DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XF370

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Sand Point City Dock Replacement Project in Sand Point, Alaska

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

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received an application from the Alaska Department of Transportation and Public Facilities (ADOT&PF) for an Incidental Harassment Authorization (IHA) to take marine mammals, by harassment, incidental to Sand Point City Dock Replacement Project in Sand Point, Alaska. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an IHA to ADOT&PF to incidentally take marine mammals during the specified activities.

DATES: Comments and information must be received no later than August 7, 2017.

ADDRESSES: Comments on the applications should be addressed to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service. Physical comments should be sent to 1315 East-West Highway, Silver Spring, MD 20910 and electronic comments should be sent to *ITP.pauline@noaa.gov*.

Instructions: NMFS is not responsible for comments sent by any other method, to any other address or individual, or received after the end of the comment period. Comments received electronically, including all attachments, must not exceed a 25-megabyte file size. Attachments to electronic comments will be accepted in Microsoft Word or Excel or Adobe PDF file formats only. All comments received are a part of the public record and will generally be posted to the Internet at *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm* without change. All personal identifying information (*e.g.,* name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Rob Pauline, Office of Protected Resources, NMFS, (301) 427–8401. Electronic copies of the applications and supporting documents, as well as a list of the references cited in this document, may be obtained by visiting the Internet at: *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm*. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

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.

The MMPA states that the term ''take'' means to harass, hunt, capture, kill or attempt to harass, hunt, capture, or kill any marine mammal.

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).

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216–6A, NMFS must review the proposed action with respect to environmental consequences on the human environment. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review. This action is consistent with categories of activities identified in CE B4 of the Companion Manual for NOAA Administrative Order 216–6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion.

Summary of Request

On September 16, 2016, NMFS received an application from ADOT&PF for the taking of marine mammals incidental to replacing the city dock in Sand Point, Alaska. On April 11, 2017, ADOT&PF submitted a revised application that NMFS determined was adequate and complete. ADOT&PF proposes to conduct in-water activities that may incidentally take, by Level A and Level B harassment, marine mammals. Proposed activities included as part of the Sand Point City Dock Replacement Project with potential to affect marine mammals include impact hammer pile driving and vibratory pile driving and removal. This IHA would be valid from August 1, 2018 through July 31, 2019.

Species with the expected potential to be present during the project timeframe include harbor seal (*Phoca vitulina*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), killer whale (*Orcinus orca*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), gray whale (*Eschrichtius robustus*), and minke whale (*Balaenoptera acutorostrata*).

Description of Specified Activities

Overview

ADOT&PF proposes to construct a new dock in Sand Point, Alaska. The existing city dock was built in 1984 and is in need of replacement, as it is nearing the end of its operational life due to corrosion and wear. The dock receives barge service from Seattle weekly throughout the year. The dock also regularly handles processed seafood. Given the lack of road access to Sand Point, the city dock is an essential component of infrastructure providing critical access between Sand Point and the Pacific Northwest region.

Impact and vibratory driving of piles and vibratory pile removal is expected to take place over a total of approximately 32 working days within a 5-month window from August 1, 2018 through December 31, 2018. However, due to the potential for unexpected delays, up to 40 working days may be required. ADOT&PF is asking for the proposed IHA to be valid for a period of one year. The new dock would be supported by approximately 52 round, 30-inch-diameter, 100-foot-long permanent steel pipe piles. Fender piles installed at the dock face would be 8 round, 24-inch-diameter, 80-foot-long permanent steel pipe piles. The single mooring dolphin would consist of 3 round, 24-inch-diameter, 120-foot-long permanent battered steel pipe piles. This equates to a total of 63 permanent piles. Up to 90 temporary piles would be installed and removed during construction of the dock and would be either H-piles or pipe piles with a diameter of less than 24 inches.

Dates and Duration

In-water pile driving and extraction activities are expected to take place over a total of approximately 32 working days within a 5-month window from August 1, 2018 through December 31, 2018. ADOT&PF has requested that the proposed IHA be valid for a period of one year in case there are delays. Table 1 illustrates the anticipated number of days required for installation and removal of various pile types. Pile driving and removal may occur for up to 4.5 hours per day.

TABLE 1—ESTIMATED NUMBER OF DAYS REQUIRED FOR PILE INSTALLATION AND REMOVAL

Activity	Number of piles	Days required
Support pile installation	52	13
Temporary pile installation and removal	90	15
Dolphin pile installation	3	2
Fender pile installation	8	2
Total Days		32
Total Days with 25 percent contingency		40

Specified Geographic Region

The Sand Point city dock is located in the city of Sand Point, Alaska, on the northwest side of Popof Island, in the western Gulf of Alaska. Sand Point is part of the Aleutians East Borough and is located approximately 10 miles (16 kilometers) south of the Alaska Peninsula. Popof Island is one of the Shumagin Islands in the western Gulf of Alaska and is approximately 16 kilometers (10 miles) long, 8 kilometers (5 miles) wide, and covers 93.7 square kilometers (36.2 square miles). It is located immediately east of the much larger Unga Island, and Popof Strait separates the two islands. The City of Sand Point is the largest community in the Shumagin Islands. See Figure 1–1 in ADOT&PF's Application.

The Sand Point city dock is located in Humboldt Harbor, on the southwest side of the city of Sand Point. The existing dock is located on the causeway of Sand Point's ''New Harbor'' at the end of Boat Harbor Road, and the proposed replacement dock is proposed to be located immediately adjacent to (southwest of) the existing city dock along the causeway, which also serves as the breakwater for the New Harbor. See Figure 1–2 in ADOT&PF's Application.

Detailed Description of Specified Activity

The proposed action includes pile installation and removal of the new city dock and the deposition of shot rock fill adjacent to the existing causeway (See Figure 5–1 in Application). New shot rock fill would be placed on the seaward side of the existing causeway to support dock construction and create an additional upland area for safe passenger staging and maneuvering of equipment. Pile installation and removal activities will potentially result in take of marine mammals. There is no mapped high tide line at Sand Point, and, therefore, engineers will use Mean Higher High Water (MHHW) to determine the placement of fill. This fill would be placed above and below MHHW to increase the causeway's areal extent and would be stabilized through the use of new and salvaged armor rock protection. Approximately 38,600 square feet of fill and 28,500 square feet of armor rock would be required for breakwater expansion. Shot rock fill deposition activities are not expected to generate underwater sound at levels that would result in Level A or Level B harassment. Therefore, this specific activity will not result in take of marine mammal and will not be discussed further.

Following deposition of fill and prior to placement of armor rock, round steel piles would be installed to support the new city dock foundation and mooring dolphins. As noted previously, the proposed project will require installation of 30-inch and 24-inch, permanent steel piles. This equates to a total of 63 permanent piles as shown in Table 2 below. It is anticipated that an ICE 44B or APE 200–6 model vibratory driver or equivalent and a Delmag D62 diesel impact hammer or equivalent would be used to install the piles. Project design engineers anticipate an impact strike rate of approximately 40 strikes per minute, based on substrate density, pile types, and hammer type, which equates to approximately 1,000 strikes for each 30-inch dock support pile, 400 strikes for each dolphin pile, and 120 strikes for each fender pile.

Permanent dock support piles would be installed using both vibratory and impact hammers; both methods of installation typically occur within the same day. Permanent piles are first installed with a vibratory hammer for approximately 45 minutes to insert the pile through the overburden sediment layer and into the bearing layer. The vibratory hammer is then replaced with the impact hammer, which is used to install the pile for the last 15 to 20 feet (approximately 25 minutes). Up to four permanent piles would be installed per day, for a total of 180 minutes of vibratory and 100 minutes of impact installation per day. Installation of permanent piles would require about 13 days of effort (52 permanent piles/4 permanent piles per day = 13 days).

Installation of the eight fender piles is anticipated to occur over 2 days (after installation of all dock support piles), at a production rate of four fender piles per day (8 fender piles/4 fender piles per day = 2 days). Each fender pile would require 30 minutes of vibratory installation and 3 minutes of impact installation, for a total of 120 minutes of vibratory and 12 minutes of impact installation each day. No temporary piles would be required for fender pile installation because they would be installed along the completed dock face.

Installation of three 24-inch permanent battered pipe piles for the dolphin would also require the installation and removal of four temporary piles (either <24 inch diameter or H-piles) to support the template. Installation of the dolphin piles will occur over 2 days, with one or two dolphin piles installed per day for a total of 3 dolphin piles. Thirty minutes of vibratory installation and 10 minutes of impact installation are anticipated per permanent dolphin pile, for a total of no more than 60 minutes of vibratory installation and 20 minutes of impact installation per day. Installation and removal of the temporary piles for the dolphin are included in the calculations for temporary piles above.

Two or more temporary piles would be used to support a template to facilitate installation of two to four permanent dock support piles. Template configuration, including the number of permanent piles that could be installed at once and the number of temporary piles required to support the template, would be determined by the contractor. Four additional temporary piles would support the template for the dolphin. In all, up to 90 temporary piles would be installed and removed during construction of the dock and dolphin. Temporary piles would be either H-piles or pipe piles with a diameter of less than 24 inches.

Temporary piles would be installed and removed during construction of the dock by vibratory methods only. Removal and installation of the temporary piles that support the template typically occur within the same day, with additional time required for installation of the template structure, which would include welding, surveying the location, and other activities. Each temporary pile would be installed in approximately 15 minutes and removed in approximately 15 minutes. Up to six temporary piles would be installed and removed per day, for a total of up to 180 minutes of vibratory installation and removal per day. Installation of temporary piles, including those required to support construction of the dolphin, would require about 15 total days of effort (90 temporary piles/6 temporary piles per day = 15 days).

Total driving time for the proposed project would consist of approximately 22 hours of impact driving and 85 hours of vibratory driving and removal.

Following initial pile installation of permanent dock support piles, the mud accumulation on the inside of each pile would be augured out and the piles filled with concrete to provide additional moment capacity and corrosion resistance. An auger with a crane-mounted rotary head would be used for pile clearing. These activities are not anticipated to result in underwater sound levels that would meet Level A or Level B harassment criteria and, therefore, will not be discussed further.

TABLE 2—PILE DETAILS AND ESTIMATED EFFORT REQUIRED FOR PILE INSTALLATION

Pile type	Diameter	Number of piles	Maximum piles per day	Hours per day	Estimated minutes per pile	Anticipated days of effort [1]
Vibratory Installation or Removal						
Permanent support pile	30″	52	4	3	45	13
Permanent dolphin pile	24″	3	2	1	30	2
Permanent fender pile	24″	8	4	2	30	2
Installation, temporary support pile	<24″ or H-pile	90	6	1.5	15	15
Removal, temporary support pile	<24″ or H-pile	90	6	1.5	15	15
Impact Installation						
Permanent support pile	30″	52	4	1.667	25	13
Permanent dolphin pile	24″	3	2	0.33	10	2
Permanent fender pile	24″	8	4	0.20	3	2

[1] Vibratory and impact driving of each permanent pile will occur on the same day. Installation and removal of each temporary piles will occur on the same day.

Proposed mitigation, monitoring, and reporting measures are described in detail later in the document (Mitigation section and Monitoring and Reporting section).

Description of Marine Mammals in the Area of Specified Activities

We have reviewed the applicants' species information—which summarizes 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, as well as to NMFS's Stock Assessment Reports (SAR; *www.nmfs.noaa.gov/pr/sars/*). Additional general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS's Web site (*www.nmfs.noaa.gov/pr/species/mammals/*).

Table 3 lists all species with expected potential for occurrence in Sand Point and summarizes information related to the population or stock, including potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2016). PBR, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population, is considered in concert with known sources of ongoing anthropogenic mortality to assess the population-level effects of the anticipated mortality from a specific project (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality are included here as gross indicators of the status of the species and other threats. Species that could potentially occur in the proposed survey areas but are not expected to have reasonable potential to be harassed by pile driving and removal activities are described briefly but omitted from further analysis. These include extralimital species, which are species that do not normally occur in a given area but for which there are one or more occurrence records that are considered beyond the normal range of the species. For status of species, we provide information regarding U.S. regulatory status under the MMPA and ESA.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock.

The marine waters of the Shumagin Islands support many species of marine mammals, including pinnipeds and cetaceans; however, the number of species regularly occurring near the project area is limited (Table 3). Steller sea lions are the most common marine mammals in the project area, and are part of the western Distinct Population Segment (wDPS), which is listed as endangered under the ESA. Humpback whales, including the ESA-listed Western North Pacific DPS (endangered) and Mexico DPS (threatened), as well as ESA-listed fin whales (endangered), may occur in the project area, but far less frequently and in lower abundance than Steller sea lions. Harbor seals and harbor porpoises may be observed in the project area. Gray whales, minke whales, killer whales, and Dall's porpoises also have the potential to occur in or near the project area, although in limited numbers.

North Pacific right whales (*Eubalaena japonica*) are very rare in general and extremely unlikely to occur within the project area. Other animals whose range overlaps with the project area include the northern fur seal (*Callorhinus ursinus*), ribbon seal (*Histriophoca fasciata*), spotted seal *(Phoca largha),* and Pacific white-sided dolphin (*Lagenorhynchus obliquidens*). However, occurrences of these species have not been reported locally and take is not anticipated or proposed. The ranges of sperm whales (*Physeter macrocephalus*) and Cuvier's beaked whales (*Ziphius cavirostris*) include the Shumagin Islands. However, these species generally inhabit deep waters and would be unlikely to occur in the relatively shallow waters of Popof Strait. Therefore, take is not proposed for either of these species. The species listed in this paragraph will not be discussed further.

All values presented in Table 3 are the most recent available at the time of publication and are available in the 2015 SARs (Muto *et al.,* 2016) and draft 2016 SARs (Muto *et al.,* 2016b) available online at: *www.nmfs.noaa.gov/pr/sars/draft.htm*).

TABLE 3—MARINE MAMMAL SPECIES POTENTIALLY PRESENT IN THE PROJECT AREA

Species	Stock	ESA/MMPA status; strategic (Y/N) [1]	Stock abundance (CV, N_{min}, most recent abundance survey) [2]	PBR [3]	Annual M/SI [4]	Relative occurrence near Sand Point
Order Cetartiodactyla—Cetacea—Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Phocoenidae (porpoises)						
Dall's porpoise	Alaska	-; N	83,400 (0.097; n/a; 1993)	Undet	38	Rare.
Harbor porpoise	Gulf of Alaska	-; Y	25,987 (0.214; n/a; 1998)	Undet	72	Common.
Order Cetartiodactyla—Cetacea—Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae (dolphins)						
Killer whale	Eastern North Pacific Alaska Resident.	-; N	2,347 (n/a; 2,347; 2012)	24	1	Uncommon.
	Eastern North Pacific Gulf of AK, Aleutian Islands, and Bering Sea Transient.	-; N	587 (n/a; 587; 2012)	5.9	1	Uncommon.
Order Cetartiodactyla—Cetacea—Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Balaenopteridae						
Humpback whale	Central North Pacific	n/a Y	10,103 (0.300; 7,890; 2006)	83	24	Uncommon.
	Western North Pacific	n/a[5]; Y	1,107 (0.300; 865; 2006)	3	2.6	Uncommon.
Fin whale	Northeast Pacific	E/D; Y	1,368 (n/a, 1,036; 2010)	2.1	0.6	Rare.
Minke whale	Alaska	-; N			0	Rare.
Order Cetartiodactyla—Cetacea—Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Eschrichtiidae						
Gray whale	Eastern North Pacific	-; N	20,990 (0.05; 20,125; 2011)	624	132	Rare.
Order Carnivora—Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions)						
Steller sea lion	wDPS	E/D; S	50,983 (n/a; 50,983; 2015)	306	236	Very common.

TABLE 3—MARINE MAMMAL SPECIES POTENTIALLY PRESENT IN THE PROJECT AREA—Continued

Species	Stock	ESA/MMPA status; strategic (Y/N) [1]	Stock abundance (CV, N_{min}, most recent abundance survey) [2]	PBR [3]	Annual M/SI [4]	Relative occurrence near Sand Point
Family Phocidae (earless seals)						
Harbor seal	(Cook Inlet/Shelikof Strait	-; N	27,386 (n/a; 25,651, 2011)	770	234	Occasional.

