entering a shutdown zone appropriate for that species and the concurrent work activity. Activity will cease until the observer is confident that the animal is clear of the shutdown zone: The animal will be considered clear if:

- It has been observed leaving the shutdown zone; or
- It has not been seen in the shutdown zone for 30 minutes for cetaceans and 15 minutes for pinnipeds.

If shutdown lasts for more than 30 minutes, pre-activity monitoring (see below) must recommence.

If the exclusion zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the exclusion zone is clearly visible. Should such conditions arise while impact driving is underway, the activity would be halted.

Level B Harassment Zone (Zone of Influence) – The zone of influence (ZOI) refers to the area(s) in which SPLs equal or exceed NMFS' current Level B harassment thresholds (160 and 120 dB rms for pulsed and non-pulsed continuous sound, respectively). ZOIs provide utility for monitoring that is conducted for mitigation purposes (*i.e.*, exclusion zone monitoring) by establishing monitoring protocols for areas adjacent to the exclusion zone. Monitoring of the ZOI enables observers to be aware of, and communicate about, the presence of marine mammals

within the project area but outside the exclusion zone and thus prepare for potential shutdowns of activity should those marine mammals approach the exclusion zone. However, the primary purpose of ZOI monitoring is to allow documentation of incidents of Level B harassment; ZOI monitoring is discussed in greater detail later (see "Monitoring and Reporting"). The modeled radial distances for ZOIs for impact and vibratory pile driving and removal (not taking into account landmasses which are expected to limit the actual ZOI radii) are shown in Table 6.

In order to document observed incidents of harassment, monitors will record all marine mammals observed within the ZOI. Modeling was performed to estimate the ZOI for impact pile driving (the areas in which SPLs are expected to equal or exceed 160 dB rms during impact driving) and for vibratory pile driving (the areas in which SPLs are expected to equal or exceed 120 dB rms during vibratory driving and removal). Results of this modeling showed the ZOI for impact driving would extend to a radius of 1,000 m from the pile being driven and the ZOI for vibratory pile driving would extend to a maximum radius of 11,659 m from the pile being driven. However, due to the geography of the project area, landmasses surround Dutch Harbor and Iliuliuk Bay are expected to limit the propagation of sound from construction activities such that the actual distances to the ZOI extent for vibratory pile driving will be substantially smaller than those described above. Modeling results of the ensonified areas, taking into account the attenuation provided by landmasses, suggest the actual ZOI will extend to a maximum distance of 3,300 m for vibratory driving. Due to this adjusted ZOI, and due to the monitoring locations chosen by the COU (see the Monitoring Plan in Appendix E of the application for details), we expect that monitors will be able to observe the entire modeled ZOI for both impact and vibratory pile driving, and thus we expect data collected on incidents of Level B harassment to be relatively accurate. The modeled areas of the ZOIs for impact and vibratory driving, taking

into account the attenuation provided by landmasses in attenuating sound from the construction project, are shown in Appendix B of the application. The actual Level B harassment/monitoring zones for impact pile driving (1,000 m) and vibratory pile driving (3,300 m) are shown in Table 6. Some of these distances have changes since the publication of the FR notice for the proposed IHA, as NMFS has incorporated more appropriate proxy source levels (see *Underwater Sound*) for some of the pile sizes based on Caltrans 2014 and 2015, as well as proxy source levels used for recent Navy pile driving construction IHAs (79 FR 43429; 81 FR 66628; Navy, 2014).

Marine Mammal Monitoring

Qualified observers will be on site before, during, and after all pile-driving activities. The Level A and Level B harassment zones for underwater noise will be monitored before, during, and after all in-water construction activity. The observers will be authorized to shut down activity if pinnipeds or cetaceans are observed approaching or within the shutdown zone of any construction activities.

Observers will follow observer protocols, meet training requirements, fill out data forms and report findings in accordance with protocols reviewed and approved by NMFS. A detailed Marine Mammal Monitoring Plan is found in Appendix E of the application.

If marine mammals are observed approaching or within the shutdown zone, shutdown procedures will be implemented to prevent unauthorized exposure. If marine mammals are observed within the monitoring zone (ZOI), the sighting will be documented as a potential Level B take and the animal behaviors shall be documented. If the number of marine mammals exposed to Level B harassment approaches the number of takes allowed by the IHA, the COU will notify NMFS and seek further consultation. If any marine mammal species are encountered that are not authorized by the IHA and are likely to be exposed to sound pressure levels greater

than or equal to the Level B harassment thresholds, then the COU will shut down in-water activity to avoid take of those species.

Pre-Activity Monitoring

Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, the observer will observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone will be cleared when a marine mammal has not been observed within zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, a soft-start (described below) cannot proceed until the marine mammal has left the zone or has not been observed for 15 minutes (for pinnipeds) and 30 minutes (for cetaceans). If the Level B harassment zone has been observed for 30 minutes 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

Soft Start

The use of a "soft-start" procedure is believed to provide additional protection to marine mammals by providing a warning and an opportunity to leave the area prior to the hammer operating at full capacity. Soft start procedures will be used prior to 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.

In-Water or Over-Water Construction Activities

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 m 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.

