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Sarah Brabson,

NOAA PRA Clearance Officer.

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XE251

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to a Test Pile Program

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 a request from the Municipality of Anchorage (MOA), through its Port of Anchorage (POA) department, for authorization to take marine mammals incidental to implementation of a Test Pile Program, including geotechnical characterization of pile driving sites, near its existing facility in Anchorage, Alaska. The POA requests that the IHA be valid for 1 year from April 1, 2016, through March 31, 2017. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to POA to incidentally take marine mammals, by Level B Harassment only, during the specified activity.

DATES: Comments and information must be received no later than January 15, 2016.

ADDRESSES: Comments on the application 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 *http://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: Robert Pauline, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Availability

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

Background

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

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

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

Summary of Request

On February 15, 2015, NMFS received an application from POA for the taking of marine mammals incidental to conducting a Test Pile Program as part of the Anchorage Port Modernization Project (APMP). POA submitted a revised application on November 23, 2015. NMFS determined that the application was adequate and complete on November 30, 2015. POA proposes to install a total of 10 test piles as part of a Test Pile Program to support the design of the Anchorage Port Modernization Project (APMP) in Anchorage, Alaska. The Test Pile Program will also be integrated with a hydroacoustic monitoring program to obtain data that can be used to evaluate potential environmental impacts and meet permit requirements. All pile driving is expected to be completed by July 1, 2016. However, to accommodate unexpected project delays and other unforeseeable circumstances, the requested and proposed IHA period for the Test Pile Program is for the 1-year period from April 1, 2016, to March 31, 2017. Subsequent incidental take authorizations will be required to cover pile driving under actual construction associated with the APMP. Construction is anticipated to last five years.

The use of vibratory and impact pile driving is expected to produce underwater sound at levels that have the potential to result in behavioral harassment of marine mammals. Species with the expected potential to be present during the project timeframe include harbor seals (*Phoca vitulina*), Cook Inlet beluga whales (*Delphinapterus leucas*), and harbor porpoises (*Phocoena phocoena*). Species that may be encountered infrequently or rarely within the project area are killer whales (*Orcinus orca*) and Steller sea lions (*Eumetopias jubatus*).

Description of the Specified Activity

Overview

The POA is modernizing its facilities through the APMP. Located within the MOA on Knik Arm in upper Cook Inlet (See Figure 1–1 in the Application), the existing 129-acre Port facility is currently operating at or above sustainable practicable capacity for the various types of cargo handled at the facility. The existing infrastructure and support facilities were largely constructed in the 1960s. They are substantially past their design life, have degraded to levels of marginal safety, and are in many cases functionally obsolete, especially in regards to seismic design criteria and condition. The APMP will include construction of new pile-supported wharves and trestles to the south and west of the existing terminals, with a planned design life of 75 years.

An initial step in the APMP is implementation of a Test Pile Program, the proposed action for this IHA application. The POA proposes to install a total of 10 test piles at the POA as part of a Test Pile Program to support the design of the APMP. The Test Pile Program will also be integrated with a hydroacoustic monitoring program to obtain data that can be used to evaluate potential environmental impacts and meet permit requirements. Proposed activities included as part of the Test Pile Program with potential to affect marine mammals within the waterways adjacent to the POA include vibratory and impact pile-driving operations in the project area.

Dates and Duration

In-water work associated with the APMP Test Pile Program will begin no sooner than April 1, 2016, and will be completed no later than March 31, 2017 (1 year following IHA issuance), but is expected to be completed by July 1, 2016. Pile driving is expected to take place over 25 days and include 5 hours of vibratory driving and 17 hours of impact driving as is shown in Table 1. A 25 percent contingency has been added to account for delays due to weather or marine mammal shutdowns resulting in an estimated 6 hours of vibratory driving and 21 hours of impact driving over 31 days of installation. Restriking of some of the piles will occur two to three weeks following installation. Approximately 25 percent of pile driving will be conducted via vibratory installation, while the remaining 75 percent of pile driving will be conducted with impact hammers. Although each indicator pile test can be conducted in less than 2 hours, mobilization and setup of the barge at the test site will require 1 to 2 days per location and could be longer depending on terminal use. Additional time will be required for installation of sound attenuation measures, and for subsequent noise-mitigation monitoring. Hydroacoustic monitoring and installation of resonance-based systems or bubble curtains will likely increase the time required to install specific indicator pile from a few hours to a day or more.

Within any day, the number of hours of pile driving will vary, but will generally be low. The number of hours required to set a pile initially using vibratory methods is about 30 minutes per pile, and the number of hours of impact driving per pile is about 1.5 hours. Vibratory driving for each test pile will occur on ten separate days. Impact driving could occur on any of the 31 days depending on a number of factors including weather delays and unanticipated scheduling issues. On some days, pile driving may occur only for an hour or less as bubble curtains and the containment frames are set up and implemented, resonance-based systems are installed, hydrophones are placed, pipe segments are welded, and other logistical requirements are handled.

TABLE 1—CONCEPTUAL PROJECT SCHEDULE FOR TEST PILE DRIVING, INCLUDING ESTIMATED NUMBER OF HOURS AND DAYS FOR PILE DRIVING

Month	Pile type	Pile diameter	Number of piles	Number of hours, vibratory driving	Number of hours, impact driving	Number of days of pile driving	Number of days of restrikes	Total number of days of pile driving
April–July 2016	Steel pipe	48″ OD	10	5	17	21	4	25
				+ 25% contingency =				
				6	21	26	5	31

Notes: OD—outside diameter.

Specified Geographic Region

The Municipality of Anchorage (MOA) is located in the lower reaches of Knik Arm of upper Cook Inlet. The POA sits in the industrial waterfront of Anchorage, just south of Cairn Point and north of Ship Creek (Latitude 61°15′ N., Longitude 149°52′ W.; Seward Meridian). Knik Arm and Turnagain Arm are the two branches of upper Cook Inlet, and Anchorage is located where the two Arms join (Figure 2–1 in the Application).

Detailed Description of Activities

Pile Driving Operations

The POA will drive ten 48-inch steel pipe indicator piles as part of the Test Pile Program. Installation of the piles will involve driving each pile with a combination of a vibratory hammer and an impact hammer, or with only an impact pile hammer. It is estimated that vibratory installation of each pile will require approximately 30 minutes. For impact pile driving, pile installation is estimated to require between 80 to 100 minutes per pile, requiring 3,200 to 4,375 pile strikes. Pile driving will be halted during installation of each pile as additional pile sections are added. These shutdown periods will range from a few hours to a day in length to accommodate welding and inspections.

During the Test Pile Program, the contractor is expected to mobilize cranes, tugs, and floating barges, including one derrick barge up to 70 feet wide x 200 feet long. These barges will be moved into location with a tugboat. The barge will not be grounded at any time, but rather anchored in position using a combination of anchor lines and spuds (two to four, depending on the barge). Cranes will be used to conduct overwater work from barges, which are anticipated to remain on-site for the duration of the Test Pile Program.

Indicator pile-load testing involves monitoring installation of prototype piles as they are driven into the ground. Ten 48-inch piles will be driven for this test. The objective of the indicator pile tests is to obtain representative pile installation and capacity data near the area of the future pier-head line. The indicator piles will be vibrated and impact-driven to depths of 175 feet or more from a large derrick barge.

Indicator piles will be driven adjacent to or shoreward of the existing wharf face. The selected locations (Figure 1–3 in the Application) provide representative driving conditions, and enable hydroacoustic measurements in water depths and locations that closely approximate future pile production locations.

Each indicator pile will take approximately 1 to 2 hours to install. However, indicator test pile locations may be as much as 500 feet apart. Therefore, the time required to mobilize equipment to drive each indicator pile will likely limit the number of piles driven to one, or perhaps two, per day.

Indicator piles 1 and 2, which will be placed outside of the U.S. Army Corps of Engineer's dredging prism, will be cut off at or below the mudline immediately after being driven to their final depth. All other piles will remain in place throughout the APMP, with the intention of incorporating them into the new design if possible. If it is determined that the former indicator piles cannot be accommodated as APMP construction nears completion, the piles will be removed by cutting the piles at or below the existing mudline. These measures will ensure that the piles do not interfere with dredging and POA operations. The eight remaining indicator piles will be allowed to settle for two to three weeks and then will be subjected to a maximum of 10 restrikes each, for a total of 80 combined restrikes. No sound attenuation measures will be used during the restrikes, as the actual time spent re-striking piles will be minimal (approximately five minutes per pile).

Geotechnical Characterization and Schedule

The POA proposes to complete geotechnical sampling at five overwater locations (Figure 1–4 in the Application) to support the design and construction of the APMP. Exploration equipment comprised of either a rotary drill rig or Cone Penetrometer Test (CPT) system will be used to perform the geotechnical sampling. This equipment will be located on the barge or wharf during the explorations. Methods used to conduct the sampling are described in Section 1.3.2 of the Application. In-water noise associated with these geotechnical sampling techniques is expected to be below harassment levels and will not be considered under this Authorization.

Hydroacoustic Monitoring

Sound attenuation measures will be used to test for achieved attenuation during pile-driving operations. The POA plans to test attenuation associated with the use of pile cushions, resonance-based systems, and bubble curtains (encapsulated or confined); however, the currents in the project area may preclude bubble curtain use if curtain frames cannot be stabilized during testing. The resonance-based sound attenuation system is a type of system that uses noise-canceling resonating slats around the pile being driven to reduce noise levels from pile driving. The sound attenuation measures will be applied during specific testing periods, and then intentionally removed to allow comparison of sound levels during the driving of an individual pile. In this way, the sound signature of an individual pile can be compared with and without an attenuation device, avoiding the confounding factor of differences among piles. If sound attenuation measures cannot easily be added and removed, then different piles with and without sound attenuation measures will be compared. Data collected from sound attenuation testing will inform future construction of the APMP, which is planned as a multi-project. Details of the hydroacoustic monitoring plan are provided in the Application.

Description of Marine Mammals in the Area of the Specified Activity

Marine mammals most likely to be observed within the upper Cook Inlet Project area include harbor seals (*Phoca vitulina*), beluga whales (*Delphinapterus leucas*), and harbor seals (*Phocoena phocoena;* NMFS 2003). Species that may be encountered infrequently or rarely within the project area are killer whales (*Orcinus orca*) and Steller sea lions (*Eumetopias jubatus;*).

TABLE 2—MARINE MAMMALS IN THE PROJECT AREA

Species or DPS*	Abundance	Comments
Cook Inlet beluga whale (*Delphinapterus leucas*).	312 [a]	Occurs in the project area. Listed as Depleted under the MMPA, Endangered under ESA.
Killer (Orca) whale (*Orcinus orca*)	2,347 Resident 587 Transient [b]	Occurs rarely in the project area. No special status or ESA listing.
Harbor porpoise (*Phocoena phocoena*).	31,046 [c]	Occurs occasionally in the project area. No special status or ESA listing.
Harbor seal (*Phoca vitulina*)	27,386 [d]	Occurs in the project area. No special status or ESA listing.
Steller sea lion (*Eumetopias jubatus*).	49,497 [e]	Occurs rarely within the project area. Listed as Depleted under the MMPA, Endangered under ESA.