[1] Endangered Species Act (ESA) status: Endangered (E), Threatened (T)/MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

[2] CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable. For certain stocks of pinnipeds, abundance estimates are based upon observations of animals (often pups) ashore multiplied by some correction factor derived from knowledge of the specie's (or similar species') life history to arrive at a best abundance estimate; therefore, there is no associated CV. In these cases, the minimum abundance may represent actual counts of all animals ashore.

[3] Potential biological removal, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population size (OSP).

[4] These values, found in NMFS's SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.,* commercial fisheries, ship strike). Annual M/SI often cannot be determined precisely and is in some cases presented as a minimum value or range. A CV associated with estimated mortality due to commercial fisheries is presented in some cases.

[5] The newly defined DPSs do not currently align with the stocks defined under the MMPA.

Cetaceans

Dall's Porpoise

Dall's porpoises are found throughout the North Pacific, from southern Japan to southern California north to the Bering Sea. All Dall's porpoises found in Alaska are members of the Alaska stock. This species can be found in offshore, inshore, and nearshore habitat, but prefer waters more than 180 meters (600 feet) deep (Jefferson 2009).

Dall's porpoises, like all marine mammals, are protected under the MMPA, but they are not listed under the ESA. Insufficient data are available to estimate current population trends, but the species is considered reasonably abundant. The current population estimate for the species is 1.2 million, and the Alaska stock was last estimated at 83,400 individuals in 1993 (Muto *et al.,* 2016a).

There currently is no information on the presence or abundance of Dall's porpoises in the Shumagin Islands. No sightings of Dall's porpoises have been documented in Humboldt Harbor and they are not expected to occur there, although they may occur in deeper waters farther offshore (HDR 2017).

Dall's porpoises generally occur in groups of 2 to 20 individuals, but have also been recorded in groups numbering in the hundreds. In Alaska, the average group size ranges from 2.7 to 3.7 individuals (Wade *et al.,* 2003). They are commonly observed bowriding vessels or large cetaceans. Common prey includes a variety of small schooling fishes (such as herrings, anchovies, mackerels, and sauries) and cephalopods. Dall's porpoises may migrate between inshore and offshore areas, make latitudinal movements, or make short seasonal migrations, but these movements are generally not consistent (Jefferson 2009).

Harbor Porpoise

In the eastern North Pacific Ocean, the harbor porpoise ranges from Point Barrow, along the Alaska coast, and down the west coast of North America to Point Conception, California. Harbor porpoises frequent primarily coastal waters in the Gulf of Alaska and Southeast Alaska (Dahlheim *et al.,* 2000), and occur most frequently in waters less than 100 meters (328 feet) deep (Hobbs and Waite 2010). The Gulf of Alaska stock ranges from Cape Suckling to Unimak Pass (Muto *et al.,* 2016a).

In Alaska, harbor porpoises are currently divided into three stocks, based primarily on geography: the Bering Sea stock, the Southeast Alaska stock, and the Gulf of Alaska stock. In areas outside Alaska, studies have shown that stock structure is more finely scaled than is reflected in the Alaska Stock Assessment Reports. However, no data are yet available to define stock structure for harbor porpoises on a finer scale in Alaska (Allen and Angliss 2014). Only the Gulf of Alaska stock is considered in this application because the other stocks occur outside the geographic area under consideration.

Harbor porpoises are neither designated as depleted under the MMPA nor listed as threatened or endangered under the ESA. Because the most recent abundance estimate is more than eight years old and information on incidental harbor porpoise mortality in commercial fisheries is not well understood, the Gulf of Alaska stock of harbor porpoises is classified as strategic. Population trends and status of this stock relative to optimum sustainable population size are currently unknown.

The number of harbor porpoises in the Gulf of Alaska stock was assessed in 1998 at 31,046. The current minimum population estimate for harbor porpoises in the Gulf of Alaska, calculated using the potential biological removal guidelines, is 25,987 individuals (Muto *et al.,* 2016b). No reliable information is available to determine trends in abundance.

Survey data for the Shumagin Islands are not available. Anecdotal observations indicate that harbor porpoises are uncommon in Humboldt Harbor proper but may occur in nearby waters (HDR 2017).

Harbor porpoises forage in waters less than 200 meters (656 feet) to bottom depth on small pelagic schooling fish such as herring, cod, pollock, octopus, smelt, and bottom-dwelling fish, occasionally feeding on squid and crustaceans (Bjørge and Tolley 2009; Wynne *et al.,* 2011).

Killer Whale

Killer whales have been observed in all the world's oceans, but the highest densities occur in colder and more productive waters found at high latitudes (NMFS 2016a). Killer whales occur along the entire Alaska coast, in British Columbia and Washington inland waterways, and along the outer coasts of Washington, Oregon, and California (NMFS 2016a). Based on data regarding association patterns, acoustics, movements, and genetic differences, eight killer whale stocks are now recognized within the Pacific U.S. Exclusive Economic Zone, seven of which occur in Alaska: (1) The Alaska resident stock; (2) the Northern resident stock; (3) the Southern resident stock; (4) the Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock; (5) the AT1 transient stock; (6) the West Coast transient stock, occurring from California through southeastern Alaska; and (7) the Offshore stock (Muto *et al.,* 2016a). Only the Alaska resident stock and the Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock are considered in this application because other stocks occur outside the geographic area under consideration. Neither of these stocks of killer whales is designated as depleted or strategic under the MMPA or listed as threatened or endangered under the ESA.

The Alaska resident stock occurs from southeastern Alaska to the Aleutian Islands and Bering Sea. The transient stock occurs primarily from Prince William Sound through the Aleutian Islands and Bering Sea.

The abundance of the Alaska resident stock of killer whales is currently estimated at 2,347 individuals, and the Gulf of Alaska, Aleutian Islands, and Bering Sea transient stock is estimated at 587 individuals. The Gulf of Alaska component of the transient stock is estimated to include 136 of the 587 individuals (Muto *et al.,* 2016a). The abundance of the Alaska resident stock is likely underestimated because researchers continue to encounter new whales in the Gulf of Alaska and western Alaska waters. At present, reliable data on trends in population abundance for both stocks are unavailable.

Line transect surveys conducted in the Shumagin Islands between 2001 and 2003 did not record any resident killer whales, but did record a relatively high abundance of transient killer whales (Zerbini *et al.,* 2007). The population trend of the transient stock of killer whales in Alaska has remained stable since the 1980s (Muto *et al.,* 2016b). Anecdotal observations indicate that killer whales are not often seen in the vicinity of Sand Point, including Popof Strait (HDR 2017).

Distinct ecotypes of killer whales include transients that hunt and feed primarily on marine mammals and residents that forage primarily on fish. Transient killer whales feed primarily on harbor seals, Dall's porpoises, harbor porpoises, and sea lions. Resident killer whale populations in the eastern North Pacific feed mainly on salmonids, showing a strong preference for Chinook salmon (Muto *et al.,* 2016b).

Transient whales are often found in long-term stable social units (pods) of fewer than 10 whales, which are generally smaller than resident social groups. Resident-type killer whales occur in larger pods of whales that are seen in association with one another more than 50 percent of the time (Muto *et al.,* 2016b).

Humpback Whale

There are five stocks of humpback whales defined under the MMPA, two of which occur in Alaska: The Central North Pacific Stock, which consists of winter/spring populations in the Hawaiian Islands which migrate primarily to northern British Columbia/Southeast Alaska, the Gulf of Alaska, and the Bering Sea/Aleutian Islands; and the Western North Pacific stock, which consists of winter/spring populations off Asia which migrate primarily to Russia and the Bering Sea/Aleutian Islands (Muto *et al.,* 2016b). The Western North Pacific stock is found in coastal and inland waters around the Pacific Rim from Point Conception, California, north to the Gulf of Alaska and the Bering Sea, and west along the Aleutian Islands to the Kamchatka Peninsula and into the Sea of Okhotsk and north of the Bering Strait, which are historical feeding grounds (Muto *et al.,* 2016b). Information from a variety of sources indicates that humpback whales from the Western and Central North Pacific stocks mix to a limited extent on summer feeding grounds ranging from British Columbia through the central Gulf of Alaska and up to the Bering Sea (Muto *et al.,* 2016).

Humpback whales worldwide were designated as ''endangered'' under the Endangered Species Conservation Act in 1970, and were listed under the ESA from its inception in 1973 until 2016. On September 8, 2016, NMFS published a final decision which changed the status of humpback whales under the ESA (81 FR 62259), effective October 11, 2016. The decision recognized the existence of 14 DPSs based on distinct breeding areas in tropical and temperate waters. Five of the 14 DPSs were classified under the ESA (4 endangered and 1 threatened), while the other 9 DPSs were delisted. Humpback whales found in the Shumagin Islands are predominantly members of the Hawaii DPS, which are not listed under the ESA. However, based on a comprehensive photo-identification study, members of both the Western North Pacific DPS (ESA-listed as endangered) and Mexico DPS (ESA-listed as threatened) are known to occur in the Gulf of Alaska and Aleutian Islands. Members of different DPSs are known to intermix on feeding grounds; therefore, all waters off the coast of Alaska should be considered to have ESA-listed humpback whales.

According to Wade *et al.* (2016), there is a 0.5 percent (CV [coefficient of variation]=0.001) probability that a humpback whale observed in the Gulf of Alaska is from the Western North Pacific DPS. The probability of a humpback whale being from the Mexico DPS is 10.5 percent (CV=0.16). The remaining 89 percent (CV=0.01) of individuals in the Gulf of Alaska are likely members of the Hawaii DPS (Wade *et al.,* 2016).

The current abundance estimate for humpback whales in the Pacific Ocean is approximately 16,132 individuals. The Hawaii DPS is the largest stock, with approximately 11,398 individuals (95 percent confidence interval [CI]: 10,503–12,370), followed by the Mexico DPS (3,264 individuals [95 percent CI: 2,912–3,659]) and the Western North Pacific DPS (1,059 individuals [95 percent CI: 898–1,249]). Summer abundance of humpback whales in the Gulf of Alaska, from all DPSs, is estimated at 2,089 individuals (95 percent CI: 1,755–2,487; Wade *et al.,* 2016). Critical habitat has not been designated for any humpback whale DPS.

Surveys from 2001 to 2004 estimated humpback whale abundance in the Shumagin Islands at between 410 and 593 individuals during the summer feeding season (July–August; Witteveen *et al.,* 2004; Zerbini *et al.,* 2006). Annual vessel-based, photo-identification surveys in the Shumagin Islands from 1999 to 2015 identified 654 unique individual humpback whales between June and September (Witteveen and Wynne 2016). Humpback whale abundance in the Shumagin Islands increased 6 percent per year between 1987 and 2003 (Zerbini *et al.,* 2006). Humpback whales are occasionally observed in Popof Strait between Popof Island and Unga Island (HDR 2017) and are known to feed in the waters west of the airport (HDR 2017). They are unlikely to occur in the shallow waters of Humboldt Harbor proper (HDR 2017) but may occur in Popof Strait in waters ensonified by pile driving and removal activities. Humpbacks are found in the Shumagin Islands from April or May through October or November, and peak feeding activity occurs between June and early September.

Large aggregations of humpback whales spend the summer and fall in the nearshore areas of the Alaska Peninsula, Gulf of Alaska, and Aleutian Islands. The waters of the western Gulf of Alaska support feeding populations of humpback whales (HDR 2017). The Shumagin Islands are considered a biologically important area for feeding humpback whales in July and August (Ferguson *et al.,* 2015).

Fin Whale

Four stocks of fin whales occur in U.S. waters: (1) Alaska (Northeast Pacific), (2) California/Washington/Oregon, (3) Hawaii, and (4) western North Atlantic (Aguilar 2009; Muto *et al.,* 2016). Fin whales in the Shumagin Islands are from the Alaska (Northeast Pacific) stock (Muto *et al.,* 2016z).

Fin whales were designated as ''endangered'' under the Endangered Species Conservation Act in 1970, and have been listed under the ESA since its inception in 1973. There are no reliable estimates of current or historic abundance for the entire North Pacific population of fin whales. Surveys in the Bering Sea, Aleutian Islands, and Gulf of Alaska estimated 5,700 whales. The population in this region is thought to be increasing at approximately 3.6 percent per year, but there is a high degree of variability in this estimate (Zerbini *et al.,* 2006). Critical habitat has not been designated for the fin whale.

Vessel-based line-transect surveys of coastal waters between Resurrection Bay and the central Aleutian Islands were completed in July and August from 2001 to 2003. Large concentrations of fin whales were found in the Semidi Islands, located midway between the Shumagin Islands and Kodiak Island just south of the Alaska Peninsula. The abundance of fin whales in the Shumagin Islands ranged from a low estimate of 604 in 2003 to a high estimate of 1,113 in 2002. Fin whales are uncommon in Humboldt Harbor or Popof Strait (HDR 2017).

Fin whales are found in deep offshore waters as well as in shallow nearshore areas. Their migratory movements are complex and their abundance can fluctuate seasonally. Fin whales often congregate in groups of two to seven whales or in larger groups of other whale species, including humpback and minke whales (Muto *et al.,* 2016a). Fin whales feed on a wide variety of organisms and their diet may vary with season and locality.

Gray Whale

Gray whales were listed under the Endangered Species Conservation Act in 1970 and under the ESA since its inception in 1973. However, in 1994, the eastern North Pacific (ENP) stock of gray whales was delisted from the ESA, while the western North Pacific (WNP) stock remains endangered. A limited number of WNP gray whales have recently been observed off the west coast of North America in winter. However, most gray whales found in Alaska are part of the ENP stock. The most recent stock assessment in 2014 estimated 20,990 individuals in the ENP stock. The WNP stock population estimate is 135 individuals (Carretta *et al.,* 2016). ENP gray whales spend summers feeding in the Chukchi and Bering seas, and their breeding and calving grounds are located off Baja California, Mexico (Caretta *et al.,* 2016). Due to the very large range and small population size of the WNP stock, occurrences of these animals in the project area are highly unlikely. Therefore, take is not anticipated or proposed and WNP whales will not be discussed further.

Gray whales pass through the Shumagin Islands from March through May on their northward migration to the Bering and Chukchi seas. Most individuals pass through Unimak Pass, which is located just west of the Shumagin Islands. The Shumagin Islands are considered a biologically important area for the gray whale due to this consistent migration route. Gray whales pass through again from November through January on their southern migration (NOAA 2016; Caretta *et al.,* 2016).

Gray whales are rarely observed near Sand Point or in Humboldt Harbor. Approximately 10 years ago, a single juvenile gray whale was observed in Humboldt Harbor, but this individual was thought to be separated from its family group (HDR 2017). During migration, however, they are known to pass through Unga Strait, to the north of the project area, or the Gorman and West Nagai straits south of the project area (NOAA 2016).

Gray whales of the eastern North Pacific stock breed and calve in protected bays and estuaries of Baja California, Mexico. Large congregations form there in January and February. Between February and May gray whales undertake long migrations to the Bering and Chukchi seas where they disperse across the feeding grounds. Gray whales feed on a wide variety of benthic organisms as well as planktonic and nektonic organisms. In recent years, shifts in sub-arctic climatic conditions have reduced the productivity of benthic communities and have resulted in a shift in the food supply. In response, gray whales have shifted their feeding strategies and focus almost exclusively on the Chukchi Sea. Secondary feeding areas include the Bering Sea, Beaufort Sea, and some individuals have been reported along the west coast of North America as far south as California. The southerly migration occurs from October through January (Jones and Swartz 2009; Muto *et al.,* 2016).

Minke Whale

Minke whales are protected under the MMPA, but they are not listed under the ESA. The population status of minke whales is considered stable throughout most of their range. The International Whaling Commission has identified three stocks in the North Pacific: One near the Sea of Japan, a second in the rest of the western Pacific (west of 180° W.), and a third, less concentrated stock found throughout the eastern Pacific. NOAA further splits this third stock between Alaskan whales and resident whales of California, Oregon, and Washington (Muto *et al.,* 2016). There are no population estimates for minke whales in Alaska; however, nearshore aerial surveys of the western Gulf of Alaska took place between 2001 and 2003. These surveys estimated the minke whale population in that area at approximately 1,233 individuals (Zerbini *et al.,* 2006).

Minke whales are common in the Aleutian Islands and north through the Bering Sea and Chukchi Sea, but are relatively uncommon in the Shumagin Islands and Gulf of Alaska (Muto *et al.,* 2016, Zerbini *et al.,* 2006). Sightings did occur northwest of Unga Island during surveys in 2001, and northeast of Popof Island during 2002 and 2003 (Zerbini *et al.,* 2006).