Sound Attenuation Devices

Sound attenuation devices (e.g., air bubble curtains, pile caps, or other attenuating device) shall be used during all impact pile driving operations. Sound levels can be greatly reduced during impact pile driving using sound attenuation devices. The exact reduction of noise level by a noise attenuator varies, and depends on many factors such as water depth, current flow, and in the case of an air bubble curtain, bubble density and bubble diameter, etc. Caltrans (2015) and Navy (2014) provide information on the general effectiveness of various air bubble curtain systems in attenuating underwater sound. In low current situations, 5 to 15 dB of noise reduction has been achieved (Caltrans, 2015). Data are more limited on the effectiveness of pile caps in reducing the sound generated by the pile during impact pile driving.

Vessel Interactions

To minimize impacts from vessels interactions with marine mammals, the crews aboard project vessels will follow NMFS's marine mammal viewing guidelines and regulations as practicable. (https://alaskafisheries.noaa.gov/protectedresources/mmv/guide.htm).

Mitigation Conclusions

We have carefully evaluated the COU's proposed mitigation measures and considered their likely effectiveness relative to implementation of similar mitigation measures in previously issued IHAs to determine whether they are likely to affect the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

(1) The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals;

(2) The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and

(3) The practicability of the measure for applicant implementation.

Based on our evaluation of the COU's proposed measures, we have determined that the mitigation measures provide the means of affecting the least practicable impact on marine mammal species or stocks and their habitat.

Monitoring and Reporting

In order to issue an IHA for an activity, section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking." The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for incidental take authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of

taking or impacts on populations of marine mammals that are expected to be present in the proposed action area.

Monitoring

Any monitoring requirement we prescribe should accomplish one or more of the following general goals:

1. An increase in the probability of detecting marine mammals, both within defined zones of effect (thus allowing for more effective implementation of the mitigation) and in general to generate more data to contribute to the analyses mentioned below;

2. An increase in our understanding of how many marine mammals are likely to be exposed to stimuli that we associate with specific adverse effects, such as behavioral harassment or hearing threshold shifts;

3. An increase in our understanding of how marine mammals respond to stimuli expected to result in incidental take and how anticipated adverse effects on individuals may impact the population, stock, or species (specifically through effects on annual rates of recruitment or survival) through any of the following methods:

- Behavioral observations in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict pertinent information, *e.g.*, received level, distance from source);
- Physiological measurements in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict pertinent information, *e.g.*, received level, distance from source); and

- Distribution and/or abundance comparisons in times or areas with concentrated stimuli versus times or areas without stimuli.

4. An increased knowledge of the affected species; or

5. An increase in our understanding of the effectiveness of certain mitigation and monitoring measures.

The COU submitted a Marine Mammal Monitoring Plan as part of their IHA application (Appendix E of the application; also available online at: *http://www.nmfs.noaa.gov/pr/permits/incidental/*). The COU's proposed Marine Mammal Monitoring Plan was created with input from NMFS and was based on similar plans that have been successfully implemented by other action proponents under previous IHAs for pile driving projects.

Visual Marine Mammal Observations

The COU will collect sighting data and will record behavioral responses to construction activities for marine mammal species observed in the project location during the period of activity. All marine mammal observers (MMOs) will be trained in marine mammal identification and behaviors and are required to have no other construction-related tasks while conducting monitoring. The COU will monitor the exclusion zone (shutdown zone) and Level B harassment zone before, during, and after pile driving, with observers located at the best practicable vantage points (See Figure 3 in the Marine Mammal Monitoring Plan for the observer locations planned for use during construction). Based on our requirements, the Marine Mammal Monitoring Plan would implement the following procedures for pile driving:

- 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 IHA
- During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals.
- If the exclusion zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the exclusion zone is clearly visible. Should such conditions arise while impact driving is underway, the activity would be halted.
- Observers will implement mitigation measures including monitoring of the shutdown and monitoring zones, clearing of the zones, and shutdown procedures.
- Observers will be in continuous contact with the construction personnel via two-way radio. A cellular phone will be used as back-up communications and for safety purposes.
- Individuals implementing the monitoring protocol will assess its effectiveness using an adaptive approach. MMOs will use their best professional judgment throughout implementation and seek improvements to these methods when deemed appropriate. Any modifications to protocol will be coordinated between NMFS and the COU.

Data Collection

We require that observers use approved data forms. Among other pieces of information, the COU will record detailed information about any implementation of shutdowns, including the distance of animals to the pile being driven, a description of specific actions that ensued, and

resulting behavior of the animal, if any. In addition, the COU will attempt to distinguish between the number of individual animals taken and the number of incidents of take, when possible. We require that, at a minimum, the following information be collected on sighting forms:

- Date and time that permitted construction activity begins or ends;
- Weather parameters (*e.g.* percent cloud cover, percent glare, visibility) and Beaufort 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.

Sound Source and Attenuation Verification

The companion User Spreadsheet provided with NMFS' new acoustic guidance uses multiple conservative assumption which may result in unrealistically large isopleths associated

with PTS onset. The COU may elect to verify the values used for source levels and sound attenuation in the various exclusion radii calculations. This would be achieved using the techniques and equipment for sound source verification discussed in Appendix A of the application. Sound levels would be measured at the earliest possibility during pile driving at 10, 100, 300, and 500 meters from the sound source. For the purpose of recalculating the observation and hazard radii, measured source levels (at 10 m) would be substituted for the assumed source levels for piles of the same size and method of installation as the measured pile. The distant values would be plotted and a logarithmic line of best fit used to determine the site specific attenuation rate (geometric loss coefficient) experienced at the project site. If the measured geometric loss coefficient is higher than the typically-used value of 15, the observation and hazard radii for all pile driving activities will be revised by applying the site specific measured values to the practical spreading loss equation. The site specific radii would be used for the remaining duration of construction. The COU may elect not to exercise this option, if the cost of shutdown during impact pile driving is not anticipated to warrant additional measurements.