* DPS refers to distinct population segment under the ESA, and is treated as a species.
[a] Abundance estimate for the Cook Inlet stock.
[b] Abundance estimate for the Eastern North Pacific Alaska Resident stock; the estimate for the transient population is for the Gulf of Alaska, Aleutian Islands, and Bering Sea stock.
[c] Abundance estimate for the Gulf of Alaska stock.
[d] Abundance estimate for the Cook Inlet/Shelikof stock.
[e] Abundance estimate for the Western U.S. Stock.
Sources for populations estimates: Allen and Angliss 2013, 2014, 2015.

We have reviewed POA's detailed species descriptions, including life history information, for accuracy and completeness and refer the reader to Section 4 of POA's application instead of reprinting the information here. Please also refer to NMFS' Web site (*www.nmfs.noaa.gov/pr/species/mammals*) for generalized species accounts.

In the species accounts provided here, we offer a brief introduction to the species and relevant stocks found near POA. Table 2 presents the species and stocks of marine mammals that occur in Cook Inlet along with abundance estimates and likely occurrence in the project area.

Pinnipeds

Harbor Seal

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 Newenhamand the Pribilof Islands. There are 12 recognized stocks in Alaska. Distribution of the Cook Inlet/Shelikof stock extends from Seal Cape (Coal Bay) through all of upper and lower Cook Inlet. The Cook Inlet/Shelikof stock is estimated at 27,386 individuals (Allen and Angliss 2014).

Harbor seals haul out on rocks, reefs, beaches, and drifting glacial ice (Allen and Angliss 2013). They are non-migratory; their local movements are associated with tides, weather, season, food availability, and reproduction, as well as sex and age class (Allen and Angliss 2013; Boveng *et al.* 2012; Lowry *et al.* 2001; Small *et al.* 2003).

Harbor seals inhabit the coastal and estuarine waters of Cook Inlet and are observed in both upper and lower Cook Inlet throughout most of the year (Boveng *et al.* 2012; Shelden *et al.* 2013). Recent research on satellite-tagged harbor seals observed several movement patterns within Cook Inlet (Boveng *et al.* 2012). In the fall, a portion of the harbor seals appeared to move out of Cook Inlet and into Shelikof Strait, Northern Kodiak Island, and coastal habitats of the Alaska Peninsula. The western coast of Cook Inlet had a higher usage than the eastern coast habitats, and seals generally remained south of the Forelands if captured in lower Cook Inlet (Boveng *et al.* 2012).

The presence of harbor seals in upper Cook Inlet is seasonal. Harbor seals are commonly observed along the Susitna River and other tributaries within upper Cook Inlet during eulachon and salmon migrations (NMFS 2003). The major haul-out sites for harbor seals are located in lower Cook Inlet; however, there are a few in upper Cook Inlet and none in the vicinity of the project site (Montgomery *et al.* 2007).

Harbor seals are occasionally observed in Knik Arm and in the vicinity of the POA, primarily near the mouth of Ship Creek (Cornick *et al.* 2011; Shelden *et al.* 2013). During annual marine mammal surveys conducted by NMFS since 1994, harbor seals have been observed in Knik Arm and in the vicinity of the POA, however, there are no haulouts in the immediate area (Shelden *et al.* 2013).

During construction monitoring conducted at the POA from 2005 through 2011, harbor seals were observed from 2008 through 2011; data were unpublished for years 2005 through 2007 (Table 4–1 in Application) (Cornick *et al.* 2011; Cornick and Saxon-Kendall 2008, 2009, 2010; Markowitz and McGuire 2007; Prevel-Ramos *et al.* 2006). Monitoring took place at different times during different years. The months of March through December were covered during one or more of these survey years. Harbor seals were documented during construction monitoring efforts in 2008. One harbor seal was sighted in Knik Arm on 13 September 2008, traveling north in the vicinity of the POA. In 2009, harbor seals were observed in the months of May through October, with the highest number of sightings being eight in September (Cornick *et al.* 2010; ICRC 2010a). There were no harbor seals reported in 2010 from scientific monitoring efforts; however, 13 were reported from construction monitoring. In 2011, 32 sightings of harbor seals were reported during scientific monitoring, with a total of 57 individual harbor seals sighted. Harbor seals were observed in groups of one to seven individuals (Cornick *et al.* 2011). There were only two sightings of harbor seals during construction monitoring in 2011 (ICRC 2012).

Steller Sea Lion

Two Distinct Population Segments (DPS) of Steller sea lions occur in Alaska: The western and eastern DPS. The western DPS includes animals that occur west of Cape Suckling, Alaska, and therefore includes individuals within the project area. The western DPS was listed under the ESA as threatened in 1990, and continued population decline resulted in a change in listing status to endangered in 1997. Since 2000, studies have documented a continued decline in the population in the central and western Aleutian Islands; however, the population east of Samalga Pass has increased and potentially is stable (Allen and Angliss 2014). This includes the population that inhabits Cook Inlet.

It is rare for Steller sea lions to be encountered in upper Cook Inlet. Steller sea lions have not been documented in upper Cook Inlet during beluga whale aerial surveys conducted annually in June from 1994 through 2012 (Shelden *et al.* 2013). During construction monitoring in June of 2009, a Steller sea lion was documented three times (within the same day) at the POA and was believed to be the same individual each time (ICRC 2009a).

Cetaceans

Harbor Porpoise

In Alaska, harbor porpoises are divided into three stocks: The Bering Sea stock, the Southeast Alaska stock, and, relevant to this proposed IHA, the Gulf of Alaska stock. The Gulf of Alaska stock is currently estimated at 31,046 individuals (Allen and Angliss 2014). NMFS suggests that a finer division of stocks is likely in Alaska (Allen and Angliss 2014). Dahlheim *et al.* (2000) estimated abundance and density of harbor porpoises in Cook Inlet from surveys conducted in the early 1990s. The estimated density of animals in Cook Inlet was 7.2 per 1,000 (km^2), with an abundance estimate of 136 (Dahlheim *et al.,* 2000), indicating that only a small number use Cook Inlet. Hobbs and Waite (2010) estimated a harbor porpoise density in Cook Inlet of 13 per 1,000 km^2 from aerial beluga whale surveys in the late 1990s.

Harbor porpoises occur in both upper and lower Cook Inlet. Small numbers of harbor porpoises have been consistently reported in the upper Cook Inlet between April and October. Several recent studies document monthly counts of harbor porpoises. Across these studies, the largest number of porpoises observed per month ranged from 12 to 129 animals, although the latter count is considered atypical. Highest monthly counts include 17 harbor porpoises reported for spring through fall 2006 by Prevel-Ramos *et al.* (2008), 14 for spring of 2007 by Brueggeman *et al.* (2007), 12 for fall of 2007 by Brueggeman *et al.* (2008a), and 129 for spring through fall in 2007 by Prevel-Ramos *et al.* (2008) between Granite Point and the Susitna River during 2006 and 2007; the reason for the spike in numbers (129) of harbor porpoises in the upper Cook Inlet is unclear and quite disparate with results of past surveys, suggesting it may be an anomaly. In the 2006 survey only three harbor porpoises were sighted during that month. The spike occurred in July, which was followed by sightings of 79 harbor porpoises in August, 78 in September, and 59 in October in 2007. The number of porpoises counted more than once was unknown, suggesting the actual numbers are likely smaller than reported.

Harbor porpoises have been detected during passive acoustic monitoring efforts throughout Cook Inlet, with detection rates being especially prevalent in lower Cook Inlet. In 2009, harbor porpoises were documented by using passive acoustic monitoring in upper Cook Inlet at the Beluga River and Cairn Point (Small 2009, 2010).

Harbor porpoises have been observed within Knik Arm during monitoring efforts since 2005. During POA construction from 2005 through 2011, harbor porpoises were reported in 2009, 2010, and 2011 (Cornick and Saxon-Kendall 2008, 2009, 2010; Cornick *et al.* 2011; Markowitz and McGuire 2007; Prevel-Ramos *et al.* 2006). In 2009, a total of 20 harbor porpoises were observed during construction monitoring with sightings occurring in June, July, August, October, and November. Harbor porpoises were observed twice in 2010, once in July and again in August. In 2011, POA monitoring efforts documented harbor porpoises five times with a total of six individuals in August, October, and November at the POA (Cornick *et al.*

2011). During other monitoring efforts conducted in Knik Arm, there were four sightings of harbor porpoises in Knik Arm in 2005 (Shelden *et al.* 2014) and a single harbor porpoise was observed within the vicinity of the POA in October 2007 (URS 2008).

Killer Whale

The population of the Eastern North Pacific Alaska Resident stock of killer whales contains an estimated 2,347 animals and the Gulf of Alaska, Aleutian Islands, and Bering Sea Transient Stock includes 587 animals (Allen and Angliss, 2014). Numbers of killer whales in Cook Inlet are small compared to the overall population, and most are recorded in lower Cook Inlet.

Resident killer whales are primarily fish-eaters, while transients consume marine mammals. Both are occasionally found in Cook Inlet, where transient killer whales are known to feed on beluga whales, and resident killer whales are known to feed on anadromous fish (Shelden *et al.* 2003).

Killer whales are rare in upper Cook Inlet, and the availability of prey species largely determines the likeliest times for killer whales to be in the area. Killer whales have been sighted in lower Cook Inlet 17 times, with a total of 70 animals between 1993 and 2012 during beluga whale aerial surveys (Shelden *et al.* 2013); no killer whales were observed in upper Cook Inlet. Surveys over 20 years by Shelden *et al.* (2003) documented an increase in sightings and strandings in upper Cook Inlet beginning in the early 1990s. Several of these sightings and strandings report killer whale predation on beluga whales. Passive acoustic monitoring efforts throughout Cook Inlet documented killer whales at Beluga River, Kenai River, and Homer Spit. They were not encountered at any mooring within the Knik Arm. These detections were likely resident (fish-eating) killer whales. Transient killer whales (marine-mammal eating) were not believed to have been detected due to their propensity to move quietly through waters to track prey (Lammers *et al.* 2013; Small 2010).

No killer whales were spotted during surveys in 2004 and 2005 by Funk *et al.* (2005), or Ireland *et al.* (2005). Similarly, none were sighted in 2007 or 2008 by Brueggeman *et al.* (2007, 2008a, 2008b). Killer whales have also not been documented during any POA construction or scientific monitoring (Cornick and Pinney 2011; Cornick and Saxon-Kendall 2008; Cornick *et al.* 2010, 2011; ICRC 2009a, 2010a, 2011a, 2012; Markowitz and McGuire 2007; Prevel-Ramos *et al.* 2006). Very few killer whales, if any, are expected to approach or be in the vicinity of the project area.

Beluga Whale

Beluga whales appear seasonally throughout much of Alaska, except in the Southeast region and the Aleutian Islands. Five stocks are recognized in Alaska: Beaufort Sea stock, eastern Chukchi Sea stock, eastern Bering Sea stock, Bristol Bay stock, and Cook Inlet stock (Allen and Angliss 2014). The Cook Inlet stock is the most isolated of the five stocks, since it is separated from the others by the Alaska Peninsula and resides year round in Cook Inlet (Laidre *et al.* 2000). Only the Cook Inlet stock inhabits the project area.