In Alaska, the minke whale diet primarily consists of euphausiids and walleye pollock. Minke whales are generally found in shallow, coastal waters within 200 meters of shore (Zerbini *et al.,* 2006) and are almost always solitary or in small groups of 2 to 3. In Alaska, seasonal movements are associated with feeding areas that are generally located at the edge of the pack ice.

Pinnipeds

Steller Sea Lions

Steller sea lions are found throughout the northern Pacific Ocean, including coastal and inland waters from Russia (Kuril Islands and the Sea of Okhotsk), east to Alaska, and south to central California (Año Nuevo Island). Steller sea lions were listed as threatened range-wide under the ESA on November 26, 1990 (55 FR 49204). Steller sea lions were subsequently partitioned into the western and eastern DPSs in 1997 (Allen and Angliss 2010). The eastern DPS remained classified as threatened (62 FR 24345) until it was delisted in November 2013. The wDPS (those individuals west of 144° W. longitude or Cape Suckling, Alaska) was upgraded to endangered status following separation of the DPSs, and it remains endangered today. Only the wDPS is considered in this application because the range of the eastern DPS is not known to include the project area.

From 2000–2004, non-pup Steller sea lion counts at trend sites in the wDPS increased 11 percent. These counts suggested the first region-wide increases for the wDPS since standardized surveys began in the 1970s, and were attributed to increased survey efforts in all regions except the western Aleutian Islands. Annual surveys of haulouts and rookeries in the western Gulf of Alaska since 1985 indicate a 16 percent increase in non-pup counts and 38 percent reduction in pup counts over the 30-year period. However, since 2003, these counts have increased by 58 percent for non-pups and 53 percent for pups (Fritz *et al.,* 2016a, 2016b). Annual increases for the western Gulf of Alaska range between 3.4 and 3.8 percent for non-pup and pup counts since the early 2000s (Muto *et al.,* 2016a; Fritz *et al.,* 2016a, 2016b).

The wDPS breeds on rookeries in Alaska from Prince William Sound west through the Aleutian Islands. Steller sea lions use 38 rookeries and hundreds of haulouts within their range in western Alaska (Allen and Angliss 2013). Steller sea lions are not known to migrate, but individuals may disperse widely outside the breeding season (late May to early July). At sea, Steller sea lions are commonly found from nearshore habitats to the continental shelf and slope.

On August 27, 1993, NMFS published a final rule designating critical habitat for the Steller sea lion. In Alaska, designated critical habitat includes all major Steller sea lion rookeries and major haulouts identified in the listing notice (58 FR 45269) and associated terrestrial, air, and aquatic zones. Critical habitat includes a terrestrial zone that extends 0.9 kilometer (3,000 feet) landward from each major rookery and major haulout, and an air zone that extends 0.9 kilometer (3,000 feet) above the terrestrial zone of each major rookery and major haulout. For each major rookery and major haulout located west of 144° W. longitude (*i.e.,* the project area), critical habitat includes an aquatic zone (or buffer) that extends 37 kilometers (20 nautical miles) seaward in all directions. Critical habitat also includes three large offshore foraging areas: The Shelikof Strait area, the Bogoslof area, and the Seguam Pass area (58 FR 45269).

The project is located within the aquatic zones (*i.e.,* designated critical habitat) of two designated major haulouts: Sea Lion Rocks (Shumagins) and The Whaleback. The ensonified Level B harassment zone related to implementation of the proposed project, described later in the ''Estimated Take'' section, overlaps with the designated aquatic zone or buffer of a third designated major haulout on Jude Island. No terrestrial or in-air critical habitat of any major haulout overlaps with the project area. The major haulout at Sea Lion Rocks (Shumagins) is located approximately 28 kilometers (15.1 nautical miles) south of the project site. The major haulout at The Whaleback is located approximately 27.4 kilometers (14.8 nautical miles) east of Sand Point. The major haulout at Jude Island is located 39.6 kilometers (21.4 nautical miles) west of Sand Point.

The project area does not overlap with the aquatic zone of any major rookery, nor does it overlap with the three designated offshore foraging areas. The closest designated major rookery is on the east side of Atkins Island, which is approximately 83.3 kilometers (45 nautical miles) southeast of Sand Point. Another major rookery is located about 85.2 kilometers (46 nautical miles) south of Sand Point on the southwest point of Chernabura Island (Fritz *et al.,* 2016c).

Steller sea lions are the most obvious and abundant marine mammal in the project area, and their abundance is highly correlated with seasonal fishing activity. Sea lions tend to congregate at the seafood processing facility (Figure 1–3 and Figure 1–4 in the application) during the walleye pollock (*Gadus chalcogramma*) fishing seasons (HDR 2017). There are four official pollock fishing seasons: The ''A'' season starts on January 20, the ''B'' season starts on March 10, the ''C'' season starts on August 25, and the ''D'' season starts on October 1 (HDR 2017). The end dates of these seasons are variable. Outside of the pollock seasons, there are few sea lions in the harbor. It is suspected that sea lions are feeding on salmon during the summer salmon runs, and are not present in high numbers around Sand Point (HDR 2017).

The closest Steller sea lion haulout to the project area is located on Egg Island, which is approximately 6 kilometers (3.7 nautical miles) from the project. Recent counts have not recorded any Steller sea lions at this haulout (Fritz *et al.,* 2016a, 2016b; HDR 2017), however, local anecdotal reports suggest that the haulout does experience some use (HDR). Researchers have noted as many as 10 sea lions at this haulout in May, although these observations are not part of systematic counts (HDR 2017). The closest rookery is located on Jude Island, approximately 38.9 kilometers (21 nautical miles) west of Sand Point, and had average annual counts of 214 sea lion pups from 2009–2014 (Fritz *et al.,* 2016a). Note that these locations are not considered major haulouts.

Sea lions have become accustomed to depredating fishing gear and raiding fishing vessels during fishing and offloading near the project area and they follow potential sources of food in and around the Humboldt Harbor, waiting for opportunities to feed. The number of sea lions in the waters near Sand Point varies depending on the season and presence of commercial fishing vessels unloading their catch at the seafood processing facility. The Sand Point harbormaster and seafood processing plant foreman are the best available sources for information on sea lion abundance at Sand Point. Information from these individuals suggests that the highest numbers of sea lions are present during the pollock fishing seasons. Average counts at the seafood processing facility range from 4 to 12, but can occasionally reach as many as 20 sea lions. There are no notable differences in abundance between the four pollock seasons. Outside of the pollock seasons, sea lions may be present, but in small numbers (*i.e.,* 1 or 2 individuals). Sea lions also regularly visit other parts of Humboldt Harbor in search of opportunistic food sources, including the small boat harbor, the New Harbor, and City Dock (HDR 2017).

Harbor Seals

Harbor seals range from Baja California north along the west coasts of Washington, Oregon, California, British Columbia, and Southeast Alaska; west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands; and north in the Bering Sea to Cape Newenham and the Pribilof Islands. In 2010, harbor seals in Alaska were partitioned into 12 separate stocks based largely on genetic structure (Allen and Angliss 2010). Harbor seals in the Shumagin Islands are members of the Cook Inlet/Shelikof Strait stock. Distribution of the Cook Inlet/Shelikof Strait stock extends from the southwest shore of Unimak Island east along the southern coast of the Alaska Peninsula to Elizabeth Island off the southwest shore of the Kenai Peninsula, including Cook Inlet, Knik Arm, and Turnagain Arm (Muto *et al.,* 2016a).

Harbor seals are not designated as depleted under the MMPA and are not listed as threatened or endangered under the ESA. The current statewide abundance estimate for Alaskan harbor seals is 205,090 based on aerial survey data collected during 1998–2011. The

2007 through 2011 abundance estimate for the Cook Inlet/Shelikof stock is 27,386 (Muto *et al.,* 2016a).

Survey data by London *et al.* (2015) for the Shumagin Islands in 2011 indicate that harbor seals used two haulouts in the project area during that year. One is located on the south shore of Popof Island south of the airport at a distance of approximately 10 km (5.5 nautical miles) from Humboldt Harbor. The other is on the northeast shore of Unga Island approximately 23 km (12 nautical miles) distant from the project site. No known haulouts overlap within the Level B underwater harassment zones estimated for the project. Aerial haulout surveys conducted by London *et al.* (2015) indicated that 15 harbor seals occupy the survey unit along the south coast of Popof Island, including the area around Sand Point. Abundance estimates at other survey units in the area ranged from zero on the north shore of Popof Island to 100 along the northeast coast of Unga Island. This information comes from a single year of surveys, and standard errors on these estimates are very high; therefore, confidence in these estimates is low (London *et al.,* 2015). Anecdotal observations indicate that harbor seals are uncommon in Humboldt Harbor proper, but are occasionally observed near the airport (HDR 2017).

Harbor seals are opportunistic feeders that forage in marine, estuarine, and, occasionally, freshwater habitat, adjusting their foraging behavior to take advantage of prey that is locally and seasonally abundant (Payne and Selzer 1989). Depending on prey availability, research has demonstrated that harbor seals conduct both shallow and deep dives during hunting (Tollit *et al.,* 1997). Harbor seals haul out on rocks, reefs, beaches, and drifting glacial ice (Muto *et al.,* 2016a). They are non-migratory; their local movements are associated with tides, weather, season, food availability, and reproduction, as well as sex and age class (Muto *et al.,* 2016a; Allen and Angliss 2014; Boveng *et al.,* 2012; Lowry *et al.,* 2001; Swain *et al.,* 1996).

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

This section includes a summary and discussion of the ways that components of the specified activity (*e.g.* sound produced by pile driving and removal) may impact marine mammals and their habitat. The ''Estimated Take'' section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The ''Negligible Impact Analysis and Determination'' section will consider the content of this section, the ''Estimated Take by Incidental Harassment'' section, and the ''Proposed Mitigation'' section, to draw conclusions regarding the likely impacts of pile driving and removal activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely affect marine mammal species or stocks.

Description of Sound Sources

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks of a sound wave; lower frequency sounds have longer wavelengths than higher frequency sounds and attenuate (decrease) more rapidly in shallower water. Amplitude is the height of the sound pressure wave or the 'loudness' of a sound and is typically measured using the decibel (dB) scale. A dB is the ratio between a measured pressure (with sound) and a reference pressure (sound at a constant pressure, established by scientific standards). It is a logarithmic unit that accounts for large variations in amplitude; therefore, relatively small changes in dB ratings correspond to large changes in sound pressure. When referring to sound pressure levels (SPLs; the sound force per unit area), sound is referenced in the context of underwater sound pressure to 1 microPascal (μPa). One pascal is the pressure resulting from a force of one newton exerted over an area of one square meter. The source level (SL) represents the sound level at a distance of 1 m from the source (referenced to 1 μPa). The received level is the sound level at the listener's position. Note that all underwater sound levels in this document are referenced to a pressure of 1 μPa and all airborne sound levels in this document are referenced to a pressure of 20 μPa.

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Rms is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Rms accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units than by peak pressures.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in all directions away from the source (similar to ripples on the surface of a pond), except in cases where the source is directional. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound. Ambient sound is defined as environmental background sound levels lacking a single source or point (Richardson *et al.,*1995), and the sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.,* waves, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic sound (*e.g.,* vessels, dredging, aircraft, construction). A number of sources contribute to ambient sound, including the following (Richardson *et al.,* 1995):

- Wind and waves: The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient noise for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Surf noise becomes important near shore, with measurements collected at a distance of 8.5 km from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions.
- Precipitation: Sound from rain and hail impacting the water surface can become an important component of total noise at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times.
- Biological: Marine mammals can contribute significantly to ambient noise levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.
- Anthropogenic: Sources of ambient noise related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean

acoustic studies. Shipping noise typically dominates the total ambient noise for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly (Richardson *et al.,* 1995). Sound from identifiable anthropogenic sources other than the activity of interest (*e.g.,* a passing vessel) is sometimes termed background sound, as opposed to ambient sound.

The sum of the various natural and anthropogenic sound sources at any given location and time—which comprise ''ambient'' or ''background'' sound—depends not only on the source levels (as determined by current weather conditions and levels of biological and shipping activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10–20 dB from day to day (Richardson *et al.,* 1995). The result is that, depending on the source type and its intensity, sound from the specified activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

In-water construction activities associated with the project would include impact pile driving, vibratory pile driving and vibratory pile extraction. The sounds produced by these activities fall into one of two general sound types: Pulsed and non-pulsed (defined in the following paragraphs). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.,* Ward, 1997 in Southall *et al.,* 2007). Please see Southall *et al.,* (2007) for an in-depth discussion of these concepts.

Pulsed sound sources (*e.g.,* explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986; Harris, 1998; NIOSH, 1998; ISO, 2003; ANSI, 2005) and occur either as isolated events or repeated in some succession. Pulsed sounds are all characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a rapid decay period that may include a period of diminishing, oscillating maximal and minimal pressures, and generally have an increased capacity to induce physical injury as compared with sounds that lack these features.

Non-pulsed sounds can be tonal, narrowband, or broadband, brief or prolonged, and may be either continuous or non-continuous (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.,* rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems (such as those used by the U.S. Navy). The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

Impact hammers operate by repeatedly dropping a heavy piston onto a pile to drive the pile into the substrate. Sound generated by impact hammers is characterized by rapid rise times and high peak levels, a potentially injurious combination (Hastings and Popper, 2005). Vibratory hammers install piles by vibrating them and allowing the weight of the hammer to push them into the sediment. Vibratory hammers produce significantly less sound than impact hammers. Peak SPLs may be 180 dB or greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman *et al.,* 2009). Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.,* 2005).

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals, and exposure to sound can have deleterious effects. To appropriately assess these potential effects, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.,* Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on measured or estimated hearing ranges on the basis of available behavioral data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans). Subsequently, NMFS (2016) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. The functional groups and the associated frequencies are indicated below (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group) (NMFS 2016):

- Low-frequency cetaceans (mysticetes): Generalized hearing is estimated to occur between approximately 7 Hz and 35 kHz, with best hearing estimated to be from 100 Hz to 8 kHz;
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): Generalized hearing is estimated to occur between approximately 150 Hz and 160 kHz, with best hearing from 10 to less than 100 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera Kogia and Cephalorhynchus; including two members of the genus Lagenorhynchus, on the basis of recent echolocation data and genetic data): Generalized hearing is estimated to occur between approximately 275 Hz and 160 kHz.
- Pinnipeds in water; Phocidae (true seals): Generalized hearing is estimated to occur between approximately 50 Hz to 86 kHz, with best hearing between 1–50 kHz;
- Pinnipeds in water; Otariidae (eared seals): Generalized hearing is estimated to occur between 60 Hz and 39 kHz, with best hearing between 2–48 kHz.

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Kastelein *et al.,* 2009; Reichmuth *et al.,* 2013).

As mentioned previously in this document, nine marine mammal species (seven cetaceans and two pinnipeds) may occur in the project area. Of the cetaceans, four are classified as a low-frequency cetacean (*i.e.,* humpback whale, gray whale, fin whale, minke whale), one is classified as a mid-frequency cetacean (*i.e.,* killer whale), and two are classified as high-frequency cetaceans (*i.e.,* harbor porpoise and Dall's porpoise) (Southall *et al.,* 2007). Additionally, harbor seals are classified as members of the phocid pinnipeds in water functional hearing group while Steller sea lions are grouped under the Otariid pinnipeds in water functional hearing group. A species' functional hearing group is a consideration when we analyze the effects of exposure to sound on marine mammals. Marine mammal hearing groups were also used in the establishment of marine mammal auditory weighting functions in the new acoustic guidance.

Acoustic Impacts

Please refer to the information given previously (*Description of Sound Sources*) regarding sound, characteristics of sound types, and metrics used in this document. Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life, from none or minor to potentially severe responses, depending on received levels, duration of exposure, behavioral context, and various other factors. The potential effects of underwater sound from active acoustic sources can potentially result in one or more of the following: Temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2004; Nowacek *et al.,* 2007; Southall *et al.,* 2007). The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and duration of the sound exposure. In general, sudden, high level sounds can cause hearing loss, as can longer exposures to lower level sounds. Temporary or permanent loss of hearing will occur almost exclusively for noise within an animal's hearing range. In this section, we first describe specific manifestations of acoustic effects before providing discussion specific to the proposed construction activities in the next section.