The COU must obtain approval from NMFS of any new exclusion zone before it may be implemented.

Reporting

Annual Report

A draft report will be submitted within 90 calendar days of the completion of the activity. The report will include information on marine mammal observations pre-activity, during-activity, and post-activity during pile driving days, and will provide descriptions of any behavioral responses to construction activities by marine mammals and a complete description of any mitigation shutdowns and results of those actions, as well as an estimate of total take based

on the number of marine mammals observed during the course of construction. A final report must be submitted within 30 days following resolution of comments from NMFS on the draft report. The report 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.
  - Detailed description of the sound attenuation system utilized, including the design.
  - 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.

General Notifications

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner not authorized by the IHA, such as a Level A harassment, or a take of a marine mammal species other than those authorized, the COU would immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Stranding Coordinator.

The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the prohibited take. NMFS would work with the COU to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The COU would not be able to resume their activities until notified by NMFS via letter, email, or telephone.

In the event that the COU discovers an injured or dead marine mammal, and determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition), the COU would immediately report the incident to Jolie Harrison (*Jolie.Harrison@noaa.gov*), Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and Mandy Migura (*Mandy.Migura@noaa.gov*), Alaska Stranding Coordinator. The report would include the same information identified in the paragraph above. Construction related activities would be able to continue while NMFS reviews the circumstances

of the incident. NMFS would work with the COU to determine whether modifications in the activities are appropriate.

In the event that the COU discovers an injured or dead marine mammal, and 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, or scavenger damage), the COU would report the incident to Jolie Harrison (*Jolie.Harrison@noaa.gov*), Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and Mandy Migura (*Mandy.Migura@noaa.gov*), Alaska Stranding Coordinator, within 24 hours of the discovery. The COU would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network. The COU can continue its operations under such a case.

Estimated Take by Incidental Harassment

Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines "harassment" as: "…any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment)."

All anticipated takes would be by Level B harassment, resulting from vibratory and impact pile driving and involving temporary changes in behavior. Based on the best available information, the proposed activities—vibratory and impact pile driving—would not result in serious injuries or mortalities to marine mammals even in the absence of the planned mitigation and monitoring measures. Additionally, the mitigation and monitoring measures are expected to

minimize the potential for injury, such that take by Level A harassment is considered discountable.

If a marine mammal responds to a stimulus by changing its behavior (*e.g.*, through relatively minor changes in locomotion direction/speed or vocalization behavior), the response may or may not constitute taking at the individual level, and is unlikely to affect the stock or the species as a whole. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on animals or on the stock or species could potentially be significant (*e.g.*, Lusseau and Bejder, 2007; Weilgart, 2007). Given the many uncertainties in predicting the quantity and types of impacts of sound on marine mammals, it is common practice to estimate how many animals are likely to be present within a particular distance of a given activity, or exposed to a particular level of sound.

This practice potentially overestimates the numbers of marine mammals taken, as it is often difficult to distinguish between the individual animals harassed and incidences of harassment. In particular, for stationary activities, it is more likely that some smaller number of individuals may accrue a number of incidences of harassment per individual than for each incidence to accrue to a new individual, especially if those individuals display some degree of residency or site fidelity and the impetus to use the site (*e.g.*, because of foraging opportunities) is stronger than the deterrence presented by the harassing activity.

The COU has requested authorization for the incidental taking of small numbers of Steller sea lions, harbor seals, humpback whales, and killer whales that may result from pile driving activities associated with the UMC dock construction project described previously in this document. In order to estimate the potential incidents of take that may occur incidental to the specified activity, we must first estimate the extent of the sound field that may be produced by

the activity and then incorporate information about marine mammal density or abundance in the project area. We first provide information on applicable sound thresholds for determining effects to marine mammals before describing the information used in estimating the sound fields, the available marine mammal density or abundance information, and the method of estimating potential incidences of take.

Sound Thresholds

We use sound exposure thresholds to determine when an activity that produces sound might result in impacts to a marine mammal such that a "take" by harassment might occur. As discussed above, NMFS has recently revised PTS (and temporary threshold shift) onset acoustic thresholds for impulsive and non-impulsive sound as part of its new acoustic guidance (refer to Table 3 for those thresholds). The Guidance does not address Level B harassment, nor airborne noise harassment; therefore, COU uses the current NMFS acoustic exposure criteria to determine exposure to airborne and underwater noise sound pressure levels for Level B harassment (Table 5).

Table 5. Current NMFS acoustic exposure criteria for Level B harassment.

Criterion	Definition	Threshold
Level B harassment (underwater)	Behavioral disruption	160 dB re: 1 µPa (impulsive source*) / 120 dB re: 1 µPa (continuous source*) (rms)
Level B harassment (airborne)**	Behavioral disruption	90 dB re: 20 µPa (harbor seals) / 100 dB re: 20 µPa (other pinnipeds) (unweighted)

* Impact pile driving produces impulsive noise; vibratory pile driving produces non-pulsed (continuous) noise.
** NMFS has not established any formal criteria for harassment resulting from exposure to airborne sound. However, these thresholds represent the best available information regarding the effects of pinniped exposure to such sound and NMFS' practice is to associate exposure at these levels with Level B harassment.