The Cook Inlet beluga whale Distinct Population Segment (DPS) is genetically (mtDNA) distinct from other Alaska populations suggesting the Peninsula is an effective barrier to genetic exchange (O'Corry-Crowe *et al.* 1997) and that these whales may have been separated from other stocks at least since the last ice age. Laidre *et al.* (2000) examined data from more than 20 marine mammal surveys conducted in the northern Gulf of Alaska and found that sightings of belugas outside Cook Inlet were exceedingly rare, and these were composed of a few stragglers from the Cook Inlet DPS observed at Kodiak Island, Prince William Sound, and Yakutat Bay. Several marine mammal surveys specific to Cook Inlet (Laidre *et al.* 2000, Speckman and Piatt 2000), including those that concentrated on beluga whales (Rugh *et al.* 2000, 2005a), clearly indicate that this stock largely confines itself to Cook Inlet. There is no indication that these whales make forays into the Bering Sea where they might intermix with other Alaskan stocks.

The Cook Inlet beluga DPS was originally estimated at 1,300 whales in 1979 (Calkins 1989) and has been the focus of management concerns since experiencing a dramatic decline in the 1990s. Between 1994 and 1998 the stock declined 47 percent which was attributed to overharvesting by subsistence hunting. Subsistence hunting was estimated to annually remove 10 to 15 percent of the population during this period. Only five belugas have been harvested since 1999, yet the population has continued to decline, with the most recent estimate at only 312 animals (Allen and Angliss 2014). NMFS listed the population as ''depleted'' in 2000 as a consequence of the decline, and as ''endangered'' under the Endangered Species Act (ESA) in 2008 after the population failed to show signs of recovery following a moratorium on subsistence harvest.

In April 2011, NMFS designated critical habitat for the beluga under the ESA (Figure 4–7 in the Application). NMFS designated two areas of critical habitat for beluga whales in Inlet. The designation includes 7,800 km^2 (3,013 mi^2) of marine and estuarine habitat within Cook Inlet, encompassing approximately 1,909 km^2 (738 mi^2) in Area 1 and 5,891 km2 (2,275 mi^2) in Area 2. From spring through fall, Area 1critical habitat has the highest concentration of beluga whales with important foraging and calving habitat. Area 2 critical habitat has a lower concentration of beluga whales in the spring and summer, but is used by belugas in the fall and winter. Critical habitat does not include two areas of military usage, the Eagle River Flats Range on Fort Richardson and military lands of JBER between Mean Higher High Water and Mean High Water. Additionally, the POA, the adjacent navigation channel, and the turning basin were excluded from critical habitat designation due to national security reasons (76 FR 20180).

NMFS' Final Conservation Plan for the Cook Inlet beluga whale characterized the relative value of four habitats as part of the management and recovery strategy (NMFS 2008a). These are sites where beluga whales are most consistently observed, where feeding behavior has been documented, and where dense numbers of whales occur within a relatively confined area of the inlet. Type 1 Habitat is termed ''High Value/High Sensitivity'' and includes what NMFS believes to be the most important and sensitive areas of the Cook Inlet for beluga whales. Type 2 Habitat is termed ''High Value'' and includes summer feeding areas and winter habitats in waters where whales typically occur in lesser densities or in deeper waters. Type 3 Habitat occurs in the offshore areas of the mid and upper inlet and also includes wintering habitat. Type 4 Habitat describes the remaining portions of the range of these whales within Cook Inlet.

The habitat that will be directly impacted from Test Pile activities at the POA is considered Type 1 Habitat, although it lies within the zone that was excluded from any critical habitat designation.

A number of studies have been conducted on the distribution of beluga whales in upper Cook Inlet including NMFS aerial surveys; NMFS data from satellite-tagged belugas (Hobbs *et al.* 2005); opportunistic sightings; baseline studies of beluga whale occurrence in Knik Arm conducted for the Knik Arm Bridge and Toll Authority (KABATA) (Funk *et al.* 2005); baseline studies of beluga whale occurrence in Turnagain Arm conducted in preparation for Seward Highway improvements (Markowitz *et al.* 2007); marine mammal surveys conducted at Ladd Landing to assess a coal shipping project (Prevel-Ramos *et al.* 2008); marine mammal surveys off Granite Point, the Beluga River, and farther south in the inlet at North Ninilchik (Brueggeman *et al.* 2007, 2008a, 2008b); passive acoustic monitoring surveys throughout Cook Inlet (Lammers *et al.* 2013); JBER observations conducted within Eagle Bay and Eagle River (U.S. Army Garrison Fort Richardson 2009); and the scientific and construction monitoring program at the POA (Cornick and Pinney 2011, Cornick and Saxon-Kendall 2007, 2008; Cornick *et al.* 2010, Cornick *et al.* 2011; ICRC 2009a, 2010a, 2011a, 2012; Markowitz and McGuire 2007; Prevel-Ramos *et al.* 2006). These data have provided a relatively good picture of the distribution and occurrence of beluga whales in upper Cook Inlet, particularly in lower Knik Arm and the project area. Findings of these studies are presented in detail in Section 4.5 in the Application.

The POA conducted a NMFS-approved monitoring program for beluga whales and other marine mammals focused on the POA area from 2005 to 2011 as part of their permitting requirements for the Marine Terminal Redevelopment Project (MTRP) (Table 4–6 in Application). Scientific monitoring was initiated in 2005 and was conducted by LGL Limited (LGL) in 2005 and 2006 (Markowitz and McGuire 2007; Prevel-Ramos *et al.* 2006). Alaska Pacific University (APU) resumed scientific monitoring in 2007 (Cornick and Saxon-Kendall 2008) and continued monitoring each year through 2011. Additionally, construction monitoring occurred during in-water construction work.

Data on beluga whale sighting rates, grouping, behavior, and movement indicate that the POA is a relatively low-use area, occasionally visited by lone whales or small groups of whales. They are observed most often at low tide in the fall, peaking in late August to early September. Although groups with calves have been observed to enter the POA area, data do not suggest that the area is an important nursery area.

Although the POA scientific monitoring studies indicate that the area is not used frequently by many beluga whales, it is apparently used for foraging habitat by whales traveling between lower and upper Knik Arm, as individuals and groups of beluga whales have been observed passing through the area each year during monitoring efforts (Table 4–7 in Application). In all years, diving and traveling were the most common behaviors observed, with many instances of confirmed feeding. Sighting rates at the POA ranged from 0.05 to 0.4 whales per hour (Cornick and Saxon-Kendall 2008; Cornick *et al.* 2011; Markowitz and McGuire 2007; Prevel-Ramos *et al.* 2006), as compared to three to five whales per hour at Eklutna, 20 to 30 whales per hour at Birchwood, and three to eight whales per hour at Cairn Point (Funk *et al.* 2005), indicating that these areas are of higher use than the POA.

Data collected annually during monitoring efforts demonstrated that few beluga whales were observed in July and early August; numbers of sightings increased in mid- August, with the highest numbers observed late August to mid-September. In all years, beluga whales have been observed to enter the project footprint while construction activities were taking place, including pile driving and dredging. The most commonly observed behaviors were traveling, diving, and suspected feeding. No apparent behavioral changes or reactions to in-water construction activities were observed by either the construction or scientific observers (Cornick *et al.* 2011).

Potential Effects of the Specified Activity on Marine Mammals and Their Habitat

This section includes a summary and discussion of the ways that stressors, (*e.g.* pile driving,) and potential mitigation activities, associated with the proposed POA Test Pile Program may impact marine mammals and their habitat. The ''Estimated Take by Incidental Harassment'' 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'' section will include the analysis of how this specific activity will impact marine mammals and 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 this activity on the reproductive success or survivorship of individuals and from that on the affected marine mammal populations or stocks. In the following discussion, we provide general background information on sound and marine mammal hearing before considering potential effects to marine mammals from sound produced by pile driving.

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.

TABLE 3—REPRESENTATIVE SOUND LEVELS OF ANTHROPOGENIC SOURCES

Sound source	Frequency range (Hz)	Underwater sound level	Reference
Small vessels	250–1,000	151 dB rms at 1 m	Richardson *et al.,* 1995.
Tug docking gravel barge	200–1,000	149 dB rms at 100 m	Blackwell and Greene, 2002.
Vibratory driving of 72-in steel pipe pile	10–1,500	180 dB rms at 10 m	Reyff, 2007.
Impact driving of 36-in steel pipe pile	10–1,500	195 dB rms at 10 m	Laughlin, 2007.
Impact driving of 66-in cast-in-steel-shell (CISS) pile.	10–1,500	195 dB rms at 10 m	Reviewed in Hastings and Popper, 2005.

There are two general categories of sound types: Impulse and non-pulse. Vibratory pile driving is considered to be continuous or non-pulsed while impact pile driving is considered to be an impulse or pulsed sound type. 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.

The likely or possible impacts of the proposed Test Pile Program on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel. Any impacts to marine mammals, however, are expected to primarily be acoustic in nature.

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. The lower and/or upper frequencies for some of these functional hearing groups have been modified from those designated by Southall *et al.* (2007). The functional groups and the associated frequencies are indicated below (note that these frequency ranges do not necessarily correspond to the range of best hearing, which varies by species):

- Low-frequency cetaceans (mysticetes): Functional hearing is estimated to occur between approximately 7 Hz and 25 kHz (extended from 22 kHz; Watkins, 1986; Au *et al.,* 2006; Lucifredi and Stein, 2007; Ketten and Mountain, 2009; Tubelli *et al.,* 2012);
- Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): Functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High-frequency cetaceans (porpoises, river dolphins, and members of the genera *Kogia* and *Cephalorhynchus;* now considered to include two members of the genus *Lagenorhynchus* on the basis of recent echolocation data and genetic data [May-Collado and Agnarsson, 2006; Kyhn *et al.* 2009, 2010; Tougaard *et al.* 2010]): Functional hearing is estimated to occur between approximately 200 Hz and 180 kHz; and
- Pinnipeds in water: Functional hearing is estimated to occur between approximately 75 Hz to 100 kHz for Phocidae (true seals) and between 100 Hz and 48 kHz for Otariidae (eared seals), with the greatest sensitivity between approximately 700 Hz and 20 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 (Hemilä *et al.,* 2006; Kastelein *et al.,* 2009; Reichmuth *et al.,* 2013).

Of the three cetacean species likely to occur in the proposed project area and for which take is requested, two are classified as mid-frequency cetaceans (*i.e.,* killer whale, beluga whale), and one is classified as a high-frequency cetacean (*i.e.,* harbor 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.

Acoustic Impacts

Potential Effects of Pile Driving Sound—The effects of sounds from pile driving might result in one or more of the following: Temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2004; Nowacek *et al.,* 2007; Southall *et al.,* 2007). The effects of pile driving on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; 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 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. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. 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.

In the absence of mitigation, impacts to marine species would be expected to result from physiological and behavioral responses to both the type and strength of the acoustic signature (Viada *et al.,* 2008). The type and severity of behavioral impacts are more difficult to document due to limited studies addressing the behavioral effects of impulse sounds on marine mammals. Potential effects from impulse sound sources can range in severity from effects such as behavioral disturbance or tactile perception to physical discomfort, slight injury of the internal organs and the auditory system, or mortality (Yelverton *et al.,* 1973).