Permanent Threshold Shift—Marine mammals exposed to high-intensity sound, or to lower-intensity sound for prolonged periods, can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Kastak *et al.,* 1999; Schlundt *et al.,* 2000; Finneran *et al.,* 2002, 2005). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.,* 2007). Repeated sound exposure that leads to TTS could cause PTS. In severe cases of PTS, there can be total or partial deafness, while in most cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter, 1985).

When PTS occurs, there is physical damage to the sound receptors in the ear (*i.e.,* tissue damage), whereas TTS represents primarily tissue fatigue and is reversible (Southall *et al.,* 2007). In addition, other investigators have suggested that TTS is within the normal bounds of physiological variability and tolerance and does not represent physical injury (*e.g.,* Ward, 1997). Therefore, NMFS does not consider TTS to constitute auditory injury.

Relationships between TTS and PTS thresholds have not been studied in marine mammals—PTS data exists only for a single harbor seal (Kastak *et al.,* 2008)—but are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several decibels above (a 40-dB threshold shift approximates PTS onset; *e.g.,* Kryter *et al.,* 1966; Miller, 1974) that inducing mild TTS (a 6-dB threshold shift approximates TTS onset; *e.g.,* Southall *et al.,* 2007). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulse sounds (such as impact pile driving pulses as received close to the source) are at least six dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.,* 2007).

Temporary threshold shift—TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends.

Marine mammal hearing plays a critical role in communication with conspecifics, and interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (*i.e.,* recovery time), and frequency range of TTS, and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious. For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that occurs during a time where ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during time when communication is critical for successful mother/calf interactions could have more serious impacts.

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin [*Tursiops trancatus*], beluga whale [*Delphinapterus leucas*], harbor porpoise, and Yangtze finless porpoise [*Neophocoena asiaeorientalis*]) and three species of pinnipeds (northern elephant seal [*Mirounga angustirostris*], harbor seal, and California sea lion [*Zalophus californianus*]) exposed to a limited number of sound sources (*i.e.,* mostly tones and octave-band noise) in laboratory settings (*e.g.,* Finneran *et al.,* 2002; Nachtigall *et al.,* 2004; Kastak *et al.,* 2005; Lucke *et al.,* 2009; Popov *et al.,* 2011). In general, harbor seals (Kastak *et al.,* 2005; Kastelein *et al.,* 2012a) and harbor porpoises (Lucke *et al.,* 2009; Kastelein *et al.,* 2012b) have a lower TTS onset than other measured pinniped or cetacean species. Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. There are no data available on noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al.* (2007), Finneran and Jenkins (2012), and Finneran (2015).

Behavioral effects—Behavioral disturbance may include a variety of effects, including subtle changes in behavior (*e.g.,* minor or brief avoidance of an area or changes in vocalizations), more conspicuous changes in similar behavioral activities, and more sustained and/or potentially severe reactions, such as displacement from or abandonment of high-quality habitat. Behavioral responses to sound are highly variable and context-specific and any reactions depend on numerous intrinsic and extrinsic factors (*e.g.,* species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day), as well as the interplay between factors (*e.g.,* Richardson *et al.,* 1995; Wartzok *et al.,* 2003; Southall *et al.,* 2007; Weilgart, 2007; Archer *et al.,* 2010). Behavioral reactions can vary not only among individuals but also within an individual, depending on previous experience with a sound source, context, and numerous other factors (Ellison *et al.,* 2012), and can vary depending on characteristics associated with the sound source (*e.g.,* whether it is moving or stationary, number of sources, distance from the source). Please see Appendices B–C of Southall *et al.* (2007) for a review of studies involving marine mammal behavioral responses to sound.

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.,* 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a ''progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial,'' rather than as, more generally, moderation in response to human disturbance (Bejder *et al.,* 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. As noted, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.,* 1995; NRC, 2003; Wartzok *et al.,* 2003). Controlled experiments with captive marine mammals have showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997; Finneran *et al.,* 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic airguns or acoustic harassment devices) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; see also Richardson *et al.,* 1995; Nowacek *et al.,* 2007).

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.,* Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2003). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

Changes in dive behavior can vary widely, and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.,* Frankel and Clark, 2000; Costa *et al.,* 2003; Ng and Leung, 2003; Nowacek *et al.;* 2004; Goldbogen *et al.,* 2013a,b). Variations in dive behavior may reflect interruptions in biologically significant activities (*e.g.,* foraging) or they may be of little biological significance. The impact of an alteration to dive behavior resulting from an acoustic exposure depends on what the animal is doing at the time of the exposure and the type and magnitude of the response.

Disruption of feeding behavior can be difficult to correlate with anthropogenic sound exposure, so it is usually inferred by observed displacement from known foraging areas, the appearance of secondary indicators (*e.g.,* bubble nets or sediment plumes), or changes in dive behavior. As for other types of behavioral response, the frequency, duration, and temporal pattern of signal presentation, as well as differences in species sensitivity, are likely contributing factors to differences in response in any given circumstance (*e.g.,* Croll *et al.,* 2001; Nowacek *et al.;* 2004; Madsen *et al.,* 2006; Yazvenko *et al.,* 2007). A determination of whether foraging disruptions incur fitness consequences would require information on or estimates of the energetic requirements of the affected individuals and the relationship between prey availability, foraging effort and success, and the life history stage of the animal.

Variations in respiration naturally vary with different behaviors and alterations to breathing rate as a function of acoustic exposure can be expected to co-occur with other behavioral reactions, such as a flight response or an alteration in diving. However, respiration rates in and of themselves may be representative of annoyance or an acute stress response. Various studies have shown that respiration rates may either be unaffected or could increase, depending on the species and signal characteristics, again highlighting the importance in understanding species differences in the tolerance of underwater noise when determining the potential for impacts resulting from anthropogenic sound exposure (*e.g.,* Kastelein *et al.,* 2001, 2005b, 2006; Gailey *et al.,* 2007).

Marine mammals vocalize for different purposes and across multiple modes, such as whistling, echolocation click production, calling, and singing. Changes in vocalization behavior in response to anthropogenic noise can occur for any of these modes and may result from a need to compete with an increase in background noise or may reflect increased vigilance or a startle response. For example, in the presence of potentially masking signals, humpback whales and killer whales have been observed to increase the length of their songs (Miller *et al.,* 2000; Fristrup *et al.,* 2003; Foote *et al.,* 2004), while right whales have been observed to shift the frequency content of their calls upward while reducing the rate of calling in areas of increased anthropogenic noise (Parks *et al.,* 2007b). In some cases, animals may cease sound production during production of aversive signals (Bowles *et al.,* 1994).

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.,* 1995). For example, gray whales are known to change direction—deflecting from customary migratory paths—in order to avoid noise from seismic surveys (Malme *et al.,* 1984). Avoidance may be short-term, with animals returning to the area once the noise has ceased (*e.g.,* Bowles *et al.,* 1994; Goold, 1996; Stone *et al.,* 2000; Morton and Symonds, 2002; Gailey *et al.,* 2007). Longer-term displacement is possible, however, which may lead to changes in abundance or distribution patterns of the affected species in the affected region if habituation to the presence of the sound does not occur (*e.g.,* Blackwell *et al.,* 2004; Bejder *et al.,* 2006; Teilmann *et al.,* 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.,* directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and Heithaus, 1996). The result of a flight response could range from brief, temporary exertion and displacement from the area where the signal provokes flight to, in extreme cases, marine mammal strandings (Evans and England, 2001). However, it should be noted that response to a perceived predator does not necessarily invoke flight (Ford and Reeves, 2008), and whether individuals are solitary or in groups may influence the response.

Behavioral disturbance can also impact marine mammals in more subtle ways. Increased vigilance may result in costs related to diversion of focus and attention (*i.e.,* when a response consists of increased vigilance, it may come at the cost of decreased attention to other critical behaviors such as foraging or resting). These effects have generally not been demonstrated for marine mammals, but studies involving fish and terrestrial animals have shown that increased vigilance may substantially reduce feeding rates (*e.g.,* Beauchamp and Livoreil, 1997; Fritz *et al.,* 2002; Purser and Radford, 2011). In addition, chronic disturbance can cause population declines through reduction of fitness (*e.g.,* decline in body condition) and subsequent reduction in reproductive success, survival, or both (*e.g.,* Harrington and Veitch, 1992; Daan *et al.,* 1996; Bradshaw *et al.,* 1998). However, Ridgway *et al.* (2006) reported that increased vigilance in bottlenose dolphins exposed to sound over a five-day period did not cause any sleep deprivation or stress effects.

Many animals perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (24-hour cycle). Disruption of such functions resulting from reactions to stressors such as sound exposure are more likely to be significant if they last more than one diel cycle or recur on subsequent days (Southall *et al.,* 2007). Consequently, a behavioral response lasting less than one day and not recurring on subsequent days is not considered particularly severe unless it could directly affect reproduction or survival (Southall *et al.,* 2007). Note that there is a difference between multi-day substantive behavioral reactions and multi-day anthropogenic activities. For example, just because an activity lasts for multiple days does not necessarily mean that individual animals are either exposed to activity-related stressors for multiple days or, further, exposed in a manner resulting in sustained multi-day substantive behavioral responses.

Stress responses—An animal's perception of a threat may be sufficient to trigger stress responses consisting of some combination of behavioral responses, autonomic nervous system responses, neuroendocrine responses, or immune responses (*e.g.,* Seyle, 1950; Moberg, 2000). In many cases, an animal's first and sometimes most economical (in terms of energetic costs) response is behavioral avoidance of the potential stressor. Autonomic nervous system responses to stress typically involve changes in heart rate, blood pressure, and gastrointestinal activity. These responses have a relatively short duration and may or may not have a significant long-term effect on an animal's fitness.

Neuroendocrine stress responses often involve the hypothalamus-pituitary-adrenal system. Virtually all neuroendocrine functions that are affected by stress—including immune competence, reproduction, metabolism, and behavior—are regulated by pituitary hormones. Stress-induced changes in the secretion of pituitary hormones have been implicated in failed reproduction, altered metabolism, reduced immune competence, and behavioral disturbance (*e.g.,* Moberg, 1987; Blecha, 2000). Increases in the circulation of glucocorticoids are also equated with stress (Romano *et al.,* 2004).

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

Relationships between these physiological mechanisms, animal behavior, and the costs of stress responses are well-studied through controlled experiments and for both laboratory and free-ranging animals (*e.g.,* Holberton *et al.,* 1996; Hood *et al.,* 1998; Jessop *et al.,* 2003; Krausman *et al.,* 2004; Lankford *et al.,* 2005). Stress responses due to exposure to anthropogenic sounds or other stressors and their effects on marine mammals have also been reviewed (Fair and Becker, 2000; Romano *et al.,* 2002b) and, more rarely, studied in wild populations (*e.g.,* Romano *et al.,* 2002a). For example, Rolland *et al.* (2012) found that noise reduction from reduced ship traffic in the Bay of Fundy was associated with decreased stress in North Atlantic right whales. These and other studies lead to a reasonable expectation that some marine mammals will experience physiological stress responses upon exposure to acoustic stressors and that it is possible that some of these would be classified as ''distress.'' In addition, any animal experiencing TTS would likely also experience stress responses (NRC, 2003).

Auditory masking—Sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.,* those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al.,* 1995). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (*e.g.,* snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.,* shipping, sonar, seismic exploration) in origin. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.,* signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.,* sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions.

Under certain circumstances, marine mammals experiencing significant masking could also be impaired from maximizing their performance fitness in survival and reproduction. Therefore, when the coincident (masking) sound is man-made, it may be considered harassment when disrupting or altering critical behaviors. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs during the sound exposure. Because masking (without resulting in TS) is not associated with abnormal physiological function, it is not considered a physiological effect, but rather a potential behavioral effect.

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.,* Clark *et al.,* 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.,* Miller *et al.,* 2000; Foote *et al.,* 2004; Parks *et al.,* 2007b; Di Iorio and Clark, 2009; Holt *et al.,* 2009). Masking can be reduced in situations where the signal and noise come from different directions (Richardson *et al.,* 1995), through amplitude modulation of the signal, or through other compensatory behaviors (Houser and Moore, 2014). Masking can be tested directly in captive species (*e.g.,* Erbe, 2008), but in wild populations it must be either modeled or inferred from evidence of masking compensation. There are few studies addressing real-world masking sounds likely to be experienced by marine mammals in the wild (*e.g.,* Branstetter *et al.,* 2013).

Masking affects both senders and receivers of acoustic signals and can potentially have long-term chronic effects on marine mammals at the population level as well as at the individual level. Low-frequency ambient sound levels have increased by as much as 20 dB (more than three times in terms of SPL) in the world's ocean from pre-industrial periods, with most of the increase from distant commercial shipping (Hildebrand, 2009). All anthropogenic sound sources, but especially chronic and lower-frequency signals (*e.g.,* from vessel traffic), contribute to elevated ambient sound levels, thus intensifying masking.

At the seafood processing plant north of the project site, fish are offloaded into the processing plant from the vessels' holds, and several vessels may raft up simultaneously during peak fishing seasons. A small boat harbor is located northeast of the project site and services a number of small vessels. High levels of vessel traffic are known to elevate background levels of noise in the marine environment. For example, continuous sounds for tugs pulling barges have been reported to range from 145 to 166 dB re 1 µPa rms at 1 meter from the source (Miles *et al.,* 1987; Richardson *et al.,* 1995; Simmonds *et al.,* 2004). Ambient underwater noise levels in the vicinity of the project site are unknown but could potentially mask some sounds of pile installation and pile extraction.

Non-auditory physiological effects—Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.,* 2006; Southall *et al.,* 2007). Studies examining such effects are limited. In general, little is known about the potential for pile driving to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source, where SLs are much higher, and to activities that extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall *et al.,* 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. Marine mammals that show behavioral avoidance of pile driving, including some odontocetes and some pinnipeds, are especially unlikely to incur auditory impairment or non-auditory physical effects.

Underwater Acoustic Effects From the Proposed Activities

Potential Effects of Pile Driving Sound—The effects of sounds from pile driving might include one or more of the following: Temporary or permanent hearing impairment, non-auditory physical or physiological effects, and behavioral disturbance (Richardson *et al.,* 1995; Gordon *et al.,* 2003; Nowacek *et al.,* 2007; Southall *et al.,* 2007). The effects of pile driving on marine mammals are dependent on several factors, including the type and depth of the animal; the pile size and type, and the intensity and duration of the pile driving sound; the substrate; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. Impacts to marine mammals from pile driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the frequency, received level, and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The further away from the source, the less intense the exposure should be. The substrate and depth of the habitat affect the sound propagation properties of the environment. In addition, substrates that are soft (*e.g.,* sand) would absorb or attenuate the sound more readily than hard substrates (*e.g.,* rock) which may reflect the acoustic wave. Soft porous substrates would also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source.

Hearing Impairment and Other Physical Effects—Marine mammals exposed to high intensity sound repeatedly or for prolonged periods can experience hearing threshold shifts. PTS constitutes injury, but TTS does not (Southall *et al.,* 2007). Based on the best scientific information available, the SPLs for the proposed construction activities may exceed the thresholds that could cause TTS or the onset of PTS based on NMFS' new acoustic guidance (81 FR 51694; August 4, 2016).

Non-auditory Physiological Effects—Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to high level underwater sound or as a secondary effect of extreme behavioral reactions (*e.g.,* change in dive profile as a result of an avoidance reaction) caused by exposure to sound include neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.,* 2006; Southall *et al.,* 2007; Zimmer and Tyack, 2007). The proposed activities do not involve the use of devices such as explosives or mid-frequency active sonar that are associated with these types of effects, nor do they have SLs that may cause these extreme behavioral reactions, and are therefore, considered unlikely.

Disturbance Reactions—Responses to continuous sound, such as vibratory pile installation, have not been documented as well as responses to pulsed sounds. With both types of pile driving, it is likely that the onset of pile driving could result in temporary, short term changes in an animal's typical behavior and/or avoidance of the affected area. Specific behavioral changes that may result from this proposed project include changing durations of surfacing and dives, moving direction and/or speed; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); and avoidance of areas where sound sources are located. 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, potential impacts on the stock or species could potentially be significant if growth, survival and reproduction are affected (*e.g.,* Lusseau and Bejder, 2007; Weilgart, 2007). Note that the significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor.