Distance to Sound Thresholds

Underwater Sound Propagation Formula – Pile driving generates underwater noise that can potentially result in disturbance to marine mammals in the project area. Transmission loss

(TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

$TL = B * \log_{10}(R_1/R_2)$, where

R_1 = the distance of the modeled SPL from the driven pile, and

R_2 = the distance from the driven pile of the initial measurement

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source (20*log(range)). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log(range)). A practical spreading value of fifteen is often used under conditions, such as Dutch Harbor, where water depth increases as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Practical spreading loss (4.5 dB reduction in sound level for each doubling of distance) is assumed here.

Underwater Sound – During the installation of piles, the project has the potential to increase underwater noise levels. This could result in disturbance to pinnipeds and cetaceans that occur within the Level B harassment zone. The intensity of pile driving sounds is greatly

influenced by factors such as the type of piles, hammers, and the physical environment in which the activity occurs. A large quantity of literature regarding SPLs recorded from pile driving projects is available for consideration. In order to determine reasonable SPLs and their associated effects on marine mammals that are likely to result from pile driving at the UMC dock, studies with similar properties to the specified activity were evaluated.

According to studies by the California Department of Transportation (Caltrans), the installation of steel sheet piles using a vibratory hammer can result in underwater noise levels reaching a source level of 163 dB RMS or 162 dB_{SEL} at 10 m (Caltrans, 2015). PND Engineers, Inc. performed acoustic measurements during vibratory installation of steel sheet pile at a similar construction project in Unalaska, Alaska, and found average SPLs of 160.7 dB RMS (Unisea, 2015). This lower value was used to calculate the harassment radii for vibratory installation sheet pile and is discussed further in Appendix A of the application.

Underwater noise levels during the vibratory removal and installation of 18-inch steel pile can reach a source level of 162 dB RMS at 10 m (Illingworth and Rodkin, 2012; Navy, 2014). Because there was little information on the underwater noise levels of the removal of timber piles, the levels used for analysis (153 dB RMS at 10 m) were taken from the installation of timber piles (Illingworth and Rodkin, 2012; Navy, 2014). Underwater noise levels during the impact pile driving of a 30-inch steel pile can reach a source level of 190 dB RMS (177 dB_{SEL}) at 10 m (Caltrans, 2014 and 2015), whereas the underwater noise from the vibratory driving of 30-inch steel pile can result in a source level of 166 dB RMS at 10 m (Illingworth and Rodkin, 2012; Navy, 2014).

Dutch Harbor does not represent open water, or free field, conditions. Therefore, sounds would attenuate as they encounter land masses. As a result, and as described above, pile driving

noise in the project area is not expected to propagate to the calculated distances for the 120 dB thresholds as shown in Table 6. See Appendix B of the application for figures depicting the actual extents of areas in which each underwater sound threshold is predicted to occur at the project area due to pile driving, taking into account the attenuation provided by landmasses.

Table 6. Modeled distances to the NMFS Level B harassment thresholds (isopleths) and actual monitoring zones during pile installation and removal.

Threshold	**Distance (m) ***	**Monitoring Zone (m)**
Impact driving, disturbance (160 dB)	1,000**	1,000
Vibratory removal, disturbance (120 dB)	11,659*** (steel)	3,300 (steel)
	1,585 (timber)	1,600 (timber)

*Distances shown are modeled maximum distances and do not account for landmasses which are expected to reduce the actual distances to sound thresholds.
**Calculated distance to the impact pile driving Level B harassment zone does not assume additional sound reductions that may result from implementation of certain types of sound attenuation devices (e.g., air bubble curtains).
**This is the maximum distance modeled. See Section 5 of the application for the modeled distances for each pile driving activity type.

Airborne Sound – During the installation of piles and blasting activities at the quarry, the project has the potential to increase airborne noise levels. This 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; however, we do not expect animals to haul out frequently within Dutch Harbor or the spit due to the amount of activity within the area. A spherical spreading loss model (*i.e.*, 6 dB reduction in sound level for each doubling of distance from the source), in which there is a perfectly unobstructed (free-field) environment not limited by depth or water surface, is appropriate for use with airborne sound and was used to estimate the distance to the airborne thresholds.

The formula for calculating spherical spreading loss in airborne noise is:

$$TL=GL \times \log(R_1/R_2)$$

where:

TL = Transmission loss (dB)

GL = Geometric Loss Coefficient (20 for spherical spreading in airborne noise)

R_1 = Range of the sound pressure level (m)

R_2 = Distance from the source of the initial measurement (m)

Noise levels used to calculate airborne harassment radii come from Laughlin (2010) and Laughlin (2013) and are summarized in Table 9 of the application. Data for vibratory driving from Laughlin (2010) is presented in dB_{L5EQ}, or the 5-minute average continuous sound level. In this case dB_{RMS} values would be calculated in a similar fashion, so these dB_{L5EQ} were considered equivalent to the standard dB_{RMS}. Impact pile driving noise levels were taken from a recent Washington State Department of Transportation IHA application which used data collected by Laughlin (2013). A report was not available for this data, but it is assumed to be provided in dB_{RMS}. Only A-weighted airborne noise levels were available for quarry plasting (Giroux, 2009), so a conservative maximum level was selected, dBA_{LMAX}.