Hearing Impairment and Other Physical Effects—Marine mammals exposed to high intensity sound repeatedly or 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 recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.,* 2007). Marine mammals depend on acoustic cues for vital biological functions, (*e.g.,* orientation, communication, finding prey, avoiding predators); thus, TTS may result in reduced fitness in survival and reproduction. However, this depends on the frequency and duration of TTS, as well as the biological context in which it occurs. TTS of limited duration, occurring in a frequency range that does not coincide with that used for recognition of important acoustic cues, would have little to no effect on an animal's fitness. Repeated sound exposure that leads to TTS could cause PTS. PTS constitutes injury, but TTS does not (Southall *et al.,* 2007). The following subsections discuss in somewhat more detail the possibilities of TTS, PTS, and non-auditory physical effects.

Temporary Threshold Shift—TTS is the mildest form of hearing impairment that can occur during exposure to a strong sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be stronger in order to be heard. In terrestrial mammals, TTS can last from minutes or hours to days (in cases of strong TTS). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the sound ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals, and none of the published data concern TTS elicited by exposure to multiple pulses of sound. Available data on TTS in marine mammals are summarized in Southall *et al.* (2007).

Given the available data, the received level of a single pulse (with no frequency weighting) might need to be approximately 186 dB re 1 μPa^2-s (*i.e.,* 186 dB sound exposure level [SEL] or approximately 221–226 dB p-p [peak]) in order to produce brief, mild TTS.

Exposure to several strong pulses that each have received levels near 190 dB rms (175–180 dB SEL) might result in cumulative exposure of approximately 186 dB SEL and thus slight TTS in a small odontocete, assuming the TTS threshold is (to a first approximation) a function of the total received pulse energy.

The above TTS information for odontocetes is derived from studies on the bottlenose dolphin (*Tursiops truncatus*) and beluga whale. There is no published TTS information for other species of cetaceans. However, preliminary evidence from a harbor porpoise exposed to pulsed sound suggests that its TTS threshold may have been lower (Lucke *et al.,* 2009). As summarized above, data that are now available imply that TTS is unlikely to occur unless odontocetes are exposed to pile driving pulses stronger than 180 dB re 1 μPa rms.

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

Relationships between TTS and PTS thresholds have not been studied in marine mammals but are assumed to be similar to those in humans and other terrestrial mammals, based on anatomical similarities. PTS might occur at a received sound level at least several decibels above that inducing mild TTS if the animal were exposed to strong sound pulses with rapid rise time. Based on data from terrestrial mammals, a precautionary assumption is that the PTS threshold for impulse sounds (such as pile driving pulses as received close to the source) is at least 6 dB higher than the TTS threshold on a peak-pressure basis and probably greater than 6 dB (Southall *et al.,* 2007). On an SEL basis, Southall *et al.* (2007) estimated that received levels would need to exceed the TTS threshold by at least 15 dB for there to be risk of PTS. Thus, for cetaceans, Southall *et al.* (2007) estimate that the PTS threshold might be an M-weighted SEL (for the sequence of received pulses) of approximately 198 dB re 1 μPa^2-s (15 dB higher than the TTS threshold for an impulse). Given the higher level of sound necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

Although no marine mammals have been shown to experience TTS or PTS as a result of being exposed to pile driving activities, captive bottlenose dolphins and beluga whales exhibited changes in behavior when exposed to strong pulsed sounds (Finneran *et al.,* 2000, 2002, 2005). The animals tolerated high received levels of sound before exhibiting aversive behaviors. Experiments on a beluga whale showed that exposure to a single watergun impulse at a received level of 207 kPa (30 psi) p-p, which is equivalent to 228 dB p-p, resulted in a 7 and 6 dB TTS in the beluga whale at 0.4 and 30 kHz, respectively. Thresholds returned to within 2 dB of the pre-exposure level within four minutes of the exposure (Finneran *et al.,* 2002). Although the source level of pile driving from one hammer strike is expected to be much lower than the single watergun impulse cited here, animals being exposed for a prolonged period to repeated hammer strikes could receive more sound exposure in terms of SEL than from the single watergun impulse (estimated at 188 dB re 1 μPa^2-s) in the aforementioned experiment (Finneran *et al.,* 2002). However, in order for marine mammals to experience TTS or PTS, the animals have to be close enough to be exposed to high intensity sound levels for a prolonged period of time. Based on the best scientific information available, these SPLs are far below the thresholds that could cause TTS or the onset of PTS.

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 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.

Disturbance Reactions

Disturbance includes a variety of effects, including subtle changes in behavior, more conspicuous changes in activities, and displacement. Behavioral responses to sound are highly variable and context-specific and reactions, if any, depend on species, state of maturity, experience, current activity, reproductive state, auditory sensitivity, time of day, and many other factors (Richardson *et al.,* 1995; Wartzok *et al.,* 2003; Southall *et al.,* 2007).

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. The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.,* 1995; NRC, 2003; Wartzok *et al.,* 2003).

Controlled experiments with captive marine mammals 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 guns or acoustic harassment devices, but also including pile driving) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; Thorson and Reyff, 2006; see also Gordon *et al.,* 2004; Wartzok *et al.,* 2003; Nowacek *et al.,* 2007). 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. These behavioral changes may include (Richardson *et al.,* 1995): changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses (*e.g.,* pinnipeds flushing into water from haul-outs or rookeries). Pinnipeds may increase their haul-out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006).

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, or reproduction. Significant behavioral modifications that could potentially lead to effects on growth, survival, or reproduction include:

- Drastic changes in diving/surfacing patterns (such as those thought to cause beaked whale stranding due to exposure to military mid-frequency tactical sonar);
- Habitat abandonment due to loss of desirable acoustic environment; and
- Cessation of feeding or social interaction.

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

Auditory Masking—Natural and artificial sounds can disrupt behavior by masking, or interfering with, a marine mammal's ability to hear other sounds. Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher levels. Chronic exposure to excessive, though not high-intensity, sound could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions. Masking can interfere with detection of acoustic signals such as communication calls, echolocation sounds, and environmental sounds important to marine mammals. Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction. If the coincident (masking) sound were anthropogenic, it could be potentially harassing if it disrupted hearing-related behavior. It is important to distinguish TTS and PTS, which persist after the sound exposure, from masking, which occurs only 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.

Masking occurs at the frequency band which the animals utilize so the frequency range of the potentially masking sound is important in determining any potential behavioral impacts. Because sound generated from in-water vibratory pile driving is mostly concentrated at low frequency ranges, it may have less effect on high frequency echolocation sounds made by porpoises. However, lower frequency man-made sounds are more likely to affect detection of communication calls and other potentially important natural sounds such as surf and prey sound. It may also affect communication signals when they occur near the sound band and thus reduce the communication space of animals (*e.g.,* Clark *et al.,* 2009) and cause increased stress levels (*e.g.,* Foote *et al.,* 2004; Holt *et al.,* 2009).

Masking affects both senders and receivers of the signals and can potentially have long-term chronic effects on marine mammal species and populations. Recent research suggests that 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, and that most of these increases are from distant shipping (Hildebrand, 2009). All anthropogenic sound sources, such as those from vessel traffic, pile driving, and dredging activities, contribute to the elevated ambient sound levels, thus intensifying masking.

Vibratory pile driving is relatively short-term, with rapid oscillations occurring for 10 to 30 minutes per installed pile. 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.

Impacts of geotechnical Investigations—Limited data exist regarding underwater noise levels associated with Standard Penetration Test (SPT) or Cone Penetrometer Test (CPT) investigations, and no data exist for SPT or CPT geotechnical investigations in Cook Inlet or Knik Arm. Geotechnical drilling for the POA, which includes SPT or CPT sampling, will be of smaller size and scale than the full-scale drilling operations described below. Hydroacoustic tests conducted by Illingworth & Rodkin (2014a) in May 2013 revealed that underwater noise levels from large drilling operations were below ambient noise levels. On two different occasions, Sound Source Verification (SSV) measurements were made of conductor pipe drilling, with and without other noise-generating activities occurring simultaneously. Drilling sounds could not be measured or heard above the other sounds emanating from the rig. The highest sound levels measured that were emanating from the rig during drilling were 128 dB rms, and they were attributed to a different sound source (Illingworth & Rodkin 2014a). Therefore, NMFS will assume that sound impacts from geotechnical investigations will not rise to Level B harassment thresholds.

Acoustic Effects, Airborne—Marine mammals that occur in the project area could be exposed to airborne sounds associated with pile driving that have the potential to cause harassment, depending on their distance from pile driving activities. Airborne pile driving sound would not impact cetaceans because sound from atmospheric sources does not transmit well underwater (Richardson *et al.,* 1995); thus, airborne sound may only be an issue for pinnipeds either hauled-out or looking with heads above water in the project area. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon their habitat and move further from the source. Studies by Blackwell *et al.* (2004) and Moulton *et al.* (2005) indicate a tolerance or lack of response to unweighted airborne sounds as high as 112 dB peak and 96 dB rms.

Vessel Interaction

Besides being susceptible to vessel strikes, cetacean and pinniped responses to vessels may result in behavioral changes, including greater variability in the dive, surfacing, and respiration patterns; changes in vocalizations; and changes in swimming speed or direction (NRC 2003). There will be a temporary and localized increase in vessel traffic during construction. A maximum of three work barges will be present at any time during the in-water and over water work. The barges will be located near each other where construction is occurring. Additionally, the floating pier will be tugged into position prior to installation.

Potential Effects on Marine Mammal Habitat

The primary potential impacts to marine mammal habitat are associated with elevated sound levels produced by impact and vibratory pile driving in the area. However, other potential impacts to the surrounding habitat from physical disturbance are also possible.

Potential Pile Driving Effects on Prey—Test Pile 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 area likely impacted by the proposed Test Pile Program is relatively small compared to the available habitat in Knik Arm. Due to the lack of definitive studies on how the proposed Test Pile Program might affect prey availability for marine mammals there is uncertainty to the impact analysis. However, this uncertainty will be mitigated due to the low quality and quantity of marine habitat, low abundance and seasonality of salmonids and other prey, and mitigation measures already in place to reduce impacts to fish. The most likely impact to fish from the proposed Test Pile Program will be temporary behavioral avoidance of the immediate area. In general, the nearer the animal is to the source the higher the likelihood of high energy and a resultant effect (such as mild, moderate, mortal injury). Affected fish would represent only a small portion of food available to marine mammals in the area. 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. Any behavioral avoidance by fish of the disturbed area will still leave significantly large areas of fish and marine mammal foraging habitat in Knik Arm. Therefore, the impacts on marine mammal prey during the proposed Test Pile Program are expected to be minor.

Effects to Foraging Habitat

The Cook Inlet beluga whale is the only marine mammal species in the project area that has critical habitat designated in Cook Inlet. NMFS designated critical habitat in portions of Cook Inlet, including Knik Arm. NMFS noted that Knik Arm is Type 1 habitat for the Cook Inlet beluga whale, which means it is the most valuable, used intensively by beluga whales from spring through fall for foraging and nursery habitat. However, the area in the immediate vicinity of POA has been excluded from critical habitat designation. The waters around POA are subject to heavy vessel traffic and the shoreline is built up and industrialized, resulting in habitat of marginal quality.