Auditory Masking—Natural and artificial sounds can disrupt behavior by masking. Given that the energy distribution of pile driving covers a broad frequency spectrum, sound from these sources would likely be within the audible range of marine mammals present in the project area. Impact pile driving activity is relatively short-term, and only used for proofing, with rapid pulses occurring for only a few minutes per pile. The probability for impact pile driving resulting from this proposed action masking acoustic signals important to the behavior and survival of marine mammal species is low. Vibratory pile driving is also relatively short-term. It is possible that vibratory pile driving resulting from this proposed action may mask acoustic signals important to the behavior and survival of marine mammal species, but the short-term duration and limited affected area would result in insignificant impacts from masking. Any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for vibratory and impact pile driving, and which have already been taken into account in the exposure analysis.

Airborne Acoustic Effects from the Proposed Activities—Pinnipeds that occur near the project site could be exposed to airborne sounds associated with pile driving that have the potential to cause behavioral harassment, depending on their distance from pile driving activities. Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

Airborne noise will primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels elevated above the acoustic criteria. We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with heads above water. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater sound. However, these animals would previously have been ''taken'' as a result of exposure to underwater sound above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Multiple instances of exposure to sound above NMFS' thresholds for behavioral harassment are not believed to result in increased behavioral disturbance, in either nature or intensity of disturbance reaction. 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.

Potential Pile Driving Effects on Prey—Construction activities would produce continuous (*i.e.,* vibratory pile driving) sounds and pulsed (*i.e.,* impact driving) sounds. Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish, although several are based on studies in support of large, multiyear bridge construction projects (*e.g.,* Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Sound pulses at received levels of 160 dB may cause subtle changes in fish behavior. SPLs of 180 dB may cause noticeable changes in behavior (Pearson *et al.,* 1992; Skalski *et al.,* 1992). SPLs of sufficient strength have been known to cause injury to fish and fish mortality.

The most likely impact to fish from pile driving activities at the project area would be temporary behavioral avoidance. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species from the proposed project are expected to be minor and temporary due to the relatively short timeframe of no more than 40 days of pile driving and extraction with approximately 22 hours of impact driving and 85 hours of vibratory driving and extraction.

Effects to Foraging Habitat—Essential Fish Habitat (EFH) has been designated within the project area for all five species of salmon (*i.e.,* chum, pink, Coho, sockeye, and Chinook salmon), walleye pollock, Pacific cod, yellowfin sole (*Limanda aspera*), arrowtooth flounder (*Atheresthes stomias*), rock sole (*Lepidopsetta spp.*), flathead sole (*Hippoglossoides elassodon*), and sculpin (Cottidae). The EFH provisions of the Magnuson-Stevens Fishery Conservation and Management Act are designed to protect fisheries habitat from being lost due to disturbance and degradation.

Pile installation may temporarily increase turbidity resulting from suspended sediments. Any increases would be temporary, localized, and minimal. ADOT&PF must comply with state water quality standards during these operations by limiting the extent of turbidity to the immediate project area. In general, turbidity associated with pile installation is localized to about a 25-foot radius around the pile (Everitt *et al.* 1980). Cetaceans are not expected to be close enough to the project pile driving areas to experience effects of turbidity, and any pinnipeds will be transiting the area and could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals. Furthermore, pile driving and removal at the project site will not obstruct movements or migration of marine mammals.

In summary, given the short duration of sound associated with individual pile driving events and the relatively small area that would be affected, pile driving activities associated with the proposed action are not likely to have a permanent, adverse effect on any fish habitat, or populations of fish species. Thus, any impacts to marine mammal habitat are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

Estimated Take

This section includes an estimate of the number of incidental ''takes'' proposed for authorization pursuant to this IHA, which will inform both NMFS' consideration of whether the number of takes is ''small'' and the negligible impact determination.

Harassment is the only means of take expected to result from these activities. 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]. As described previously Level A and Level B harassment is expected to occur and is proposed to be authorized in the numbers identified below.

ADOT&PF has requested authorization for the incidental taking of limited numbers, by Level B harassment in the form of behavioral disturbance, of harbor porpoise, Dall's porpoise, killer whale, humpback whale, fin whale, gray whale, minke whale, Steller sea lion, and harbor seal near the project area that may result from impact and vibratory pile driving activities. Level A harassment in the form of PTS resulting from impact driving has also been requested for small numbers of harbor porpoise, humpback whale, and harbor seal.

Take estimates are generally based on average marine mammal density in the project area multiplied by the area size of ensonified zones within which received noise levels exceed certain thresholds (*i.e.,* Level A and/or Level B harassment) from specific activities, then multiplied by the total number of days such activities would occur. If density information is not available, local observational data may be used instead.

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 consider the sound field in combination with 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 incidents of take.

Sound Thresholds

We use the following generic sound exposure thresholds (Table 4) to determine when an activity that produces sound might result in impacts to a marine mammal such that a take by behavioral harassment (Level B) might occur.

TABLE 4—UNDERWATER LEVEL B THRESHOLD DECIBEL LEVELS FOR MARINE MAMMALS

Criterion	Criterion definition	Threshold [1]
Level B harassment	Behavioral disruption for impulse noise (*e.g.,* impact pile driving)	160 dB RMS.
Level B harassment	Behavioral disruption for non-pulse noise (*e.g.,* vibratory pile driving, drilling).	120 dB RMS.

[1] All decibel levels referenced to 1 micropascal (re: 1 µPa). Note all thresholds are based off root mean square (RMS) levels.

We use NMFS' acoustic criteria (NMFS 2016a, 81 FR 51694; August 4, 2016), which establishes sound exposure thresholds to determine when an activity that produces sound might result in impacts to a marine mammal such that a take by auditory injury, *i.e.,* PTS, (Level A harassment) might occur. The specific methodology is presented in Appendix D of the Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Guidance), available at *http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm*) and the accompanying User Spreadsheet. 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 ADOT&PF's application uses the recommended values for vibratory and impact driving therein. The acoustic thresholds are presented using dual metrics of SEL_{cum} and peak sound level (PK) as shown in Table 5. 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. The method uses estimates of sound exposure level and duration of the activity to calculate the threshold distances at which a marine mammal exposed to those values would experience PTS. Differences in hearing abilities among marine mammals are accounted for by use of weighting factor adjustments for the five functional hearing groups (NMFS 2016). Note that for all proposed pile driving activities at Sand Point, the User Spreadsheet indicated that the Level A isopleths generated using the SEL_{cum} were the largest.

TABLE 5—SUMMARY OF PTS ONSET ACOUSTIC THRESHOLDS

Hearing group	PTS onset acoustic thresholds [1] (received level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1*—Lpk,flat: 219 dB; LE,LF,24h: 183 dB.	*Cell 2*—LE,LF,24h: 199 dB.
Mid-Frequency (MF) Cetaceans	*Cell 3*—Lpk,flat: 230 dB; LE,MF,24h: 185 dB.	*Cell 4*—LE,MF,24h: 198 dB.
High-Frequency (HF) Cetaceans	*Cell 5*—Lpk,flat: 202 dB; LE,HF,24h: 155 dB.	*Cell 6*—LE,HF,24h: 173 dB.
Phocid Pinnipeds (PW) (Underwater)	*Cell 7*—Lpk,flat: 218 dB; LE,PW,24h: 185 dB.	*Cell 8*—LE,PW,24h: 201 dB.
Otariid Pinnipeds (OW) (Underwater)	*Cell 9*—Lpk,flat: 232 dB; LE,OW,24h: 203 dB.	*Cell 10*—LE,OW,24h: 219 dB.

[1] 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 1µPa²s. 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.

Distance to Sound Thresholds

The sound field in the project area is the existing background noise plus additional construction noise from the proposed project. Marine mammals are expected to be affected via sound generated by the primary components of the project, *i.e.,* impact pile driving, vibratory pile driving, and vibratory pile removal. Vibratory hammers produce constant sound when operating, and produce vibrations that liquefy the sediment surrounding the pile, allowing it to penetrate to the required seating depth. An impact hammer would then generally be used to place the pile at its intended depth. The actual durations of each installation method vary depending on the type and size of the pile. An impact hammer is a steel device that works like a piston, producing a series of independent strikes to drive the pile. Impact hammering typically generates the loudest noise associated with pile installation. Factors that could potentially minimize the potential impacts of pile installation associated with the project include:

• The relatively shallow waters in the project area (Taylor *et al.,* 2008);

• Land forms around Sand Point that would block the noise from spreading; and

• Vessel traffic and other commercial and industrial activities in the project area that contribute to elevated background noise levels.

Sound would likely dissipate relatively rapidly in the shallow waters over soft seafloors in the project area. Additionally, portions of Popof Island and Unga Island would block much of the noise from propagating to its full extent through the marine environment.

In order to calculate distances to the Level A and Level B sound thresholds for piles of various sizes being used in this project, NMFS used acoustic monitoring data from other locations. Note that piles of differing sizes have different sound source levels.

Empirical data from recent ADOT&PF sound source verification (SSV) studies at Kake, Ketchikan, and Auke Bay, were used to estimate sound source levels (SSLs) for vibratory and impact installation of 30-inch steel pipe piles (MacGillivray *et al.,* 2016, Warner and Austin 2016b, Denes *et al.,* 2016a, respectively). Construction sites in Alaska were generally assumed to best represent the environmental conditions found in Sand Point and represent the nearest available source level data for 30-inch steel piles. Similarities among the sites include island chains and groups of islands adjacent to continental landmasses; deeply incised marine channels and fjords; local water depths of 20–40 meters; Gulf of Alaska marine water influences; and numerous freshwater inputs. However, the use of data from Alaska sites was not appropriate in all instances. Details are described below.

To derive source levels for vibratory driving of 30-in piles, NMFS used summary data from Auke Bay and Ketchikan as described in a comprehensive summary report by Denes *et al.,* (2016b). During the two studies, three 30-inch steel piles were installed at each location via both impact and vibratory driving. For each pile, the mean recorded SPL in dB re 1 µPa was reported for the locations monitoring hydrophones (Denes *et al.,* 2016; Warner and Austin 2016b). The vibratory data were then derived to a 10-meter standard distance. The average of the mean source levels from both Auke Bay and Ketchikan locations was then calculated for each measurement (rms and peak SPL, as well as sound exposure level [SEL]) (Denes *et al.,* 2016b). ADOT&PF also considered data from a study in Kake (MacGillivray *et al.,* 2016). However, conditions at Kake include an organic mud substrate which would likely absorb sound and decrease source level values for vibratory driving. NMFS believes that these conditions resulted in anomalous source level measurements for vibratory pile driving that would not be expected at locations with dissimilar substrates. NMFS will continue to evaluate use of these data on a case-specific basis, however, for these reasons vibratory data from that study was not included in this analysis. Results are shown in Table 6.

For vibratory driving of 24-inch steel dolphin and fender piles, data from three projects (two projects in Washington and one in California) were reviewed. The Washington marine projects at the Washington State Ferries Friday Harbor Terminal (WSDOT, 2010) and Naval Base Kitsap, Bangor waterfront (Navy 2012), only measured one pile each, but reported similar sound levels of 162 dB RMS and 159 dB RMS (range 157 dB to 160 dB), respectively. Because only two piles were measured in Washington, the California project was also included in the analysis. The California project was located in a coastal bay and reported a ''typical'' value of 160 dB RMS with a range 158 to 178 dB RMS for two piles where vibratory levels were measured. Caltrans summarized the project's RMS level as 170 dB RMS, although most levels observed were nominally 160 dB. Although the data set is limited to these projects, close agreement of the levels (average project values from 159 to 162 dB at 10 meters) resulted in NMFS selecting a source level of 161 dB RMS. Note that a fourth project at NBK, Bangor drove 16-inch hollow steel piles, with measured levels similar to those for the 24-inch piles. Therefore, NMFS elected to use the same 161 dB RMS as a source level for vibratory driving of 18-inch steel piles. NMFS believes it appropriate to use source levels from the next largest pile size when data are lacking for specific pile sizes, as is the case with the18-inch piles under consideration.

ADOT&PF suggested a source level of 142 dB RMS for vibratory driving of steel H-piles. However, NMFS found this data to be inconsistent with other reported values and opted to use a value of 150 dB which was derived from summary data pertaining to vibratory driving of 12-inch H piles (Caltrans 2015).

In the application, ADOT&PF derived source levels for impact driving of 30-inch steel piles by averaging the individual mean values associated with impact driving of the same size and type from Auke Bay, Kake, and Ketchikan (Denes *et al.,* 2016a; MacGillivray *et al.,* 2016; Warner and Austin 2016b; Denes *et al.,* 2016b). Impact driving values at Kake did not seem to be influenced by substrate conditions in the way vibratory driving measurements are believed to have been and, therefore, Kake data was included. The average of the mean source levels from these three sites was then calculated for each metric (rms, SEL, and peak). Results are shown in Table 6.

For the 24-inch impact pile driving, NMFS used data from a Navy (2015) study of proxy sound source values for use at Puget Sound military installations. The Navy study recommended a value of 193 dB RMS which was derived from data generated by impact driving of 24-inch steel piles at the Bainbridge Island Ferry Terminal Preservation Project and the Friday Harbor Restoration Ferry Terminal Project. NMFS found this estimated source level to be appropriate.

TABLE 6—ESTIMATES OF MEAN UNDERWATER SOUND LEVELS (DECIBELS) GENERATED DURING VIBRATORY AND IMPACT PILE INSTALLATION AND VIBRATORY PILE REMOVAL

Method and pile type	Sound level at 10 meters			Literature source
Vibratory hammer	dB re 1 µPa rms			
30-inch steel piles	165.6			Derived from Denes *et al.* 2016a (Auke); Warner and Austin 2016b (Ketchikan).
24-inch steel piles	161			WSDOT 2010; Caltrans 2012; Navy 2012.
18-inch steel piles	161			WSDOT 2010; Caltrans 2012; Navy 2012.
Steel H-piles	150			Caltrans 2015.
Impact hammer	dB rms	dB SEL	dB peak	
30-inch steel piles	193.6	179.3	207.1	Derived from Denes *et al.* 2016a; Warner and Austin 2016b, MacGillivray *et al.,* 2016.
24-inch steel piles	193	181	210	Navy 2015.

The formula below is used to calculate underwater sound propagation. 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:

TL = transmission loss in dB
B = transmission loss coefficient; for practical spreading equals 15
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.

NMFS typically recommends a default practical spreading loss of 15 dB per tenfold increase in distance. ADOT&PF analyzed the available underwater acoustic data utilizing the practical spreading loss model.

Pulse duration from the SSV studies described above are unknown. All necessary parameters were available for the SELcum (cumulative Single Strike Equivalent) method for calculating isopleths. Therefore, this method was selected. To account for potential variations in daily productivity during impact installation, isopleths were calculated for different numbers of piles that could be installed each day (Table 7). Should the contractor expect to install fewer piles in a day than the maximum anticipated, a smaller Level A shutdown zone would be employed to monitor take.

To derive Level A harassment isopleths associated with the impact driving of 30-inch piles, ADOT&PF utilized a single strike SEL of 179.3 dB and assumed 1000 strikes per pile for 1 to 4 piles per day. For 24-inch dolphin piles, ADOT&PF used a single strike SEL of 181 dB and assumed 400 strikes at a rate of 1 or 2 piles per day. For 24-inch fender piles, ADOT&PF used the same single strike SEL of 181 dB and assumed 120 strikes per pile and 1 to 4 pile installations per day. To calculate Level A harassment isopleths associated with the vibratory driving of 30-inch piles, ADOT&PF utilized a source level (RMS SPL) of 165.6 dB and assumed 3 hours of driving per day. For 24-inch dolphin and fender piles, ADOT&PF used a source level of 161 dB and assumed up to 2 hours of driving per day. For installation and/or removal of piles less than 24-inches in diameter, ADOT&PF assumed use of 18-inch piles and used the same source level of 161 dB for up to 3 hours per day. If H-piles are used, a source level of 150 dB was utilized. Practical spreading was used in all instances. Results are shown in Table 7. Isopleths for Level B harassment associated with impact (160 dB) and vibratory harassment (120 dB) were also calculated and are included in Table 7.