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

- For the vibratory installation of 18-inch steel piles, the calculated airborne Level B harassment zone for harbor seals is 11.4 m; for Steller sea lions, the distance is 3.6 m;

- For the vibratory installation of 30-inch steel piles, the calculated airborne Level B harassment zone for harbor seals is 31.9 meters; for Steller sea lions, the distance is 10.1 m;
- For the impact installation of 24-inch steel piles, the calculated airborne Level B harassment zone for harbor seals is 152.4 m; for Steller sea lions, the distance is 48.2 m; and
- For quarry blasting, the calculated Level B harassment zone for harbor seals extends to 38.5 m and 12.2 m for Steller sea lions.

Vibratory installation of sheet piles is assumed to create lower noise levels than installation of 30-inch round piles, so these values will be used for sheet pile driving. Similarly, vibratory removal of steel or wooden piles will observe the same harassment radii. For the purposes of this analysis, impact installation of 30-inch steel piles is assumed to generate similar sound levels to the installation of 24-inch piles, as no unweighted data was available for the 30-inch piles.

Since the in-water area encompassed within the above areas is located entirely within the underwater Level B harassment zone, the pinnipeds that come within these areas will already be recorded as a take based on Level B harassment threshold for underwater noise, which are in all cases larger than those associated with airborne sound. Further, it is not anticipated that any pinnipeds will haul out within the airborne harassment zone. Airborne noise thresholds have not been established for cetaceans (NOAA, 2015b), and no adverse impacts are anticipated.

Distance from the quarry bottom to the shoreline is an average of 70 - 80 m, so exposure to even Level B harassment from blasting noise is highly unlikely.

Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Marine Mammal Occurrence

The most appropriate information available was used to estimate the number of potential incidences of take. Density estimates for Steller sea lions, harbor seals, humpback whales, and killer whales in Dutch Harbor, and more broadly in the waters surrounding Unalaska Island, are not readily available. Likewise, we were not able to find any published literature or reports describing densities or estimating abundance of either species in the project area. As such, data collected from marine mammal surveys represent the best available information on the occurrence of both species in the project area.

Beginning in April 2015, UMC personnel began conducting surveys within Dutch Harbor under the direction of an ecological consultant. The consultant visited the site every month to ensure that data was gathered consistently and comprehensively. Observers monitored for a variety of marine mammals, including Steller sea lions, whales, and harbor seals. Several observation locations from various vantage points were selected for the surveys. Observations took place for approximately 15 minutes from each point, and included only marine mammals which were inside Dutch Harbor. The survey recorded the type of species observed, the number of species observed, the primary activity of the species, and any applicable notes. Surveys were conducted through July 2016.

These surveys represent the most recent data on marine mammal occurrence in the harbor, and represent the only targeted marine mammal surveys of the project area that we are aware of.

Data from bird surveys of Dutch Harbor conducted by the U.S. Army Corps of Engineers (USACE) from 2003-2013, which included observations of Steller sea lions in the harbor, were also available; however, we determined that these data were unreliable as a basis for prediction of marine mammal abundance in the project location as the goal of the USACE surveys was to develop a snapshot of waterfowl and seabird location and abundance in the harbor, thus the surveys would have been designed and carried out differently if the goal had been to document marine mammal use of the harbor. Additionally, USACE surveys occurred only in winter; as Steller sea lion abundance is expected to vary significantly between the breeding and the non-breeding season in the project location, data that were collected only during the non-breeding season have limited utility in predicting year-round abundance. As such, we determined that the data from the surveys commissioned by COU in 2015-2016 represents the best available information on marine mammals in the project location.

Description of Take Calculation

The take calculations presented here rely on the best data currently available for marine mammal populations in the project location. Density data for marine mammal species in the project location is not available. Therefore the data collected from marine mammal surveys of Dutch Harbor in 2015-2016 represent the best available information on marine mammal populations in the project location, and this data was used to estimate take. As such, the zones that have been calculated to contain the areas ensonified to the Level A and Level B thresholds for marine mammals have been calculated for mitigation and monitoring purposes and were not used in the calculation of take. See Table 7 for total estimated incidents of take. Estimates were based on the following assumptions:

- All marine mammals estimated to be in areas ensonified by noise exceeding the Level B harassment threshold for impact and vibratory driving (as shown in Appendix B of the application) are assumed to be in the water 100 percent of the time. This assumption is based on the fact that there are no haulouts or rookeries within the area predicted to be ensonified to the Level B harassment threshold based on modeling.
- Predicted exposures were based on total estimated total duration of pile driving/removal hours, which are estimated at 1,470 hours over the entire project. This estimate is based on a 245 day project time frame, an average work day of 12 hours, and a conservative estimate that up to approximately 50 percent of time (likely less on some days, based on the short pile driving durations provided in Table 4) during those work days will include pile driving and removal activities (with the rest of the work day spent on non-pile driving activities which will not result in marine mammal take, such as installing templating and bracing, moving equipment, etc.).
- Vibratory or impact driving could occur at any time during the "duration" and our approach to take calculation assumes a rate of occurrence that is the same for any of the calculated zones.
- The hourly marine mammal observation rate recorded during marine mammal surveys of Dutch Harbor in 2015 is reflective of the hourly rate that will be observed during the construction project.
- Takes were calculated based on estimated rates of occurrence for each species in the project area and this rate was assumed to be the same regardless of the size of the zone (for impact or vibratory driving/removal).
- Activities that may be accomplished by either impact driving or down-the-hole drilling (*i.e.*, fender support/pin piles, miscellaneous support piles, and temporary support piles) were assumed to be accomplished via impact driving. If any of these activities are ultimately accomplished via down-the-hole drilling instead of impact driving, this would not result in a change in the amount of overall effort (as they will be accomplished via down-the-hole drilling instead of, and not in addition to, impact driving). As take estimates are calculated based on effort and not marine mammal densities, this would not change the take estimate.