The proposed Test Pile Program will not result in permanent impacts to habitats used by marine mammals. Pile installation may temporarily increase turbidity resulting from suspended sediments. Any increases would be temporary, localized, and minimal. POA 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 site driving areas to experience effects of turbidity, and any pinnipeds will be transiting the terminal area and could avoid localized areas of turbidity. Therefore, the impact from increased turbidity levels is expected to be discountable to marine mammals. The proposed Test Pile Program will result in temporary changes in the acoustic environment. Marine mammals may experience a temporary loss of habitat because of temporarily elevated noise levels. The most likely impact to marine mammal habitat would be from pile-driving effects on marine mammal prey at and near the POA and minor impacts to the immediate substrate during installation of piles during the proposed Test Pile Program. Long-term effects of any prey displacements are not expected to affect the overall fitness of the Cook Inlet beluga whale population or its recovery; effects will be minor and will terminate after cessation of the proposed Test Pile Program.

Proposed Mitigation Measures

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, their habitat. 50 CFR 216.104(a)(11). For the proposed project, POA worked with NMFS and proposed the following mitigation measures to minimize the potential impacts to marine mammals in the project vicinity. The primary purposes of these mitigation measures are to minimize sound levels from the activities, and to monitor marine mammals within designated zones of influence corresponding to NMFS' current Level A and B harassment thresholds which are depicted in Table 5 found later in the *Estimated Take by Incidental Harassment* section.

In addition to the measures described later in this section, POA would employ the following standard mitigation measures:

(a) Conduct briefings between construction supervisors and crews, marine mammal monitoring team, and POA staff 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.

(b) For in-water heavy machinery work other than pile driving (using, *e.g.,* standard barges, tug boats, barge-mounted excavators, or clamshell equipment used to place or remove material), 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).

Time Restrictions—Work would occur only during daylight hours, when visual monitoring of marine mammals can be conducted.

Establishment of Disturbance Zone or Zone of Influence—Disturbance zones or zones of influence (ZOI) are the areas in which SPLs equal or exceed 160 dB rms for impact driving and 125 dB rms for vibratory driving. Note that 125 dB has been established as the Level B harassment zone isopleth for vibratory driving since ambient noise levels near the POA are likely to be above 120 dB RMS and this value has been used previously as a threshold in this area. Disturbance zones provide utility for monitoring conducted for mitigation purposes (*i.e.,* shutdown zone 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. However, the primary purpose of disturbance zone monitoring is for documenting incidents of Level B harassment; disturbance zone monitoring is discussed in greater detail later (see ''Proposed Monitoring and Reporting''). Nominal radial distances for disturbance zones are shown in Table 5. Given the size of the disturbance zone for vibratory pile driving, it is impossible to guarantee that all animals would be observed or to make comprehensive observations of fine-scale behavioral reactions to sound. We discuss monitoring objectives and protocols in greater depth in ''Proposed Monitoring and Reporting.''

In order to document observed incidents of harassment, monitors record all marine mammal observations, regardless of location. The observer's location, as well as the location of the pile being driven, is known from a GPS. The location of the animal is estimated as a distance from the observer, which is then compared to the location from the pile and the ZOIs for relevant activities (*i.e.,* pile installation). This information may then be used to extrapolate observed takes to reach an approximate understanding of actual total takes.

Soft Start—The use of a soft start procedure is believed to provide additional protection to marine mammals by warning or providing a chance to leave the area prior to the hammer operating at full capacity, and typically involves a requirement to initiate sound from the hammer for 15 seconds at reduced energy followed by a waiting period. This procedure is repeated two additional times. It is difficult to specify the reduction in energy for any given hammer because of variation across drivers and, for impact hammers, the actual number of strikes at reduced energy will vary because operating the hammer at less than full power results in ''bouncing'' of the hammer as it strikes the pile, resulting in multiple ''strikes.'' The project will utilize soft start techniques for both impact and vibratory pile driving. POA will initiate sound from vibratory hammers for fifteen seconds at reduced energy followed by a 1 minute waiting period, with the procedure repeated two additional times. For impact driving, we require an initial set of three strikes from the impact hammer at reduced energy, followed by a thirty-second waiting period, then two subsequent three strike sets. Soft start will be required at the beginning of each day's pile driving work and at any time following a cessation of pile driving of 20 minutes or longer (specific to either vibratory or impact driving).

Monitoring and Shutdown for Pile Driving

The following measures would apply to POA's mitigation through shutdown and disturbance zones:

Shutdown Zone—For all pile driving activities, POA will establish a shutdown zone. Shutdown zones are intended to contain the area in which SPLs equal or exceed the 180/90 dB rms acoustic injury criteria, with the purpose being 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), thus preventing injury of marine mammals. POA, however, will implement a minimum shutdown zone of 100 m radius for all marine mammals around all vibratory and impact pile activity. These precautionary measures would also further reduce the possibility of auditory injury and behavioral impacts as well as limit the unlikely possibility of injury from direct physical interaction with construction operations.

Shutdown for Large Groups—To reduce the chance of POA reaching or exceeding authorized take, and to minimize harassment to beluga whales, in-water pile driving operations will be shut down if a group of five or more beluga whales is sighted within or approaching the Level B harassment 160 dB and 125 dB disturbance zones, as appropriate. If the group is not re-sighted within 20 minutes, pile driving will resume.

Shutdown for Beluga Whale Calves—Beluga whale calves are likely more susceptible to loud anthropogenic noise than juveniles or adults. If a calf is sighted within or approaching a harassment zone, in-water pile driving will cease and will not be resumed until the calf is confirmed to be out of the harassment zone and on a path away from the pile driving. If a calf or the group with a calf is not re-sighted within 20 minutes, pile driving will resume.

Visual Marine Mammal Observation—POA will collect sighting data and behavioral responses to construction for marine mammal species observed in the region of activity during the period of activity. All observers will be trained in marine mammal identification and behaviors and are required to have no other construction-related tasks while conducting monitoring. POA will monitor the shutdown zone and disturbance zone before, during, and after pile driving, with observers located at the best practicable vantage points. Based on our requirements, the Marine Mammal Monitoring Plan would implement the following procedures for pile driving:

- Four MMOs will work concurrently in rotating shifts to provide full coverage for marine mammal monitoring during in-water pile installation activities for the Test Pile Program. MMOs will work in four-person teams to increase the probability of detecting marine mammals and to confirm sightings. Three MMOs will scan the Level A and Level B harassment zones surrounding pile-driving activities for marine mammals by using big eye binoculars (25X), hand-held binoculars (7X), and the naked eye. One MMO will focus on the Level A harassment zone and two others will scan the Level B zone. Four MMOs will rotate through these three active positions every 30 minutes to reduce eye strain and increase observer alertness. The fourth MMO will record data on the computer, a less-strenuous activity that will provide the opportunity for some rest. A theodolite will also be available for use.
- In order to more effectively monitor the larger Level B harassment zone for vibratory pile driving, one or more MMOs shall be placed on one of the vessels used for hydroacoustic monitoring, which will be stationed offshore.
- Before the Test Pile Program commences, MMOs and POA authorities will meet to determine the most appropriate observation platform(s) for monitoring during pile driving. Considerations will include:
  - Height of the observation platform, to maximize field of view and distance
  - Ability to see the shoreline, along which beluga whales commonly travel

◦ Safety of the MMOs, construction crews, and other people present at the POA

◦ Minimizing interference with POA activities

Height and location of an observation platform are critical to ensuring that MMOs can adequately observe the harassment zone during pile installation. The platform should be mobile and able to be relocated to maintain maximal viewing conditions as the construction site shifts along the waterfront. Past monitoring efforts at the POA took place from a platform built on top of a cargo container or a platform raised by an industrial scissor lift. A similar shore-based, raised, mobile observation platform will likely be used for the Test Pile Program.

• POA will monitor a 100-meter ''shutdown'' zone during all pile-driving operations (vibratory and impact) to prevent Level A take by injury. If a marine mammal passes the 100-meter shutdown zone prior to the cessation of in-water pile installation but does not reach the Level A harassment zone, which is 14 m for pinnipeds 63 m for cetaceans, there is no Level A take.

• MMOs will begin observing for marine mammals within the Level A and Level B harassment zones for 20 minutes before ''the soft start'' begins. If a marine mammal(s) is present within the 100-meter shutdown zone prior to the ''soft start'' or if marine mammal occurs during ''soft start'' pile driving will be delayed until the animal(s) leaves the 100-meter shutdown zone. Pile driving will resume only after the MMOs have determined, through sighting or by waiting 20 minutes, that the animal(s) has moved outside the 100-meter shutdown zone. After 20 minutes, when the MMOs are certain that the 100-meter shutdown zone is clear of marine mammals, they will authorize the soft start to begin.

• If a marine mammal is traveling along a trajectory that could take it into the Level B harassment zone, the MMO will record the marine mammal(s) as a ''take'' upon entering the Level B harassment zone. While the animal remains within the Level B harassment zone, that pile segment will be completed without cessation, unless the animal approaches the 100-meter shutdown zone, at which point the MMO will authorize the immediate shutdown of in-water pile driving before the marine mammal enters the 100-meter shutdown zone. Pile driving will resume only once the animal has left the 100-meter shutdown zone on its own or has not been resighted for a period of 20 minutes.

• Beluga whale calves are likely more susceptible to loud anthropogenic noise than juveniles or adults. If a calf is sighted approaching a harassment zone, in-water pile driving will cease and not resume until the calf is confirmed to be out of the harassment zone and on a path away from the pile driving. If a calf or the group with a calf is not re-sighted within 20 minutes, pile driving may resume.

• If waters exceed a sea-state which restricts the observers' ability to make observations within the marine mammal shutdown zone (the 100 meter radius) (*e.g.* excessive wind or fog), impact pile installation will cease until conditions allow the resumption of monitoring.

• The waters will be scanned 20 minutes prior to commencing pile driving at the beginning of each day, and prior to commencing pile driving after any stoppage of 20 minutes or greater. If marine mammals enter or are observed within the designated marine mammal buffer zone (the 100m radius) during or 20 minutes prior to pile driving, the monitors will notify the on-site construction manager to not begin until the animal has moved outside the designated radius.

• The waters will continue to be scanned for at least 20 minutes after pile driving has completed each day.

Mitigation Conclusions

NMFS has carefully evaluated the applicant's proposed mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribes the means of affecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

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

• The proven or likely efficacy of the specific measure to minimize adverse impacts as planned

• The practicability of the measure for applicant implementation,

Any mitigation measure(s) prescribed by NMFS should be able to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

1. Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal).

2. A reduction in the numbers of marine mammals (total number or number at biologically important time or location) exposed to received levels of pile driving, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only).

3. A reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to received levels of pile driving, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only).

4. A reduction in the intensity of exposures (either total number or number at biologically important time or location) to received levels of pile driving, or other activities expected to result in the take of marine mammals (this goal may contribute to a, above, or to reducing the severity of harassment takes only).

5. Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time.