TABLE 7—PILE INSTALLATION AND REMOVAL ACTIVITIES AND CALCULATED DISTANCES TO LEVEL A AND LEVEL B HARASSMENT ISOPLETHS [1]

Activity	Estimated duration		Level A harassment zone (meters) (based on new technical guidance)					Level B Harassment Zone (meters) (based on practical spreading loss model)
			Cetaceans			Pinnipeds		
	Hours per day	Days of effort	LF	MF	HF	PW	OW	Cetaceans and Pinnipeds (120 dB)
Vibratory Installation 30″	3	13	28.8	2.6	42.6	17.5	1.2	10,970 (10,964)
Vibratory Installation 24″ Dolphin	1	2	6.8	0.6	10.1	4.2	0.3	
Vibratory Installation 24″ Fender	2	2	10.8	1	16	6.6	0.5	5,420 (5,412)
Vibratory Installation and/or removal <24″ (18″)	3	15	14	1	21	8.6	0.6	

TABLE 7—PILE INSTALLATION AND REMOVAL ACTIVITIES AND CALCULATED DISTANCES TO LEVEL A AND LEVEL B HARASSMENT ISOPLETHS [1]—Continued

Activity	Estimated duration		Level A harassment zone (meters) (based on new technical guidance)					Level B Harassment Zone (meters) (based on practical spreading loss model)
			Cetaceans			Pinnipeds		
	Hours per day	Days of effort	LF	MF	HF	PW	OW	Cetaceans and Pinnipeds (120 dB)
Vibratory Installation and/or removal <24″ (H-piles)	3	15	2.6	0.2	3.9	1.6	0.1	1,000

Activity	Piles per day	Strikes per pile	Days of effort	Cetaceans			Pinnipeds		Cetaceans and Pinnipeds (160 dB)
				LF	MF	HF	PW	OW	
Impact Installation 30″	4	1,000	13	1,426	51	1,699	763	56	1,740 (1,738)
	3		18	1,177	42	1,402	630	46	
	2		26	898	32	1,070	481	35	
	1		52	566	20	674	303	22	
Impact Installation 24″ Dolphin	2	400	2	633	23	754	339	25	
	1		3	399	14	475	213	16	
Impact Installation 24″ Fender	4	120	2	450	16	537	241	18	1,590 (1,585)
	3		3	372	13	443	199	15	
	2		4	284	10	338	152	11	
	1		8	178	6	213	96	7	

[1] To account for potential variations in daily productivity during impact installation, isopleths were calculated for different numbers of piles that could be installed each day (Therefore, should the contractor expect to install fewer piles in a day than the maximum anticipated, a smaller Level A shutdown zone would be required to avoid take.)

Note that the actual area ensonified by pile driving activities is significantly constrained by local topography relative to the total threshold radius. The actual ensonified area was determined using a straight line-of-sight projection from the anticipated pile driving locations. The corresponding areas of the Level A and Level B ensonified zones for impact driving and vibratory installation/removal are shown in Table 8.

TABLE 8—CALCULATED AREAS (km^2) ENSONIFIED WITHIN LEVEL A AND LEVEL B HARASSMENT THRESHOLDS IN EXCESS OF 100-METER DISTANCE DURING PILE INSTALLATION AND REMOVAL ACTIVITIES

Activity	Estimated duration		Level A harassment zone (km^2) (based on new technical guidance)					Level B harassment zone (km^2) (based on practical spreading loss model)
			Cetaceans			Pinnipeds		
	Hours per day	Days of effort	LF	MF	HF	PW	OW	Cetaceans and Pinnipeds (120 dB)
Vibratory Installation 30″	3	13	NA	NA	NA	NA	NA	24.42
Vibratory Installation 24″ Dolphin	1	2	NA	NA	NA	NA	NA	17.19
Vibratory Installation 24″ Fender	2	2	NA	NA	NA	NA	NA	
Vibratory Installation and/or removal <24″ (18″)	3	15	NA	NA	NA	NA	NA	
Vibratory Installation and/or removal <24″ (H-piles)	3	15	NA	NA	NA	NA	NA	1.47

Activity	Piles per day	Strikes per pile	Days of effort	Cetaceans			Pinnipeds		Cetaceans and Pinnipeds (160 dB)
				LF	MF	HF	PW	OW	
Impact Installation 30″	4	1,000	13	2.84	NA	3.91	0.91	NA	4.08
	3		18	1.98	NA	2.75	0.66	NA	
	2		26	1.21	NA	1.66	0.41	NA	
	1		52	0.55	NA	0.74	0.18	NA	
Impact Installation 24″ Dolphin	2	400	2	0.67	NA	0.89	0.22	NA	3.45
	1		3	0.29	NA	0.40	0.09	NA	

Activity	Piles per day	Strikes per pile	Days of effort	Cetaceans			Pinnipeds		Cetaceans and Pinnipeds (160 dB)
				LF	MF	HF	PW	OW	
Impact Installation 24″ Fender	4	120	2	0.36	NA	0.50	0.11	NA	
	3		3	0.26	NA	0.35	0.08	NA	
	2		4	0.16	NA	0.22	0.04	NA	
	1		8	0.06	NA	0.09	0.02	NA	

Potential exposures to impact and vibratory pile driving noise for each threshold were estimated using local marine mammal density datasets where available and local observational data.

Dall's Porpoise

There currently is no information on the presence or abundance of Dall's porpoises in the Shumagin Islands. No sightings of Dall's porpoises have been documented in Humboldt Harbor and they are not expected to occur there (HDR 2017). However, individuals may occur in the deeper waters north of Popof Island or in Popof Strait, west of the Sand Point Airport. These porpoises have been sighted infrequently on research cruises heading in and out of Sand Point in deeper local waters (Speckman, Pers. Comm.). Dall's porpoise are non-migratory; therefore, exposure estimates are not dependent on season. Exposure of Dall's porpoise to noise from impact hammer pile installation is unlikely, as they are not expected to occur within the 1,738 meter Level B harassment zone. Similarly, we do not anticipate Dall's porpoise would be exposed to noise in excess of the Level A harassment threshold, which would be located at a maximum distance of 1,699 meters. It is possible, however, that they would occur in the larger Level B zone associated with vibratory driving of 30-inch (up to 10,970 meters) and 24-inch piles (up to 5,420 meters). Over the course of 40 days in which vibratory driving will be employed, NMFS conservatively anticipates no more than one observation of a Dall's porpoise pod in these Level B vibratory harassment zones. With an average pod size of 3.7 (Wade *et al.* 2003), NMFS estimates up to four Dall's porpoises could be taken during the pile installation period. No Level A take is proposed for Dall's porpoises.

Harbor Porpoise

There are no reports of harbor porpoises or harbor porpoise densities in the Shumagin Islands. It is reasonable to assume that they would occur in the vicinity of Popof and Unga Islands given that they are common in the Gulf of Alaska and their preferred habitat consists of coastal waters of 100 meters or less (Hobbs and Waite 2010). Based on the known range of the Gulf of Alaska stock, only six sightings of singles or pairs during 110 days of monitoring of the Kodiak Ferry Terminal and Dock Improvements project, and occasional sightings during monitoring of projects at other locations on Kodiak Island, it is assumed that harbor porpoises could be present on an intermittent basis.

Harbor porpoises are non-migratory; therefore, exposure estimates are not dependent on season. NMFS conservatively estimates harbor porpoise could be exposed to construction-related in-water noise on two out of every three construction days. Harbor porpoises in this area have an average group size of 1.82. Therefore, NMFS estimates 49 harbor porpoise exposures as shown below.

Sighting every 0.667 days * 40 days of exposure * 1.82 group size = 49 (48.55) rounded up).

During impact installation of piles, the Level A harassment isopleth for harbor porpoises extends up to 1,699 meters when a maximum of four 30-inch piles are installed on the same day. Given that harbor porpoises prefer near-shore waters, we anticipate that it is possible for up to one-third of the harbor porpoise sighting to occur in a Level A harassment zone. Therefore, NMFS proposes that of the 49 exposures, 16 will occur within a Level A harassment isopleth and 33 will occur within a Level B harassment isopleth.

Killer Whale

Line transect surveys conducted in the Shumagin Islands between 2001 and 2003 did not record any resident killer whales, but did record a relatively high abundance of transient killer whales (Zerbini *et al.,* 2007). The same study estimated a density of approximately 0.002 killer whales per square kilometer (km^2) in the Shumagin Islands (Zerbini *et al.,* 2007). The population trend of the transient stock of killer whales in Alaska has remained stable since the 1980s (Muto *et al.,* 2016a). Anecdotal observations indicate that killer whales are not often seen in the vicinity of Sand Point, including Popof Strait (HDR 2017). Killer whales are expected to be uncommon in the project area and are not expected to enter into Humboldt Harbor. However, NMFS used the density estimate of 0.002 per km^2 to determine the number of killer whales potentially observed within the project area. Given the low probability of occurrence within the project area, using the available density estimates as an indication of exposure is a conservative approach to estimate potential killer whale exposure to pile driving noise. Vibratory installation of 30-inch piles will occur on 13 days while vibratory installation of 24-inch dolphin piles, 24-inch fender piles, and temporary 18-inch or h-piles will occur on a total of 19 days. NMFS assumed that 18-inch piles would be installed instead of h-piles and that 18-inch piles have the same source level and isopleth as 24-in piles. NMFS also added a 25 percent contingency factor to account for unanticipated delays. Therefore, there would be up to 16.25 days of vibratory installation of 30-inch piles and 23.75 days of 24-inch piles. At a density of 0.002 whales/km^2, NMFS anticipates approximately 0.79 killer whales (*i.e.,* 0.002 whales/km^2 * 24.42 km^2 30-inch vibratory harassment zone * 16.25 days) would be exposed to Level B harassment associated with 30-inch vibratory driving while 0.82 killer whales (*i.e.,* 0.002 whales/km^2 * 17.19 km^2 24-inch vibratory harassment zone * 23.75 days) would be exposed to Level B harassment from 24-inch vibratory driving over 40 days. Over the 40 day construction period, 2 killer whales (1.61 rounded up) would be exposed to Level B harassment.

However, killer whales generally travel in pods, or groups of individuals. The average pod size for transient killer whales is four individuals (Zerbini *et al.* 2007) and 5–50 for resident killer whales (Heise *et al.* 2003). A monitoring report associated with issuance of an IHA for Kodiak Ferry Terminal and Dock Improvements Project recorded four killer whale pod observations during 110 days of monitoring with the largest pod size consisting of seven individuals. NMFS will, therefore, assume that there will be sightings of two pods with an average group size of seven over the course of the 40-day construction period resulting in a total estimate of 14 killer whale Level B takes. These killer whales would likely be transients, but could also be residents, so take is proposed for both stocks. No Level A take is proposed for killer whales since the injury zone is smaller than the 100 meter shutdown zone.

Humpback Whale

Surveys from 2001 to 2004 estimated humpback whale abundance in the Shumagin Islands at between 410 and 593 individuals during the summer feeding season (July–August; Witteveen *et al.,* 2004; Zerbini *et al.,* 2006). Annual vessel-based, photo-identification surveys in the Shumagin Islands from 1999 to 2015 identified 654 unique individual humpback whales between June and September (Witteveen and Wynne 2016). Humpback whale abundance in the Shumagin Islands increased 6 percent per year between 1987 and 2003 (Zerbini *et al.,* 2006). Between 2001 and 2003, summer line transect surveys in the Shumagin Islands estimated the humpback whale density at 0.02 whales per km^2 (Zerbini *et al.,* 2006). Given an approximate population increase of 6 percent each year since the early 2000's (Muto *et al.,* 2016b), we conservatively estimate the current density of humpback whales as about 0.04 whale per km^2 (0.02 whale/km^2 * [6 percent increase/year * 13 years]).

Exposure of humpback whales to Level A and Level B harassment noise levels is possible in August and, to a lesser extent, in September. Exposure is unlikely between October and December because humpback whale abundance is low during late fall and winter. Humpback whales, when present, are unlikely to enter Humboldt Harbor or approach the City of Sand Point, but would instead transit through Popof Strait or feed in the deeper waters off the airport, between Popof and Unga islands (HDR 2017). Harassment from pile installation is possible in waters between Popof and Unga islands, including Popof Strait. Because we do not know exactly when construction might occur, we will use the updated summer density estimate (and our only density estimate) of 0.04 whales/km^2 to estimate exposure.

At a density of 0.04 whales/km^2, NMFS anticipates approximately 15.87 humpback whales (*i.e.,* 0.04 whales/km^2 * 24.42 km^2 30-inch vibratory harassment zone * 16.25 days) would be exposed to harassment on days when 30-inch vibratory driving would occur. Additionally, 16.33 whales (*i.e.,* 0.04 whales/km^2 * 17.19 km^2 24-inch vibratory harassment zone * 23.75 days) would be exposed to harassment on days in which 24-inch piles are driven for a total of 32 (32.2 rounded down) whale takes over 40 days.

A subset of the 32 humpback whales potentially exposed to harassment noise levels may enter the Level A harassment zone, which extends 1,426 meters assuming an optimal productivity of driving four 30-inch piles per day; 633 meters when driving two 24-inch dolphins; and 450 meters when driving four 24-inch fenders. NMFS has again added a 25 percent contingency and will assume 16.25 days of 30-inch impact pile driving, 2.5 days of 24-inch dolphin installation and 2.5 days of 24-inch fender installation. Note that when estimating Level A take, NMFS conservatively defaulted to the Level A isopleth and corresponding area associated with maximum number of piles that can driven each day for each pile size. We anticipate approximately 1.84 humpback whales (*e.g.,* 0.04 whales/km^2 * 2.84 km^2 Level A harassment zone * 16.25 days) would be exposed to Level A harassment during 30-inch impact pile driving; approximately 0.07 humpback whales (*e.g.,* 0.04 whales/km^2 * 0.67 km^2 Level A harassment zone * 2.5 days) would be exposed to Level A harassment during 24-inch dolphin installation; and approximately 0.04 humpback whales (*e.g.,* 0.04 whales/km^2 * 0.36 km^2 Level A harassment zone * 2.5 days) would be exposed to Level A harassment during 24-inch fender installation. Therefore, a total of 2 (1.95 rounded up) humpback whales could be exposed to Level A harassment. Therefore, NMFS is proposing 30 Level B and 2 Level A humpback whale takes.

Humpback whales found in the Shumagin Islands are predominantly members of the Hawaii DPS, which are not listed under the ESA. However, based on a comprehensive photo-identification study, members of both the Western North Pacific DPS (ESA-listed as endangered) and Mexico DPS (ESA-listed as threatened) are known to occur in the Gulf of Alaska and Aleutian Islands. Members of different DPSs are known to intermix on feeding grounds; therefore, all waters off the coast of Alaska should be considered to have ESA-listed humpback whales. According to Wade *et al.,* (2016), the probability of encountering a humpback whale from the Western North Pacific DPS in the Gulf of Alaska is 0.5 percent (CV [coefficient of variation] = 0.001). The probability of encountering a humpback whale from the Mexico DPS is 10.5 percent (CV = 0.16). The remaining 89 percent (CV = 0.01) of individuals in the Gulf of Alaska are likely members of the Hawaii DPS (Wade *et al.,* 2016). Therefore it is estimated that 28 humpback whales would be from the Hawaii DPS, three humpback whales would be from the threatened Mexico DPS, and 1 humpback whale would be from the endangered Western North Pacific DPS. Given the small number of anticipated Level A takes, NMFS will assume that both authorized Level A takes represent members of the Hawaii DPS.

Fin Whale

Vessel-based line-transect surveys of coastal waters between Resurrection Bay and the central Aleutian Islands were completed in July and August from 2001 to 2003. Large concentrations of fin whales were found in the Semidi Islands, located midway between the Shumagin Islands and Kodiak Island just south of the Alaska Peninsula. The abundance of fin whales in the Shumagin Islands ranged from a low estimate of 604 in 2003 to a high estimate of 1,113 in 2002. The estimated density of fin whales in the Shumagin Islands was 0.007 whales per km^2 and this is the density estimate assumed for the project area (Zerbini *et al.,* 2006). Fin whale density in the Shumagin Islands at other times of the year is unknown, and they are uncommon in Humboldt Harbor or Popof Strait (HDR 2017). At a density of 0.007 whales/km^2, NMFS anticipates approximately 2.77 fin whales (*i.e.,* 0.007 whales/km^2 * 24.42 km^2 30-inch vibratory harassment zone * 16.25 days) would be exposed to Level B harassment on days when 30-inch vibratory driving would occur. Additionally, 2.86 whales (*i.e.,* 0.007 whales/km^2 * 17.19 km^2 24-inch vibratory harassment zone * 23.75 days) would be exposed to Level B harassment on days in which 24-inch piles are driven for a total of 6 (5.63 rounded up) Level B takes of fin whales over 40 days. Therefore, NMFS is proposing 6 Level B fin whale takes. Fin whales are typically found in deep, offshore waters so no Level A take is proposed for this species.