Take estimates for Steller sea lions, harbor seals, humpback whales, and killer whales were calculated using the following series of steps:

1. The average hourly rate of animals observed during 2015-2016 marine mammal surveys of Dutch Harbor was calculated separately for both species ("Observation Rate"). Thus "Observation Rate" (OR) = Number of individuals observed/hours of observation;
2. 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"). Thus "Exposure Rate" (XR) = $\mu_{OR} + CI_{95}$ (where μ_{OR} = average of hourly observation rates and CI_{95} = 95 percent confidence interval (normal distribution);
3. The total estimated hours of pile driving work over the entire project was calculated, as described above ("Duration"); Thus "Duration" = total number of work days (245) * average pile driving/removal hours per day (6) = total work hours for the project (1,470); and
4. The estimated number of exposures was calculated by multiplying the "Duration" by the estimated "Exposure Rate" for each species. Thus, estimated takes = Duration * XR.

Please refer to Appendix G of the application for a more thorough description of the statistical analysis of the observation data from marine mammal surveys.

Steller Sea Lion – Steller sea lion density data for the project area is not available. Steller sea lions occur year-round in the Aleutian Islands and within Unalaska Bay and Dutch Harbor. As described above, local abundance in the non-breeding season (winter months) is generally lower overall; data from surveys conducted by the COU in 2015-2016 revealed Steller sea lions were present in Dutch Harbor in most months that surveys occurred. We assume, based on marine mammal surveys of Dutch Harbor, and based on the best available information on seasonal abundance patterns of the species including over 20 years of NOAA National Marine Mammal Laboratory (NMML) survey data collected in Unalaska, that Steller sea lions will be

regularly observed in the project area during most or all months of construction. As described above, all Steller sea lions in the project area at a given time are assumed to be in the water, thus any sea lion within the modeled area of ensonification exceeding the Level B harassment threshold would be recorded as taken by Level B harassment.

Estimated take of Steller sea lions was calculated using the equations described above, as follows:

μ_{OR} = 0.40 animals/hour

CI_{95} = 0.23 animals/hour

XR = 0.63 animals/hour

Estimated exposures (Level B harassment) = 0.63 * 1,470 = 926

Thus we estimate that a total of 926 Steller sea lion takes will occur as a result of the proposed UMC dock construction project (Table 7).

Harbor Seal – Harbor seal density data for the project location is not available. We assume, based on the best on the best available information, that harbor seals will be encountered in low numbers throughout the duration of the project. We relied on the best available information to estimate take of harbor seals, which in this case was survey data collected from the 2015-2016 marine mammal surveys of Dutch Harbor as described above. That survey data showed harbor seals are present in the harbor only occasionally (average monthly observation rate = 0.41). NMML surveys have not been performed in Dutch Harbor, but the most recent NMML surveys of Unalaska Bay confirm that harbor seals are present in the area in relatively small numbers, with the most recent haulout counts in Unalaska Bay (2008-2011) recording no more than 19 individuals at the three known haulouts there. NMML surveys have been limited to the months of July and August, so it is not known whether harbor seal abundance in the project

area varies seasonally. As described above, all harbor seals in the project area at a given time are assumed to be in the water, thus any harbor seals within the modeled area of ensonification exceeding the Level B harassment threshold would be recorded as taken by Level B harassment.

Estimated take of harbor seals was calculated using the equations described above, as follows:

μ_{OR} = 0.16 animals/hour

CI_{95} = 0.16 animals/hour

XR = 0.32 animals/hour

Estimated exposures (Level B harassment) = 0.32 * 1,470 hours = 470

Thus we estimate that a total of 470 harbor seal takes will occur as a result of the proposed UMC dock construction project (Table 7).

Humpback Whale – Humpback whale density data for the project location is not available. We assume, based on the best on the best available information, that humpback whales will be encountered in low numbers throughout the duration of the project. We relied on the best available information to estimate take of humpback whales, which in this case was survey data collected from the 2015-2016 marine mammal surveys of Dutch Harbor as described above. That survey data showed humpback whales are present in the harbor only occasionally (average monthly observation rate = 0.06). Estimated take of humpback whales was calculated using the equations described above, as follows:

μ_{OR} = 0.06 animals/hour

CI_{95} = 0.06 animals/hour

XR = 0.12 animals/hour

Estimated exposures (Level B harassment) = 0.12 * 1,470 hours = 176

Thus we estimate that a total of 176 humpback whale takes will occur as a result of the proposed UMC dock construction project (Table 7).