6. For monitoring directly related to mitigation—an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

Based on our evaluation of the applicant's proposed measures, as well as other measures considered by NMFS, our preliminarily determination is that the proposed mitigation measures provide the means of effecting the least practicable impact on marine mammals 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 ITA 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 ITAs 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. POA submitted a marine mammal monitoring plan as part of the IHA application. It can be found at *http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm.*

Monitoring measures prescribed by NMFS should accomplish one or more of the following general goals:

1. An increase in the probability of detecting marine mammals, both within the mitigation zone (thus allowing for more effective implementation of the mitigation) and in general to generate more data to contribute to the analyses mentioned below;
2. An increase in our understanding of how many marine mammals are likely to be exposed to levels of pile driving that we associate with specific adverse effects, such as behavioral harassment, TTS, or PTS;
3. An increase in our understanding of how marine mammals respond to stimuli expected to result in take and how anticipated adverse effects on individuals (in different ways and to varying degrees) may impact the population, species, or stock (specifically through effects on annual rates of recruitment or survival) through any of the following methods:
   - Behavioral observations in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict received level, distance from source, and other pertinent information);
   - Physiological measurements in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict received level, distance from source, and other pertinent information);
   - Distribution and/or abundance comparisons in times or areas with concentrated stimuli versus times or areas without stimuli;
4. An increased knowledge of the affected species; and
5. An increase in our understanding of the effectiveness of certain mitigation and monitoring measures.

Acoustic Monitoring

The POA will conduct acoustic monitoring for impact pile driving to determine the actual distances to the 190 dB re 1μPa rms, 180 dB re 1μPa rms, and 160 dB re 1μPa rms isopleths, which are used by NMFS to define the Level A injury and Level B harassment zones for pinnipeds and cetaceans for impact pile driving. Encapsulated bubble curtains and resonance-based attenuation systems will be tested during installation of some piles to determine their relative effectiveness at attenuating underwater noise. The POA will also conduct acoustic monitoring for vibratory pile driving to determine the actual distance to the 120 dB re 1μPa rms isopleth for behavioral harassment relative to background levels (estimated to be 125 dB re 1μPa in the project area).

A typical daily sequence of operations for an acoustic monitoring day will include the following activities:

- Discussion of the day's pile-driving plans with the crew chief or appropriate contact and determination of setup locations for the fixed positions. Considerations include the piles to be driven and anticipated barge movements during the day.
- Calibration of hydrophones.
- Setup of the near (10-meter) system either on the barge or the existing dock.
- Deployment of an autonomous or cabled hydrophone at one of the distant locations.
- Recording pile driving operational conditions throughout the day.
- Upon conclusion of the day's pile driving, retrieve the remote systems, post-calibrate all the systems, and download all systems.
- A stationary hydrophone recording system will be suspended either from the pile driving barge or existing docks at approximately 10 meters from the pile being driven, for each pile driven. These data will be monitored in real-time.
- Prior to monitoring, a standard depth sounder will record depth before pile driving commences. The sounder will be turned off prior to pile driving to avoid interference with acoustic monitoring. Once the monitoring has been completed, the water depth will be recorded.
- A second stationary hydrophone will be deployed across the Knik Arm near Port MacKenzie, approximately 2,800–3,200 meters from the pile, from either an anchored floating raft or an autonomous hydrophone recorder package (Figure 13–2 and Figure 13–3 in Application). At 3,000 meters, the hydrophone will be located in the water approximately three-quarters of the way across Knik Arm. The autonomous hydrophone is a self-contained system that is anchored and suspended from a float. Data collected using this system will not be in real-time; the distant hydrophones will collect a continuous recording of the noise produced by the piles being driven.

Vessel-based Hydrophones (One to Two Locations):

- An acoustic vessel with a single-channel hydrophone will be in the Knik Arm open water environment to monitor near-field and real-time isopleths for marine mammals (Figure 13–1, Figure 13–4 in Application).
- Continuous measurements will be made using a sound level meter.
- One or two acoustic vessels are proposed to deploy hydrophones that will be used to collect data to estimate the distance to far-field sound levels (*i.e.,* the 120–125-dB zone for vibratory and 160-dB zone for impact driving).
- During the vessel-based recordings, the engine and any depth finders must be turned off. The vessel must be silent and drifting during spot recordings.
- Either a weighted tape measure or an electronic depth finder will be used to determine the depth of the water before measurement and upon completion of measurements. A GPS unit or range finder will be used to determine the distance of the measurement site to the piles being driven.
- Prior to and during the pile-driving activity, environmental data will be gathered, such as water depth and tidal level, wave height, and other factors, that could contribute to influencing the underwater sound levels (*e.g.,* aircraft, boats, etc.). Start and stop time of each pile-driving event and the time at which the bubble curtain is turned on and off will be logged.
- The construction contractor will provide relevant information, in writing, to the hydroacoustic monitoring contractor for inclusion in the final monitoring report:

Data Collection

MMOs will use approved data forms. Among other pieces of information, POA 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, POA will attempt to distinguish between the number of individual animals taken and the number of incidents of take. At a minimum, the following information would be collected on the sighting forms:

- Date and time that monitored activity begins or ends;
- Construction activities occurring during each observation period;
- 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 Measures

POA would provide NMFS with a draft monitoring report within 90 days of the conclusion of the proposed construction work or 60 days prior to any subsequent authorization, whichever is sooner. A monitoring report is required before another authorization can be issued to POA. 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. If no comments are received from NMFS within 30 days, 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.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA (if issued), such as an injury, serious injury or mortality (*e.g.,* ship-strike, gear interaction, and/or entanglement), POA would immediately cease the specified activities and report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinators. The report would include the following information:

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

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

In the event that POA discovers an injured or dead marine mammal, and the lead MMO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.,* in less than a moderate state of decomposition as described in the next paragraph), POA would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with POA to determine whether modifications in the activities are appropriate.

In the event that POA discovers an injured or dead marine mammal, and the lead MMO 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), POA would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators, within 24 hours of the discovery. POA would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

Estimated Take by Incidental Harassment

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

All anticipated takes would be by Level B harassment resulting from vibratory pile driving and impact pile driving and are likely to involve temporary changes in behavior. Physical injury or lethal takes are not expected due to the expected source levels and sound source characteristics associated with the activity, and the proposed mitigation and monitoring measures are expected to further minimize the possibility of such take.

Given the many uncertainties in predicting the quantity and types of impacts of sound on marine mammals, it is common practice to estimate how many animals are likely to be present within a particular distance of a given activity, or exposed to a particular level of sound, where NMFS believes take is likely.

Upland work can generate airborne sound and create visual disturbance that could potentially result in disturbance to marine mammals (specifically, pinnipeds) that are hauled out or at the water's surface with heads above the water. However, because there are no regular haul-outs in the vicinity of the site of the proposed project area, we believe that incidents of incidental take resulting from airborne sound or visual disturbance are unlikely.

POA has requested authorization for the incidental taking of small numbers of Steller sea lion, harbor seal, harbor porpoise, killer whale and beluga whale near the project area that may result from vibratory and impact pile driving during activities associated with a Test Pile Program.

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 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 incidences of take.

Sound Thresholds

We use generic sound exposure thresholds to determine when an activity that produces sound might result in impacts to a marine mammal such that a take by harassment might occur. To date, no studies have been conducted that explicitly examine impacts to marine mammals from pile driving sounds or from which empirical sound thresholds have been established. These thresholds (Table 4) are used to estimate when harassment may occur (*i.e.,* when an animal is exposed to levels equal to or exceeding the relevant criterion) in specific contexts; however, useful contextual information that may inform our assessment of effects is typically lacking and we consider these thresholds as step functions. NMFS is working to revise these acoustic guidelines; for more information on that process, please visit *www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.*

TABLE 4—UNDERWATER INJURY AND DISTURBANCE THRESHOLD DECIBEL LEVELS FOR MARINE MAMMALS

Criterion	Criterion definition	Threshold *
Level A harassment	PTS (injury) **	190 dB RMS for pinnipeds. 180 dB RMS for cetaceans.
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).	125 dB RMS ***.

* All decibel levels referenced to 1 micropascal (re: 1 µPa). Note all thresholds are based off root mean square (RMS) levels
** PTS=Permanent Threshold Shift conservatively based on TTS (Temporary Threshold Shift)
*** Assuming ambient background noise of 125 dB RMS. Usually 120 dB RMS

Distance to Sound Thresholds

Underwater Sound Propagation Formula—Pile driving generates underwater noise that can potentially result in disturbance to marine mammals in the project area. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6 dB reduction in sound level for each doubling of distance from the source (20*log[range]). Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10*log[range]). A practical spreading value of fifteen is often used in the absence of reliable data and under conditions where water increases with depth as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions. Practical spreading loss (4.5 dB reduction in sound level for each doubling of distance) is assumed here.

A review of underwater sound measurements for similar projects was undertaken to estimate the near-source sound levels for vibratory and impact pile driving at POA. Sounds from similar-sized steel shell piles have been measured in water for several projects. Measurements conducted for the US Navy Explosive Handling Wharf in the Hood Canal, in the Puget Sound at Naval Base Kitsap-Bangor, Washington, are most representative due to the similar pile size and depth of water at the site. Underwater sound levels at 10 m for 48-inch-diameter pile installation was measured at 164 dB RMS for vibratory driving and 192 dB RMS for impact driving (Illingsworth & Rodkin 2012, 2013). This data was used to calculate distances to Level A and Level B thresholds.

The formula for transmission loss is TL = X log10 (R/10), where R is the distance from the source assuming the near source levels are measured at 10 meters (33 feet) and X is the practical spreading loss value. This TL model, based on the default practical spreading loss assumption, was used to predict distances to isopleths for Level A injury and Level B harassment (Table 5). Pile-driving sound measurements recorded during the Test Pile Program will further refine the rate of sound propagation or TL and help inform the APMP marine mammal monitoring strategy.

TABLE 5—DISTANCES IN METERS TO NMFS' LEVEL A (INJURY) AND LEVEL B HARASSMENT THRESHOLDS (ISOPLETHS) FOR A 48-INCH-DIAMETER PILE, ASSUMING A 125-dB BACKGROUND NOISE LEVEL

Pile diameter (inches)	Impact			Vibratory		
	Pinniped, level A injury 190 dB	Cetacean, level A injury 180 dB	Level B harassment 160 dB	Pinniped, level A injury 190 dB	Cetacean, level A injury 180 dB	Level B harassment 125 dB
48, unattenuated	14 m	63 m	1,359 km	<10 m	<10 m	3,981 m

The distances to the Level B harassment and Level A injury isopleths were used to estimate the areas of the Level B harassment and Level A injury zones for an unattenuated a 48-inch pile. Note that 125 dB was used as the Level B harassment zone isopleth since ambient noise is likely elevated in that area. Distances and areas were calculated for both vibratory and impact pile driving, and for cetaceans and pinnipeds. Geographic information system software was used to map the Level B harassment and Level A injury isopleths from each of the six indicator test pile locations. Land masses near the POA, including Cairn Point, the North Extension, and Port MacKenzie, act as barriers to underwater noise and prevent further spread of sound pressure waves. As such, the harassment zones for each threshold were truncated and modified with consideration of these impediments to sound transmission (See Figures 6–1—6–6 in the Application). The measured areas (Table 6) were then used in take calculations for beluga whales. Although sound attenuation methods will be used during pile installation, it is unknown how effective they will be and for how many hours they will be utilized. Therefore, to estimate potential exposure of beluga whales, the areas of the harassment zones for impact and vibratory pile driving with no sound attenuation were used.