Minke Whale

There are no population estimates for minke whales in Alaska; however, nearshore aerial surveys of the western Gulf of Alaska took place between 2001 and 2003. These surveys estimated the minke whale population in that area at approximately 1,233 individuals (Zerbini *et al.* 2006). Conservatively, minke whales could be exposed to construction-related noise levels year round. Surveys indicate a density of

0.001 minke whales per km^2 south of the Alaska Peninsula (including the Shumagin Islands). At a density of 0.001 whales/km^2, NMFS anticipates approximately 0.40 minke whales (*i.e.,* 0.001 whales/km^2 * 24.42 km^2 30-inch vibratory harassment zone * 16.25 days) would be exposed to Level B harassment on days when 30-inch vibratory driving would occur. Additionally, 0.41 whales (*i.e.,* 0.001 whales/km^2 * 17.19 km^2 24-inch vibratory harassment zone * 23.75 days) would be exposed to Level B harassment on days in which 24-inch piles are driven for a total of 1 (0.81 rounded up) level B take of minke whales over 40 construction days. With a pod size of two or three (NMFS 2015), NMFS proposes that three minke whales could be taken during the 40-day construction period. No Level A take is proposed for minke whales due to low abundance near the project area.

Gray Whale

Gray whales could potentially migrate through the area between March through May and November through January. Gray whale presence near Sand Point and in Humboldt Harbor is rare and unlikely to occur during the construction period. As such, exposure of gray whales to noise from impact hammer pile installation is unlikely, as they are not expected to occur within the 1,426 meter harassment zone. Harassment from vibratory pile installation is possible in the deeper water north of Popof Strait. Because there are no density estimates for the area and the rarity of gray whales within the project area, NMFS conservatively estimates that gray whales will not be observed more than one time during the construction period. Multiplying the one potential observation by the average pod size of 2.4 (Rugh *et al.,* 2005), NMFS estimates that two gray whales could be exposed to construction-related noise at the Level B harassment level over the course of the construction period. No Level A take is proposed for gray whales.

Steller Sea Lion

The number of unique individuals used to calculate take was based on information reported by the nearby seafood processing facility. It is estimated that about 12 unique individual sea lions likely occur in Humboldt Harbor each day during the pollock fishing seasons (HDR 2017). It is assumed that Steller sea lions may be present every day, and also that take will include multiple harassments of the same individual(s) both within and among days. It is also assumed that 12 unique individual sea lions occur in Humboldt Harbor each day and could potentially be exposed to Level B harassment over 40 days of construction. Given that the project area is located within the aquatic zones (*i.e.,* designated critical habitat) of two designated major haulouts (Sea Lion Rocks and The Whaleback), sea lions could commonly enter into the Level B ensonified zone outside of the Humboldt Harbor. As such, it assumed that an additional 12 animals per day may occur in the Level B harassment zone outside of Humboldt Harbor. Total exposures is calculated using the following equation:

24 sea lions per day * 40 days of exposure = 960 potential exposures

No Level A take is proposed for Steller sea lions since the Level A isopleths are smaller than the 100 meter shutdown zone.

Harbor Seal

Anecdotal observations indicate that harbor seals are uncommon in Humboldt Harbor proper (HDR 2017). However, they are expected to occur occasionally in the project area. The Kodiak Ferry Terminal and Dock Improvements Project on Kodiak Island recorded 13 single sightings of harbor seals during 110 days of monitoring. Although the harbor seal stock is different at Kodiak (South Kodiak stock) and the project sites are somewhat dissimilar, NMFS used this information to conservatively estimate that one harbor seal could be present near Sand Point on any given day. An aerial haulout survey in 2011 estimated that 15 harbor seals occupy the survey unit along the south coast of Popof Island (London *et al.,* 2015) and anecdotal observations indicate that harbor seals are known to occur intermittently near the airport (HDR 2017). NMFS conservatively estimates that one animal per day will be observed near the harbor while another animal will occur near the airport or elsewhere within an ensonified zone. Therefore, NMFS proposes that up to two harbor seals may be taken each day during the 40-day pile installation period for a total of 80 authorized takes.

During impact installation of 30-inch piles, the Level A harassment isopleth for harbor seals extends out to a maximum distance of 763 meters on days when four piles are driven; out to 339 meters when two 24-inch dolphins are installed on the same day; and out to 241 meters when four fenders are installed on a single day. Harbor seals often act curious toward on-shore activities and are known to approach humans, lifting their heads from the water to look around. Given that harbor seals are likely to be found in the near-shore environment, we are proposing limited Level A take since the impact pile driving injury zones can extend well beyond the 100 meter shutdown zone. We anticipate that up to one-third of harbor seal takes would be by Level A harassment resulting in 27 Level A and 53 Level B proposed takes of harbor seals.

Proposed 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. NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully balance two primary factors: (1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat which considers the nature of the potential adverse impact being mitigated (likelihood, scope, range), as well as the likelihood that the measure will be effective if implemented; and the likelihood of effective implementation, and; (2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

In addition to the measures described later in this section, ADOT&PF will employ the following standard mitigation measures:

(a) Conduct briefings between construction supervisors and crews, and marine mammal monitoring team, prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures, and;

(b) For in-water heavy machinery work other than pile driving (*e.g.,* standard barges, tug boats), if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions. This type of work could include the following activities: (1) Movement of the barge to the pile location; or (2) positioning of the pile on the substrate via a crane (*i.e.,* stabbing the pile).

(c) Work may only occur during daylight hours, when visual monitoring of marine mammals can be conducted.

The following measures would apply to ADOT&PFs mitigation requirements:

Establishment of Shutdown Zone—For all pile driving activities, ADOT&PF will establish a shutdown zone. The purpose of a shutdown zone is generally to define an area within which shutdown of activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). In this case, shutdown zones are intended to contain areas in which SPLs equal or exceed acoustic injury criteria for some authorized species, based on NMFS' new acoustic technical guidance published in the **Federal Register** on August 4, 2016 (81 FR 51693). The shutdown zones vary for specific species. A conservative shutdown zone of 100 meters will be monitored during all pile driving activities to prevent Level A exposure to most species. During vibratory installation of piles of all sizes and impact installation of 24-inch piles, piles under 24 inches, and H-piles, a 100-meter shutdown zone would prevent Level A take to marine mammals. A 100-meter shutdown zone would also be sufficient to prevent Level A take of mid-frequency cetaceans and otariid pinnipeds (*i.e.,* Steller sea lions) during impact installation of 30-inch and 24-inch piles. Note that Level A take is not proposed for the low-frequency species of fin whale, gray whale and minke whale, mid-frequency killer whale and high-frequency Dall's porpoise since estimated take numbers are low. In the unlikely occurrence that animals of these species are observed approaching their respective Level A zones, pile driving operations will shut down.

Establishment of Level A Take Zone—ADOT&PF will establish Level A take zones which are areas beyond the shutdown zones where animals may be exposed to sound levels that could result in PTS. During impact installation of 30-inch and 24-inch piles, a 100-meter shutdown zone would not be sufficient to prevent Level A take of low-frequency cetaceans (*i.e.,* humpback whales), high-frequency cetaceans (*i.e.,* harbor porpoises), or phocid pinnipeds (*i.e.,* harbor seals). For this reason, Level A take for small numbers of humpback whales, harbor porpoises, and harbor seals is proposed.

To account for potential variations in daily productivity during impact installation, isopleths were calculated for different numbers of piles that could be installed each day. Therefore, should the contractor expect to install fewer piles in a day than the maximum anticipated, a smaller Level A shutdown zone reflecting the number of piles driven would be required to avoid take. Furthermore, if the first pile is driven and no marine mammals have been observed within the radius of corresponding Level A zone, then the Level A radius for the next pile shall be decreased to next largest Level A radius. This pattern shall continue unless an animal is observed within the most recent shutdown zone radius, at which that specific shutdown radius shall remain in effect for the rest of the workday. Additionally, if piles of different sizes are installed in a single day, the size of the monitored Level A zone for all installed piles will default to the isopleth corresponding to the largest pile being driven that day. Level A zones will be rounded up to the nearest 10 m and are depicted in Table 9.

TABLE 9—LEVEL A ZONE ISOPLETHS DURING IMPACT DRIVING

Activity	Piles installed per day	Isopleths (m)		
		LF (Humpback whales)	HF (Harbor porpoises)	PW (Harbor seals)
Impact Installation 30″	4	1,430 (1,426)	1,700 (1,699)	770 (763)
	3	1,180 (1,177)	1,410 (1,402)	630 (630)
	2	900 (898)	1,070 (1,070)	490 (481)
	1	570 (566)	680 (674)	310 (303)
Impact Installation 24″ Dolphin	2	640 (633)	760 (754)	340 (339)
	1	400 (399)	480 (475)	220 (213)
Impact Installation 24″ Fender	4	450 (450)	540 (537)	250 (241)
	3	380 (372)	450 (443)	200 (199)
	2	290 (284)	340 (338)	160 (152)
	1	180 (178)	220 (213)	100 (96)

Establishment of Disturbance Zones—ADOT&PF will establish Level B disturbance zones or zones of influence (ZOI) which are areas where SPLs equal or exceed 160 dB rms for impact driving and 120 dB rms during vibratory driving. Disturbance zones provide utility for monitoring by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables observers to be aware of and communicate the presence of marine mammals in the project area but outside the shutdown zone and thus prepare for potential shutdowns of activity. The Level B zone isopleths will be rounded up to the nearest 10 m and are depicted in Table 10.

TABLE 10—LEVEL B ZONE ISOPLETHS DURING IMPACT AND VIBRATORY DRIVING

Activity	Level B harassment zone (meters) (based on practical spreading loss model)
	Cetaceans and Pinnipeds (120 dB)
Vibratory Installation 30″	10,970 (10,964)
Vibratory Installation 24″ Dolphin	5,420 (5,412)
Vibratory Installation 24″ Fender	5,420 (5,412)
Vibratory Installation and/or removal <24″ or H-piles	5,420 (5,412)
Activity	Cetaceans and Pinnipeds (160 dB)
Impact Installation 30″	1,740 (1,738)
Impact Installation 24″ Dolphin	1,740 (1,738)
Impact Installation 24″ Fender	1,740 (1,738)

Soft Start—The use of a soft-start procedure is believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. For impact pile driving, contractors will be required to provide an initial set of strikes from the hammer at 40 percent energy, each strike followed by no less than a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins. Soft Start is not required during vibratory pile driving and removal activities.

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 cannot proceed until the animal has left the zone or has not been observed for 30 minutes (for cetaceans) and 15 minutes (for pinnipeds). 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.

Sound Attenuation Devices—During impact pile driving, contractors will be required to use pile caps. Pile caps reduce the sound generated by the pile, although the level of reduction can vary.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, NMFS has preliminarily determined that the proposed mitigation measures provide the means effecting the least practicable adverse impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Proposed 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 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. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the action area (*e.g.,* presence, abundance, distribution, density).
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) Action or environment (*e.g.,* source characterization, propagation, ambient noise); (2) affected species (*e.g.,* life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.,* age, calving or feeding areas).
- Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors.
- How anticipated responses to stressors impact either: (1) Long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks.
- Effects on marine mammal habitat (*e.g.,* marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat).
- Mitigation and monitoring effectiveness.

Visual Marine Mammal Observation

Monitoring will be conducted by qualified marine mammal observers (MMOs), who are trained biologists, with the following minimum qualifications:

- Independent observers (*i.e.,* not construction personnel) are required;
- At least one observer must have prior experience working as an observer;
- Other observers may substitute education (undergraduate degree in biological science or related field) or training for experience;
- Ability to conduct field observations and collect data according to assigned protocols.
- Experience or training in the field identification of marine mammals, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior;
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary; and
- NMFS will require submission and approval of observer CVs.

In order to effectively monitor the pile driving monitoring zones, two MMOs will be positioned at the best practical vantage point(s). The monitoring position may vary based on pile driving activities and the locations of the piles and driving equipment. The monitoring location(s) will be identified with the following characteristics: (1) Unobstructed view of pile being driven; (2) Unobstructed view of all water within the Level A (if applicable) and Level B harassment zones for pile being driven, although it is understood that monitoring may be impaired at longer distances; and (3) Safe distance from pile driving activities in the construction area. If necessary, observations may occur from two locations simultaneously. Potential observation locations include the existing City Dock, the airport, the fish processing facility, or the quarry hillside located south of the project site.

Observers will be on site and actively observing the shutdown and disturbance zones during all pile driving and extraction activities. Observers will use their naked eye with the aid of binoculars, big-eye binoculars and a spotting scope to search continuously for marine mammals during all pile driving and extraction activities.

The following additional measures apply to visual monitoring:

- If waters exceed a sea-state which restricts the observers' ability to make observations within 100 m of the pile driving activity (*e.g.,* excessive wind or fog), pile installation and removal will cease. Pile driving will not be initiated until the entire shutdown zone is visible.
- If a marine mammal authorized for Level A take is present within the Level A harassment zone, a Level A take would be recorded. If Level A take reaches the authorized limit, then pile installation would be stopped as these species approach the Level A harassment area to avoid additional take of these species.
- If a marine mammal authorized for Level B take is present in the Level B harassment zone, pile driving activities or soft-start may begin and a Level B take would be recorded. Pile driving activities may occur when these species are in the Level B harassment zone, whether they entered the Level B zone from the Level A zone (if relevant), shutdown zone or from outside the project area. If Level B take reaches the authorized limit, then pile installation would be stopped as these species approach to avoid additional take of these species.
- If a marine mammal is present in the Level B harassment zone, pile driving activities may be delayed to avoid a Level B take of an authorized species. Pile driving activities or soft-start would then begin only after the MMO has determined, through sighting, that the animal(s) has moved outside the Level B harassment zone or if it has not been seen in the Level B zone for 30 minutes (for cetaceans) and 15 minutes (for pinnipeds).
- If any marine mammal species not authorized for take are encountered during activities and are likely to be exposed to Level B harassment, then ADOT&PF must stop pile driving activities and report observations to NMFS' Office of Protected Resources;
- When a marine mammal is observed, its location will be determined using a rangefinder to verify distance and a GPS or compass to verify heading.
- The MMOs will record any authorized cetacean or pinniped present in the relevant injury zone. The Level A zones are shown in Table 9.
- The MMOs will record any authorized cetacean or pinniped present in the relevant disturbance zone. The Level B zones are shown in Table 10.
- Ongoing in-water pile installation may be continued during periods when conditions such as low light, darkness, high sea state, fog, ice, rain, glare, or other conditions prevent effective marine mammal monitoring of the entire Level B harassment zone. MMOs would continue to monitor the visible portion of the Level B harassment zone throughout the duration of driving activities.
- At the end of the pile driving day, post-construction monitoring shall be conducted for 30 minutes beyond the cessation of pile driving;

Data Collection

Observers are required to use approved data forms. Among other pieces of information, ADOT&PF will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any. In addition, the ADOT&PF will attempt to distinguish between the number of individual animals taken and the number of incidents of take. At a minimum, the following information will be collected on the sighting forms:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- Detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any;
- Weather parameters (*e.g.,* percent cover, visibility);
- Water conditions (*e.g.,* sea state, tide state);
- Species, numbers, and, if possible, sex and age class of marine mammals;
- Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;
- Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;
- Locations of all marine mammal observations; and
- Other human activity in the area.

Reporting

ADOT&PF will notify NMFS prior to the initiation of the pile driving activities and will provide NMFS with a draft monitoring report within 90 days of the conclusion of the construction work. This report will detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed, including the total number extrapolated from observed animals across the entirety of relevant monitoring zones. If no comments are received from NMFS within 30 days of submission of the draft final report, the draft final report will constitute the final report. If comments are received, a final report must be submitted within 30 days after receipt of comments.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact 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'' (50 CFR 216.103). 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 takes, alone, is not enough information on which to base an impact determination. In addition to considering the authorized number of marine mammals that might be ''taken'' through harassment, NMFS considers 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, etc.), as well as effects on habitat, the status of the affected stocks, and the likely effectiveness of the mitigation. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into these analyses via their impacts on the environmental baseline (*e.g.,* as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, the discussion of our analyses applies to all the species listed in Table 3. There is little information about the nature of severity of the impacts or the size, status, or structure of any species or stock that would lead to a different analysis for this activity.