Killer Whale - Little is known about killer whales that inhabit waters near Unalaska (Parsons *et al.*, 2013). While it is likely that killer whales may appear in Dutch Harbor, given their known range and the availability of food, the 2015-2016 surveys saw only a small number (2) of marine mammals that were suspected to be killer whales (average monthly observation rate for these unidentified whales = 0.02). There are differences in the physical appearance of transient and resident killer whales; however, in the surveys no distinction was notated. Killer whale density data for the project location is not available. We assume, based on the best on the best available information, that killer whales will be encountered in low numbers throughout the duration of the project. We relied on the best available information to estimate take of killer whales, which in this case was survey data collected from the 2015-2016 marine mammal surveys of Dutch Harbor as described above. That survey data showed killer whales are potentially present in the harbor only very rarely. Estimated take of killer whales was calculated using the equations described above, as follows:

μ_{OR} = 0.02 animals/hour

CI_{95} = 0.04 animals/hour

XR = 0.06 animals/hour

Estimated exposures (Level B harassment) = 0.06 * 1,470 hours = 88

Thus we estimate that a total of 88 killer whale takes will occur as a result of the proposed UMC dock construction project (Table 7).

We therefore propose to authorize the take, by Level B harassment only, of a total of 926 Steller sea lions (Western DPS), 470 harbor seals (Aleutian Islands Stock), 88 killer whales

(Eastern North Pacific Alaska Resident and Gulf of Alaska, Aleutian Islands, and Bering Sea Transient Stocks), and 176 humpback whales (Central North Pacific Stock; Western North Pacific Stock) as a result of the proposed construction project. These take estimates are considered reasonable estimates of the number of marine mammal exposures to sound above the Level B harassment threshold that are likely to occur over the course of the project, and not the number of individual animals exposed. For instance, for pinnipeds that associate fishing boats in Dutch Harbor with reliable sources of food, there will almost certainly be some overlap in individuals present day-to-day depending on the number of vessels entering the harbor, 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.

Table 7. Number of potential marine mammal incidental takes authorized, and percentage of stock abundance, as a result of the proposed project.

Species	Underwater[1]		Percentage of stock abundance
	Level A	Level B	
Humpback whale	0	176	1.6%
Killer whale	0	88	3.0%
Steller sea lion	0	926	1.9%
Harbor seal	0	470	8.1%

[1] We assume, for reasons described earlier, that no takes would occur as a result of airborne noise.

Analyses and Determinations

Negligible Impact Analysis

NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival." A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of Level B harassment takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through behavioral harassment, we consider other factors, such as the likely nature of any responses (*e.g.*, intensity, duration), the context of any responses (*e.g.*, critical reproductive time or location, migration), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, and effects on habitat.

To avoid repetition, the discussion of our analyses applies generally to all the species listed in Table 7, given that the anticipated effects of this pile driving project on marine mammals are expected to be relatively similar in nature. Where there are species-specific factors that have been considered, they are identified below.

Pile driving activities associated with the proposed dock construction project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment (behavioral disturbance) only, from underwater sounds generated from pile driving. Potential takes could occur if individuals of these species are present in the ensonified zone when pile driving and removal are under way.

The takes from Level B harassment will be due to potential behavioral disturbance and TTS. No injury, serious injury or mortality of marine mammals would be anticipated as a result of vibratory and impact pile driving. Except when operated at long continuous duration (not the

case here) in the presence of marine mammals that do not move away, vibratory hammers do not have significant potential to cause injury to marine mammals due to the relatively low source levels produced and the lack of potentially injurious source characteristics. Impact pile driving produces short, sharp pulses with higher peak levels than vibratory driving and much sharper rise time to reach those peaks. The potential for injury that may otherwise result from exposure to noise associated with impact pile driving will effectively be minimized through the implementation of the planned mitigation measures. These measures include: the implementation of an exclusion (shutdown) zone, which is expected to eliminate the likelihood of marine mammal exposure to noise at received levels that could result in injury; and the use of "soft start" before pile driving, which is expected to provide marine mammals near or within the zone of potential injury with sufficient time to vacate the area. We believe the required mitigation measures, which have been successfully implemented in similar pile driving projects, will minimize the possibility of injury that may otherwise exist as a result of impact pile driving.

The proposed activities are localized and of relatively short duration. The entire project area is limited to the UMC Dock area and its immediate surroundings. These localized and relatively short-term noise exposures may cause short-term behavioral modifications in harbor seals, Steller sea lions, killer whales, and humpback whales. Moreover, the mitigation and monitoring measures, including injury shutdowns, soft start techniques, and multiple MMOs monitoring the behavioral and injury zones for marine mammal presence, are expected to reduce the likelihood of injury and behavior exposures. Additionally, no critical habitat or other specifically important areas for marine mammals are known to be within the ensonification areas of the proposed action area during the construction time frame. No pinniped rookeries or haul-outs are present within the project area

The project also is not expected to have significant adverse effects on affected marine mammals' habitat. The project activities would not modify existing marine mammal habitat for a significant amount of time. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range; but, because of the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from similar pile driving projects that have received incidental take authorizations from NMFS, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging. Most likely, individuals will simply move away from the sound source and be temporarily displaced from the area of pile driving. In response to vibratory driving, harbor seals have been observed to orient towards and sometimes move towards the sound. Repeated exposures of individuals to comparatively lower levels of sound that may cause Level B harassment are unlikely to result in hearing impairment or to significantly disrupt foraging behavior. Thus in this case, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in fitness to those individuals, and thus would not result in any adverse impact to the stock as a whole. Take of marine mammal species or stocks and their habitat will be reduced to the level of least practicable impact through use of mitigation measures described herein and, if sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the project area while the activity is occurring.