TABLE 6—AREAS OF THE LEVEL A INJURY ZONES AND LEVEL B HARASSMENT ZONES *

	Impact					
	Pinniped, level A injury	Cetacean, level A injury	Level B harassment			
			Indicator test piles	190 dB	180 dB	160 dB
Piles 3 and 4	<0.01 km²	<0.01 km²	2.24 km²	0 km²	0 km²	15.54 km²
Pile 1			2.71 km²			19.54 km²
Pile 2			2.76 km²			20.08 km²
Pile 5 and 6			2.79 km²			20.90 km²
Pile 7			2.80 km²			20.95 km²
Piles 8, 9, 10			3.03 km²			22.14 km²

* Based on the distances to sound isopleths for a 48-inch-diameter pile, assuming a 125-dB background noise level.

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a ZOI, described earlier in the mitigation section, during active pile driving. Monitoring data recorded for the MTRP were used to estimate daily sighting rates for harbor seals and harbor porpoises in the project area (See Table 4–1 and 4–2 in Application). Sighting rates of harbor seals and harbor porpoises were highly variable, and there was some indication that reported sighting rates may have increased during the years of MTRP monitoring. It is unknown whether any increase, if real, were due to local population increases or habituation to on-going construction activities. Shelden *et al.* (2014) reported evidence of increased abundance of harbor porpoise in upper Cook Inlet, which may have contributed to this pattern. As a conservative measure, the highest monthly individual sighting rate for any recorded year was used to quantify take of harbor seals and harbor porpoises for pile driving associated with the Test Pile Program.

The pile driving take calculation for all harbor seal and harbor porpoise exposures is: Exposure estimate = (N) * # days of pile driving per site, where:

N = highest daily abundance estimate for each species in project area

Take for Steller sea lions was estimated based on three sightings of what was likely a single individual. Take for killer whales was estimated based on their known occasional presence in the project area, even though no killer whales were observed during past MTRP monitoring efforts.

Beluga Whale

Aerial surveys for beluga whales in Cook Inlet were completed in June and July from 1993 through 2008 (Goetz *et al.* 2012). Data from these aerial surveys were used along with depth soundings, coastal substrate type, an environmental sensitivity index, an index of anthropogenic disturbance, and information on anadromous fish streams to develop a predictive beluga whale habitat model (Goetz *et al.* 2012). Three different beluga distribution maps were produced from the habitat model based on sightings of beluga whales during aerial surveys. First, the probability of beluga whale presence was mapped using a binomial (*i.e.,* yes or no) distribution and the results ranged from 0.00 to 0.01. Second, the expected group size was mapped. Group size followed a Poisson distribution, which ranged from 1 to 232 individuals in a group. Third, the product (*i.e.,* multiplication) of these predictive models produced an expected density model, with beluga whale densities ranging from 0 to 1.12 beluga whales/km². From this model Goetz *et al.* (2012) developed a raster GIS dataset which provides a predicted density of beluga whales throughout Cook Inlet at a scale of one square kilometer (See Figure 6–7 in the Application). Habitat maps for beluga whale presence, group size, and density (beluga whales/km²) were produced from these data and resulting model, including a raster Geographic Information System data set, which provides a predicted density of beluga whales throughout Cook Inlet at a 1-km² scale grid.

The numbers of beluga whales potentially exposed to noise levels above the Level B harassment thresholds for impact (160 dB) and vibratory (125 dB) pile driving were estimated using the following formula:

Beluga Exposure Estimate = N * Area * # days of pile driving where:

N = maximum predicted # of beluga whales/km²

Area = Area of Isopleth (area in km² within the 160-dB isopleth for impact pile driving, or area in km² within the 125-dB isopleth for vibratory pile driving); (Table 6)

The beluga whale exposure estimate was calculated for each of the six indicator test pile locations separately, because the area of each isopleth was different for each location. The predicted beluga whale density raster (developed by Goetz *et al.* 2012) was overlaid with the isopleth areas for each of the indicator test pile locations. The maximum predicted beluga whale density within each area of isopleth was then used to calculate the beluga whale exposure estimate for each of the indicator test pile locations. The maximum density values ranged from 0.031 to 0.063 beluga whale/km².

The area values from Table 6 were multiplied by these maximum predicted densities. The final step in the equation is to account for the number of days of exposure. As discussed in Section 1.2, the maximum number of days of impact pile driving, plus a 25 percent contingency, is 31 days. As such, the predicted exposure estimate for each of the 10 indicator test piles was multiplied by 3.1 to account for the number of days of exposure. The maximum number of days of vibratory pile driving (10), plus a 25 percent contingency, is 12.5 days. As such, the predicted exposure estimate for each indicator test pile was multiplied by 1.25 to account for the number of days of exposure. The total estimated exposure of beluga whales to Level B harassment from impact pile driving (160 dB) is 3.884. The total estimated exposure of beluga whales to Level B harassment from vibratory pile driving (125 dB) is 15.361. The expected number of beluga whale exposures for each indicator test pile and total exposure estimates is shown in Table 7.

TABLE 7—MAXIMUM PREDICTED BELUGA WHALE DENSITIES AND EXPOSURE ESTIMATES WITHIN EACH OF THE SIX UNIQUE ISOPLETH AREAS

Indicator test pile	Impact driving (160 dB) maximum density (whales/km²)	Vibratory driving (125dB) maximum density (whales/km²)	Impact driving exposure estimate	Vibratory driving exposure estimate
3,4	0.031	0.056	0.428	2.191
1	0.042	0.063	0.350	1.541
2	0.038	0.062	0.329	1.550
5,6	0.062	0.062	1.066	3.225
7	0.062	0.062	0.536	1.617
8,9,19	0.042	0.063	1.175	5.238
Total Exposure Estimates			3.884	15.361

Based on predicted beluga whale density in the vicinity of the POA, an estimated total of 19.245 beluga whales could be exposed to noise levels at the Level B harassment level during vibratory and impact pile driving (Table 7).

Beluga whale distribution in Cook Inlet is much more clumped than is portrayed by the estimated density model (See Figure 6–7 in Application). Beluga whales are highly mobile animals that move based on tidal fluctuations, prey abundance, season, and other factors. Generally, beluga whales pass through the vicinity of the POA to reach high-quality feeding areas in upper Knik Arm or at the mouth of the Susitna River. Although beluga whales may occasionally linger in the vicinity of the POA, they typically transit through the area. It is important to note that the instantaneous probability of observing a beluga whale at any given time is extremely low (0.0 to 0.01) based on the Goetz *et al.* (2012) model; however, the probability of observing a beluga whale can change drastically and increase well above predicted values based on season, prey abundance, tide stage, and other variables. The Goetz *et al.* (2012) density model is the best available information for upper Cook Inlet and for the estimation of beluga whale density across large areas. However, in order to account for the clumped and highly variable distribution of beluga whales, we have accounted for large groups to improve our estimate of exposure.

During previous POA monitoring, large groups of beluga whales were seen swimming through the POA vicinity. Based on reported takes in monitoring reports from 2008 through 2011, groups of beluga whales were occasionally taken by Level B harassment during previous POA activities (See Table 6–9 in Application).

During past monitoring efforts, an occasional group of animals was observed, and on three occasions, groups of five beluga whales or more were observed (See Table 6–9 in Application). Therefore, the use of the beluga exposure estimate formula alone does not account for larger groups of beluga whales that could be taken, and does not work well for calculating relatively minor, short-term construction events involving small population densities or infrequent occurrences of marine mammals.

The beluga density estimate used for estimating potential beluga exposures does not accurately reflect the reality that beluga whales can travel in large groups. As a contingency that a large group of beluga whales could occur in the project area, NMFS buffered the exposure estimate detailed in the preceding by adding the estimated size of a notional large group of beluga whales. Incorporation of large groups into the beluga whale exposure estimate is intended to reduce risk to the Test Pile Program of the unintentional take of a larger number of belugas than would be authorized by using the density method alone. A common convention in statistics and other fields is use of the 95th percentile to evaluate risk. Use of the 95th percentile of group size to define a large group of beluga whales, which can be added to the estimate of exposure, calculated by the density method, provides a conservative value that reduces the risk to the POA of taking a large group of beluga whales and exceeding authorized take levels. A single large group has been added to the estimate of exposure for beluga whales based on the density method, in the anticipation that the entry of a large group of beluga whales into a Level B harassment zone would take place, at most, one time during the project. To determine the most appropriate size of a large group, two sets of data were examined: (1) Beluga whale sightings collected opportunistically by POA employees since 2008 (See Table 6–10 in Application), and (2) Alaska Pacific University (APU) scientific monitoring that occurred from 2007 through 2011 (See Table 6–11, Figure 1–1 in Application). It is important to understand how data were collected for each data set to assess how the data can be used to determine the size of a large group.

POA employees are encouraged to document opportunistic sightings of beluga whales in a logbook. This has resulted in a data set of beluga sightings that spans all months over many years, and includes estimates of group size. Observations were not conducted systematically or from the same location, and this data set is likely to be biased in that smaller groups or individual whales are less likely to be sighted than larger groups. However, the data set contains good information on relative frequency of sightings and maximum group sizes. The APU data were collected systematically by dedicated observers, and bias against small groups is likely less than for the POA opportunistic sightings. However, the APU data were collected over a more limited range of dates, and sampling effort was less in April and May, when the Test Pile Program is scheduled. Both data sets are useful for assessing beluga group size in the POA area.

The APU scientific monitoring data set documents 390 beluga whale sightings. Group size exhibits a mode of 1 and a median of 2, indicating that over half of the beluga groups observed over the 5-year span of the monitoring program were of individual beluga whales or groups of 2. As expected, the opportunistic sighting data from the POA do not reflect this preponderance of small groups. The POA opportunistic data do indicate, however, that large groups of belugas were regularly seen in the area over the past 7 years, and that group sizes ranged as high as 100 whales. Of the 131 sightings documented in the POA opportunistic data set, 48 groups were of 15 or more beluga whales.

The 95th percentile of group size for the APU scientific monitoring data is 11.1 beluga whales (rounded up to 12 beluga whales). This means that, of the 390 documented beluga whale groups in this data set, 95 percent consisted of fewer than 11.1 whales; 5 percent of the groups consisted of more than 11.1 whales. Therefore, it is improbable that a group of more than 12 beluga whales would occur during the Test Pile Program. This number balances reduced risk to the POA with protection of beluga whales. POA opportunistic observations indicate that many groups of greater than 12 beluga whales commonly transit through the project area. APU scientific monitoring data indicate that 5 percent of their documented groups consisted of greater than 12 beluga whales. To reduce the chance of the POA reaching or exceeding authorized take, and to minimize harassment to beluga whales, in-water pile driving operations will be shut down if a group of 5 or more beluga whales is sighted approaching the Level B harassment 160 dB and 125 dB isopleths. Although POA would shut down for groups of 5 or more belugas, NMFS assumes here that a large group occurring in the far reaches of the ZOI may not be observed by the MMOs.