Pile driving and extraction activities associated with the Sand Point City Dock Replacement Project, as outlined previously, have the potential to injure, disturb or displace marine mammals. Specifically, Level A harassment (injury) in the form of PTS may occur to a limited numbers of three marine mammal species while a total of nine species could experience Level B harassment (behavioral disturbance). Potential takes could occur if individuals of these species are present in Level A or Level B ensonified zones when pile driving or removal is under way.

No mortality is anticipated to result from this activity. Limited take of three species of marine mammal by Level A harassment (injury) is authorized due to potential auditory injury (PTS) that cannot reasonably be prevented through mitigation. The marine mammals authorized for Level A take (27 harbor seals, 16 harbor porpoises, and 2 humpback whales) are estimated to experience PTS if they remain within the outer limits of a Level A harassment zone during the entire time that impact pile driving would occur during a single day. Marine mammal species, however, are known to avoid areas where noise levels are high (Richardson *et al.,*1995). Animals would likely move away from the sound source and exit the Level A zone. Because of the proximity to the source in which the animals would have to approach, and the longer time in which they would need to remain in a farther proximity from the sound source within a Level A zone, we believe the likelihood of marine mammals experiencing PTS is low but acknowledge it could occur. Although NMFS is authorizing limited take by PTS, the anticipated takes reflect the onset of PTS, which would be relatively mild, rather than severe PTS which would be expected to have more impact on an animal's overall fitness.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.,* Thorson and Reyff 2006; Lerma 2014). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. In response to vibratory driving, pinnipeds (which may become somewhat habituated to human activity in industrial or urban waterways) have been observed to orient towards and sometimes move towards the sound. The pile driving and extraction activities analyzed here are similar to, or less impactful than, numerous construction activities conducted in similar locations in Alaska, which have taken place with no reported serious injuries or mortality to marine mammals, and no known long-term adverse consequences from behavioral harassment. Repeated exposures of individuals to levels of sound that may cause Level B harassment are unlikely to result in hearing impairment or to significantly disrupt foraging behavior. Thus, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in fitness for the affected individuals, and would not result in any adverse impact to the stock as a whole.

ADOT&PF's proposed activities are localized and of relatively short duration. The entire project area is limited to the Sand Point dock area and its immediate surroundings. Specifically, the use of impact driving will be limited to approximately 22 hours over the course of up to 40 days of construction. Total vibratory pile driving time is estimated at approximately 85 hours over the same period. While impact driving does have the potential to cause injury to marine mammals, mitigation in the form of a 100 m shutdown zone should limit exposure to potentially injurious sound.

The project is not expected to have significant adverse effects on marine mammal habitat. No important marine mammal reproductive areas, such as rookeries, are known to exist within the ensonified areas. The proposed project is located within the aquatic zones (*i.e.,* designated critical habitat) of two major Steller sea lion haul outs, and the Level B underwater harassment zone associated with the proposed project overlaps with a third. The closest major haulout is approximately 27 km distant. The project activities are limited in time and would not modify existing marine mammal habitat. EFH near the project area has been designated for a number of species. While the activities may cause some fish to leave the area of disturbance, temporarily impacting marine mammals' foraging opportunities, this would encompass a relatively small area of habitat leaving large areas of existing fish and marine mammal foraging habitat unaffected. As such, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

In summary, this negligible impact analysis is founded on the following factors: (1) The possibility of serious injury or mortality to authorized species may reasonably be considered discountable; (2) the likelihood that PTS could occur in a limited number of animals is low, but acknowledged; (3) the anticipated incidences of Level B harassment consist of, at worst, temporary modifications in behavior or potential TTS; (4) the limited temporal and spatial impacts on marine mammals or their habitat; (5) the absence of any major haul outs or rookeries near the project area; and (6) the presumed efficacy of the planned mitigation measures in reducing the effects of the specified activity to the level of effecting the least practicable impact upon the affected species. 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 individuals. 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 planned monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from ADOT&PF's Sand Point City Dock Replacement Project will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, NMFS compares the number of individuals taken to the most appropriate estimation of the relevant species or stock size in our determination of whether an authorization is limited to small numbers of marine mammals.

Table 11 presents the number of animals that could be exposed to received noise levels that could cause Level A and Level B harassment for the proposed work at the Sand Point Dock Replacement Project. Our analysis shows that between <0.01 percent and 3.07 percent of the populations of affected stocks could be taken by harassment. Therefore, the numbers of animals authorized to be taken for all species would be considered small relative to the relevant stocks or populations even if each estimated taking occurred to a new individual—an extremely unlikely scenario. For pinnipeds, especially Steller sea lions, occurring in the vicinity of the project site, there will almost certainly be some overlap in individuals present day-to-day, and these takes are likely to occur only within some small portion of the overall regional stock.

TABLE 11—SUMMARY OF THE ESTIMATED NUMBERS OF MARINE MAMMALS POTENTIALLY EXPOSED TO LEVEL A AND LEVEL B HARASSMENT NOISE LEVELS

Species (DPS/stock)	Estimated number of individuals potentially exposed to the Level A harassment threshold	Estimated number of individuals potentially exposed to the Level B harassment threshold	DPS/stock abundance (DPS/stock)	Percent of population exposed to Level A or Level B thresholds
Steller sea lion (wDPS)	0	960	50,983	1.88.
Harbor seal (Cook Inlet/Shelikof Strait)	27	53	27,386	0.29.
Harbor porpoise (Gulf of Alaska)	16	33	31,046	0.16.
Dall's porpoise (Alaska)	0	4	83,400	<0.01.
Killer whale (Gulf of Alaska, Aleutian Islands, and Bering Sea transient or Alaska resident).	0	18	587 (transient) 2,347 (resident)	3.07 (transient). 0.76 (resident).
Humpback whale [1] (Central North Pacific)	2	30	10,103	0.32.
Fin whale (Northeast Pacific)	0	6	1,368 [2]	0.44.
Gray whale (Eastern North Pacific)	0	2	20,990	<0.01.
Minke whale (Alaska)	0	3	2,020 [3]	<0.01.
Total	66	590	N/A	N/A.

[1] The Hawaii DPS is estimated to account for approximately 89 percent of all humpback whales in the Gulf of Alaska, whereas the Mexico and Western North Pacific DPSs account for approximately 10.5 percent and 0.5 percent, respectively (Wade *et al.* 2016; NMFS 2016). Therefore, an estimated 28 animals from Hawaii DPS; 3 from Mexico DPS: And 1 from Western North Pacific DPS.

[2] Based on 2010 survey of animals north and west of Kenai Peninsula in U.S. waters and is likely an underestimate (Muto *et al.* 2016b).

[3] Based on 2010 survey on Eastern Bering Sea shelf. Considered provisional and not representative of abundance of entire stock (Muto *et al.* 2016a).

N/A: Not Applicable.

Based on the analysis contained herein of the proposed activity (including the proposed mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the population size of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. The proposed project is not known to occur in a subsistence hunting area. It is a developed area with regular marine vessel traffic. Additionally, ADOT&PF has spoken with local officials about concerns regarding impacts to subsistence uses and none were expressed. Therefore, NMFS has preliminarily determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

Issuance of an MMPA authorization requires compliance with the ESA. There are DPSs of two marine mammal species that are listed as endangered under the ESA with confirmed or possible occurrence in the study area: The WNP DPS and Mexico DPS of humpback whale and the western DPS of Steller sea lion. NMFS will initiate formal consultation under Section 7 of the ESA with NMFS Alaska Regional Office. NMFS will issue a Biological Opinion that will analyze the effects to ESA listed species as well as critical habitat. The ESA consultation will conclude prior to reaching a determination regarding the proposed issuance of the authorization.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to ADOT&PF for conducting pile driving and extraction activities associated with the reconstruction of the city dock in Sand Point, Alaska provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

1. This Authorization is valid from August 1, 2018, through July 31, 2019.

2. This Authorization is valid only for activities associated with in-water construction work at the Sand Point City Dock Replacement Project in Sand Point, Alaska.

3. General Conditions

(a) A copy of this IHA must be in the possession of ADOT&PF, its designees, and work crew personnel operating under the authority of this IHA.

(b) The species and number of animals authorized for taking by Level A and Level B harassment are shown in Table 11 and include: Harbor seal (*Phoca vitulina*), Steller sea lion (*Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise

(*Phocoenoides dalli*), killer whale (*Orcinus orca*), gray whale (*Eschrichtius robustus*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus)* and minke whale (*Balaenoptera acutorostrata*).

(c) ADOT&PF shall conduct briefings between construction supervisors and crews and the marine mammal monitoring team prior to the start of all pile driving activity.

(d) For in-water heavy machinery work other than pile driving (*e.g.,* standard barges, tug boats, barge-mounted excavators), if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions.

(e) In-water construction work shall occur only during daylight hours.

4. Prohibitions

(a) The taking, by incidental harassment only, is limited to the species listed under condition 3(b) above and by the numbers listed in Table 11 of this notice. The taking by death of these species or the taking by harassment, injury or death of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this Authorization.

5. Mitigation Measures

The holder of this Authorization is required to implement the following mitigation measures.

(a) Shutdown Measures.

(i) ADOT&PF shall implement shutdown measures if a marine mammal is detected within or approaching the specified 100 m shutdown zone.

(ii) Shutdown shall occur if low-frequency cetaceans (*i.e.* fin whale, gray whale, minke whale), mid-frequency cetaceans (*i.e.* killer whale), or high-frequency cetaceans (Dall's porpoise) approach relevant Level A take isopleths since Level A take of these species is not authorized.

(ii) ADOT&PF shall implement shutdown measures if the number of any allotted marine mammal takes reaches the limit under the IHA and if such marine mammals are sighted within the vicinity of the project area and are approaching their respective Level A or Level B harassment zone.

(b) ADOT&PF shall establish Level A harassment zones as shown in Table 9.

(i) For impact pile driving, the Level A harassment zone defaults to the isopleth corresponding to the number of piles planned for installation on a given day as shown in Table 9.

(ii) After the first pile is driven, if no marine mammals have been observed within the radius of the corresponding Level A zone, then the Level A radius for the next pile shall be decreased to the next largest Level A radius. This pattern shall continue unless an animal is observed within the most recent shutdown zone radius, at which that specific shutdown radius shall remain in effect for the rest of the workday.

(ii) If piles of varying sizes are installed in a single day, the radius of the Level A zone shall default to the isopleth for the largest pile being driven on that workday.

(b) ADOT&PF shall establish Level B harassment zones for impact and vibratory driving as shown in Table 10.

(c) Soft Start.

(i) When there has been downtime of 30 minutes or more without impact pile driving, the contractor shall initiate the driving with ramp-up procedures described below.

(ii) Soft start for impact hammers requires contractors to provide an initial set of strikes from the impact hammer at 40 percent energy, followed by no less than a 30-second waiting period. This procedure shall be conducted a total of three times before impact pile driving begins.

(d) Pre-Activity Monitoring.

(i) 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(s) shall observe the shutdown and monitoring zones for a period of 30 minutes.

(ii) The shutdown zone shall be cleared when a marine mammal has not been observed within that zone for that 30-minute period.

(iii) If a marine mammal is observed within the shutdown zone, a soft-start can proceed if the animal is observed leaving the zone or has not been observed for 30 minutes (for cetaceans) or 15 minutes (for pinnipeds), even if visibility of Level B zone is impaired.

(iv) If the Level B zone is not visible while work continues, exposures shall be recorded at the estimated exposure rate for each permitted species.

(e) Pile caps shall be used during all impact driving.

6. Monitoring

(a) Monitoring shall be conducted by qualified marine mammal observers (MMOs), with minimum qualifications as described previously in the *Monitoring and Reporting* section.

(b) Two observers shall be on site and actively observing the shutdown and disturbance zones during all pile driving and extraction activities.

(c) Observers shall use their naked eye with the aid of binoculars, big-eye binoculars and a spotting scope during all pile driving and extraction activities.

(d) Monitoring location(s) shall be identified with the following characteristics:

(i) Unobstructed view of pile being driven;

(ii) Unobstructed view of all water within the Level A (if applicable) and Level B harassment zones for pile being driven.

(f) If waters exceed a sea-state which restricts the observers' ability to make observations within the marine mammal shutdown zone of 100 m (*e.g.,* excessive wind or fog), pile installation and removal shall cease. Pile driving shall not be initiated until the entire shutdown zone is visible.

(g) If a marine mammal authorized for Level A take is present within the Level A harassment zone, a Level A take would be recorded. If Level A take reaches the authorized limit, then pile installation would be stopped as these species approach the Level A harassment area to avoid additional take of these species.

(h) If a marine mammal authorized for Level B take is present in the Level B harassment zone, pile driving activities or soft-start may begin and a Level B take would be recorded. If Level B take reaches the authorized limit, then pile installation would be stopped as these species approach to avoid additional take of these species.

(i) Marine mammal location shall be determined using a rangefinder and a GPS or compass.

(j) Ongoing in-water pile installation may be continued during periods when conditions such as low light, darkness, high sea state, fog, ice, rain, glare, or other conditions prevent effective marine mammal monitoring of the entire Level B harassment zone. MMOs would continue to monitor the visible portion of the Level B harassment zone throughout the duration of driving activities.

(k) Post-construction monitoring shall be conducted for 30 minutes beyond the cessation of pile driving at end of day.

7. Reporting

The holder of this Authorization is required to:

(a) Submit a draft report on all monitoring conducted under the IHA within ninety calendar days of the completion of marine mammal and acoustic monitoring. This report shall detail the monitoring protocol, summarize the data recorded during monitoring, and estimate the number of marine mammals that may have been harassed, including the total number extrapolated from observed animals across the entirety of relevant monitoring zones. A final report shall be prepared and submitted within thirty days following resolution of comments on the draft report from NMFS. This report must contain the following:

(i) Date and time that monitored activity begins or ends;

(ii) Construction activities occurring during each observation period;

(iii) Record of implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any;

(iv) Weather parameters (*e.g.,* percent cover, visibility);

(v) Water conditions (*e.g.,* sea state, tide state);

(vi) Species, numbers, and, if possible, sex and age class of marine mammals;

(vii) Description of any observable marine mammal behavior patterns,

(viii) Distance from pile driving activities to marine mammals and distance from the marine mammals to the observation point;

(ix) Locations of all marine mammal observations; and

(x) Other human activity in the area.

(b) Reporting injured or dead marine mammals:

(i) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by this IHA, such as an injury (Level A harassment), serious injury, or mortality, ADOT&PF shall immediately cease the specified activities and report the incident to the Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinator, NMFS. The report must include the following information:

1. Time, date, and location (latitude/longitude) of the incident;

2. Name and type of vessel involved;

3. Vessel's speed during and leading up to the incident;

4. Description of the incident;

5. Water depth;

6. Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, and visibility);

7. Description of all marine mammal observations and active sound source use in the 24 hours preceding the incident;

8. Species identification or description of the animal(s) involved;

9. Fate of the animal(s); and

10. Photographs or video footage of the animal(s).

ADOT&PF may not resume their activities until notified by NMFS.

(ii) In the event that ADOT&PF discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition), ADOT&PF shall immediately report the incident to the Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinator, NMFS. The report must include the same information identified in 6(b)(i) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS shall work with ADOT&PF to determine whether additional mitigation measures or modifications to the activities are appropriate.

(iii) In the event that ADOT&PF discovers an injured or dead marine mammal, and the lead observer determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), ADOT&PF shall report the incident to the Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinator, NMFS, within 24 hours of the discovery. ADOT&PF shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS.

7. This Authorization may be modified, suspended or withdrawn if the holder fails to abide by the conditions prescribed herein, or if NMFS determines the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

Request for Public Comments

We request comment on our analyses, the draft authorization, and any other aspect of this Notice of Proposed IHA for ADOT&PF's Sand Point City Dock Replacement Project. Please include with your comments any supporting data or literature citations to help inform our final decision on the request for MMPA authorization.

Dated: June 30, 2017.

Donna S. Wieting,

Director, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. 2017–14157 Filed 7–5–17; 8:45 am]

BILLING CODE 3510–22–P