While we are not aware of comparable construction projects in the project location, the pile driving activities analyzed here are similar to other in-water construction activities that have received incidental harassment authorizations previously, including a Unisea dock construction project in neighboring Iliuliuk Harbor, and at Naval Base Kitsap Bangor in Hood Canal, Washington, and at the Port of Friday Harbor in the San Juan Islands, which have occurred with no reported injuries or mortalities to marine mammals, and no known long-term adverse consequences to marine mammals from behavioral harassment.

In summary, this negligible impact analysis is founded on the following factors: (1) the possibility of injury, serious injury, or mortality may reasonably be considered discountable; (2) the anticipated incidences of Level B harassment consist of, at worst, temporary modifications in behavior or potential short-term TTS; (3) the absence of any major rookeries and only a few isolated haulout areas near the project site; (4) the absence of any other known areas or features of special significance for foraging or reproduction within the project area; and (5) the presumed efficacy of planned mitigation measures in reducing the effects of the specified activity to the level of least practicable impact. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activity will have only short-term effects on individual animals. The specified activity is not expected to impact rates of recruitment or survival and will therefore not result in population-level impacts.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the monitoring and mitigation measures, we find that the total marine mammal take from UMC dock

construction activities in Dutch Harbor will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers Analysis

The numbers of animals authorized to be taken would be considered small relative to the relevant stocks or populations (1.9 percent for Steller sea lions, 8.1 percent for harbor seals, 1.6 percent for humpback whales, and 3.0 percent for killer whales) even if each estimated taking occurred to a new individual. However, the likelihood that each take would occur to a new individual is extremely low.

Further, these takes are likely to occur only within some small portion of the overall regional stock. For example, of the estimated 49,497 western DPS Steller sea lions throughout Alaska, there are probably no more than 300 individuals with site fidelity to the three haulouts located nearest to the project location, based on over twenty years of NMML survey data (see "Description of Marine Mammals in the Area of the Specified Activity" above). For harbor seals, NMML survey data suggest there are likely no more than 60 individuals that use the three haulouts nearest to the project location (the only haulouts in Unalaska Bay). Thus the estimate of take is an estimate of the number of anticipated exposures, rather than an estimate of the number of individuals that will be taken, as we expect the majority of exposures would be repeat exposures that would accrue to the same individuals. As such, the authorized takes would represent a much smaller number of individuals in relation to total stock sizes.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the mitigation and monitoring measures, we find that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species for Taking for Subsistence Uses

Subsistence hunting and fishing is an important part of the history and culture of Unalaska Island. However, the number of Steller sea lions and harbor seals harvested in Unalaska decreased from 1994 through 2008; in 2008, the last year for which data is available, there were no harbor seals reported as harvested for subsistence use and only three Steller sea lions reported (Wolfe *et al*., 2009). Data on pinnipeds hunted for subsistence use in Unalaska has not been collected since 2008. For a summary of data on pinniped harvests in Unalaska from 1994-2008, see Section 8 of the application. Subsistence hunting for humpback whales and killer whales does not occur in Unalaska.

Aside from the apparently decreasing rate of subsistence hunting in Unalaska, Dutch Harbor is not likely to be used for subsistence hunting or fishing due to its industrial nature, with several dock facilities located along the shoreline of the harbor. In addition, the proposed construction project is likely to result only in short-term, temporary impacts to pinnipeds in the form of possible behavior changes, and is not expected to result in the injury or death of any marine mammal. As such, the proposed project is not likely to adversely impact the availability of any marine mammal species or stocks that may otherwise be used for subsistence purposes.

Endangered Species Act (ESA)

Threatened or endangered marine mammal species with confirmed occurrence in the project area include the Western North Pacific DPS and Mexico DPS of humpback whale, and the Western DPS Steller sea lion. The project area occurs within critical habitat for three major Steller sea lion haul-outs and one rookery. The three haul-outs (Old Man Rocks, Unalaska/Cape Sedanka, and Akutan/Reef-Lava) are located between approximately 15 and 19 nautical miles

from the project area. The closest rookery is Akutan/Cape Morgan, which is about 19 nautical miles from the project area.

The NMFS Alaska Regional Office Protected Resources Division issued a Biological Opinion on April 19, 2017, under Section 7 of the ESA, on the issuance of an IHA to the COU under section 101(a)(5)(D) of the MMPA by the NMFS Permits and Conservation Division. The Biological Opinion concluded that the action is not likely to jeopardize the continued existence of Western DPS Steller sea lions or the Mexico DPSs of humpback whales, and is not likely to destroy or adversely modify western DPS Steller sea lion critical habitat.

National Environmental Policy Act (NEPA)

NMFS prepared an Environmental Assessment (EA) analyzing the potential impacts to marine mammals from the proposed action and subsequently signed a Finding of No Significant Impact (FONSI). A copy of the EA and Finding of No Significant Impact (FONSI) is available upon request (see **ADDRESSES**).

Dated: May 18, 2017.

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Donna S. Wieting,

Director, Office of Protected Resources,

National Marine Fisheries Service.

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