The total number of proposed takes of Cook Inlet beluga whales is, therefore, 19.245 (density method) plus 12 (large group method) rounded up to a conservative 32 total incidents of take. No Level A harassment is expected or proposed.

Harbor Seal

Airborne noise was not considered in this analysis since no known harbor seal haul-out or pupping sites occur in the vicinity of the POA. With the exception of newborn pups, all ages and sexes of harbor seals could occur in the project area for the duration of the Test Pile Program. However, harbor seals are not known to regularly reside in the POA area. For these reasons, any harassment to harbor seals during test pile driving will primarily involve a limited number of individuals that may potentially swim through the project area. Harbor seals that are disturbed by noise may change their behavior and be temporarily displaced from the project area for the short duration of test pile driving.

The maximum number of harbor seals observed during POA construction monitoring conducted from 2005 through 2011 was 57 individuals, recorded over 104 days of monitoring, from June–November 2011. Based on these observations, sighting rates during the 2011 POA construction monitoring period were 0.55 harbor seal/day. Take by Level B harassment during 31 days of impact and vibratory pile driving for the Test Pile Program is anticipated to be less than 1 harbor seal per day. With in water pile driving occurring for only about 27 hours over those 31 days, the potential for exposure within the 160-dB and 125-dB isopleths is anticipated to be low. Level B take is conservatively estimated at a total of 31 harbor seals (31 days x 1 harbor seal/day) for the duration of the Test Pile Program. Few harbor seals are expected to approach the project area, and this small number of takes is expected to have no more than a negligible effect on individual animals, and no effect on the population as a whole. Level B harassment has the most potential to occur during the mid-summer and fall when anadromous prey fish return to Knik Arm, in particular near Ship Creek south of the POA area. Because the unattenuated 190-dB isopleth is estimated to extend only 14 meters from the source, no Level A harassment take is anticipated or proposed under this authorization.

Steller Sea Lion

Steller sea lions are expected to be encountered in low numbers, if at all, within the project area. Based on the three sightings of what was likely a single individual in the project area in 2009, NMFS proposes an encounter rate of 1 individual every 5 pile driving days. The proposed Test Pile Program will drive piles for up to 31 days and, therefore, NMFS proposes the take of up to 6 individuals over the duration of test pile driving activities. Because the unattenuated 190-dB isopleth is estimated to extend only 14 meters from the source, no Level A harassment take is anticipated or proposed.

Harbor Porpoises

Aerial surveys designed specifically to estimate population size for the three management stocks of harbor porpoises in Alaska were conducted in 1997, 1998, and 1999 (Hobbs and Waite 2010). As part of the overall effort, Cook Inlet harbor porpoises were surveyed 9–15 June 1998 by NMFS as part of their annual beluga whale survey effort (Hobbs and Waite 2010; Rugh *et al.* 2000). The survey yielded an average harbor porpoise density in Cook Inlet of 0.013 harbor porpoise/km^2, with a coefficient of variation of 13.2 percent. Although the survey transited both upper and lower Cook Inlet, harbor porpoise sightings were limited to 8, all of which were south of Tuxedni Bay, in lower Cook Inlet; no harbor porpoises were sighted during this survey in upper Cook Inlet. Given the summer timing of this survey effort and lack of upper Cook Inlet sightings, NMFS determined that use of this density for estimating take of harbor porpoises in association with the Test Pile Program, which is planned for the fall season, will not be appropriate.

Harbor porpoise sighting rates during the POA pre-construction monitoring period in 2007 were rare, and only four sightings were reported in 2005 (Table 4–2). Harbor porpoise sighting rates in the project area from 2008–2011 during pile driving and other port activities ranged from 0–0.09 harbor porpoise/day. We have rounded this up to 1 harbor porpoise per day. Take by Level B harassment during the Test Pile Program over 31 days of pile driving activity is estimated to be no more than 31 harbor porpoises (31 days × 1 harbor porpoise/day). Harbor porpoises sometimes travel in small groups, so as a contingency, an additional 6 harbor porpoise takes are estimated, for a total of 37 Level B takes. With in-water pile driving occurring for only about 27 hours over those 31 days, the potential for exposure within the 160-dB and 125-dB isopleths is anticipated to be low. Because the unattenuated 190-dB isopleth is estimated to extend only 63 meters from the source, no Level A take is anticipated, nor requested under this authorization.

Killer Whales

No killer whales were sighted during previous monitoring programs for the Knik Arm Crossing and POA construction projects, based on a review of monitoring reports. The infrequent sightings of killer whales that are reported in upper Cook Inlet tend to occur when their primary prey (anadromous fish for resident killer whales and beluga whales for transient killer whales) are also in the area (Shelden *et al.* 2003).

With in-water pile driving occurring for only about 27 hours over 31 days, the potential for exposure within the Level B harassment isopleths is anticipated to be extremely low. Level B take is conservatively estimated at no more than 8 killer whales, or two small pods, for the duration of the Test Pile Program. Few killer whales are expected to approach the project area, and this small potential exposure is expected to have no more than a nominal effect on individual animals. Because the unattenuated 180-dB isopleth is estimated to extend only 63 meters from the source, no Level A harassment take is anticipated or proposed.

Analysis and Preliminary Determinations

Negligible Impact

Negligible impact is ''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 Level B harassment takes, alone, is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be ''taken'' through behavioral harassment, NMFS must consider other factors, such as the likely nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, effects on habitat, and the status of the species.

To avoid repetition, the discussion of our analyses applies to all the species listed in Table 2, given that the anticipated effects of this pile driving project on marine mammals are expected to be relatively similar in nature. Except for beluga whales, where we provide additional discussion, there is no information about the size, status, or structure of any species or stock that would lead to a different analysis for this activity, else species-specific factors would be identified and analyzed.

Pile driving activities associated with the Test Pile Program, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment (behavioral disturbance) only, from underwater sounds generated from pile driving. Harassment takes could occur if individuals of these species are present in the ensonified zone when pile driving is happening.

No injury, serious injury, or mortality is anticipated given the nature of the activity and measures designed to minimize the possibility of injury to marine mammals. The potential for these outcomes is minimized through the implementation of the following planned mitigation measures. POA will employ a ''soft start'' when initiating driving activities. Given sufficient ''notice'' through use of soft start, marine mammals are expected to move away from a pile driving source. The likelihood of marine mammal detection ability by trained observers is high under the environmental conditions described for waters around the project area. This further enables the implementation of shutdowns if animals come within 100 meters of operational activity to avoid injury, serious injury, or mortality. POA's proposed activities are localized and of relatively short duration. The total amount of time spent pile driving, including a 25% contingency, will be 27 hours over approximately 31 days.

These localized and short-term noise exposures may cause brief startle reactions or short-term behavioral modification by the animals. These reactions and behavioral changes are expected to subside quickly when the exposures cease.

The project also is not expected to have significant adverse effects on affected marine mammals' habitat, as analyzed in detail in the ''Anticipated Effects on Marine Mammal Habitat'' section. No important feeding and/or reproductive areas for marine mammals other than beluga whales are known to be near the proposed project area. Project-related activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range; but, because of the short duration of the activities and the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

Beluga whales have been observed transiting past the POA project by both scientific and opportunistic surveys. During the spring and summer when the Test Pile Program is scheduled belugas are generally concentrated near warmer river mouths where prey availability is high and predator occurrence is low (Moore et al. 2000). Data on beluga whale sighting rates, grouping, behavior, and movement indicate that the POA is a relatively low-use area, occasionally visited by lone whales or small groups of whales. They are observed most often at low tide in the fall, peaking in late August to early September. Groups with calves have been observed to enter the POA area, but data do not suggest that the area is an important nursery area. Although POA scientific monitoring studies indicate that the area is not used frequently by many beluga whales, it is apparently used for foraging habitat by whales traveling between lower and upper Knik Arm, as individuals and groups of beluga whales have been observed passing through the area each year during monitoring efforts. Data collected annually during monitoring efforts demonstrated that few beluga whales were observed in July and early August; numbers of sightings increased in mid-August, with the highest numbers observed late August to mid-September. In all years, beluga whales have been observed to enter the project footprint while construction activities were taking place, including pile driving and dredging. The most commonly observed behaviors were traveling, diving, and suspected feeding. No apparent behavioral changes or reactions to in-water construction activities were observed by either the construction or scientific observers (Cornick *et al.* 2011).

Critical habitat for Beluga whales has been identified in the area. However, habitat in the immediate vicinity of the project has been excluded from critical habitat designation. Furthermore the project activities would not modify existing marine mammal habitat. NMFS concludes that both the short-term adverse effects and the long-term effects on Beluga whale prey quantity and quality will be insignificant. The sound from pile driving may interfere with whale passage between lower upper Knik Arm. However, POA is an industrialized area with significant noise from vessel traffic and beluga whales pass through the area unimpeded. Given the low use of the area, lack of observed behavioral changes associated with past construction operations, and nominal impact on critical habitat, NMFS believes that the proposed activity is not expected to impact rates of recruitment or survival for belugas whales and therefore will have a negligible impact on the species.

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. The pile removal activities analyzed here are similar to, or less impactful than, numerous construction activities conducted in other similar locations, which have taken place with no reported 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 here 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 species is unlikely to result in any significant realized decrease in fitness for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. Level B harassment will be reduced to the level of least practicable impact through use of mitigation measures described herein. Finally, if sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the project area while the activity is occurring.

In summary, this negligible impact analysis is founded on the following factors for beluga whales: (1) The seasonal distribution and habitat use patterns of Cook Inlet beluga whales, which suggest that for much of the time only a small portion of the population would be in the vicinity of the Test Pile Program; (2) the proposed mitigation requirements, including shutdowns for groups of 5 or more belugas as well as for or calves approaching the Level B harassment area to avoid impacts to large numbers of belugas or to calves who may be more susceptible to acoustic impacts; (3) the proposed monitoring requirements and mitigation measures described earlier in this document for all marine mammal species that will further reduce the amount and intensity of takes; and (4) monitoring results from previous activities that indicated low numbers of beluga whale sightings within the Level B disturbance exclusion zone and low levels of Level B harassment takes of other marine mammals.

For marine mammals other than beluga whales the negligible impact analysis is based on the following: (1) The possibility of injury, serious injury, or mortality may reasonably be considered discountable; (2) the anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior; (3) the absence of any significant habitat within the project area, including rookeries, significant haul-outs, or known areas or features of special significance for foraging or reproduction; (4) the anticipated efficacy of the proposed mitigation measures in reducing the effects of the specified activity. 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 have a negligible impact on those species.

Therefore, 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 proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from POA's Test Pile Program will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers

Table 8 indicates the numbers of animals that could be exposed to received noise levels that could cause Level B behavioral harassment from work associated with the proposed Test Pile Program. The analyses provided represents between <0.01% to 10.2% of the populations of these stocks that could be affected by Level B behavioral harassment. These are small numbers of marine mammals relative to the sizes of the affected species and population stocks under consideration.

TABLE 8—SUMMARY OF THE ESTIMATED NUMBERS AND PERCENTAGES OF MARINE MAMMALS POTENTIALLY EXPOSED TO LEVEL B HARASSMENT NOISE LEVELS

Species	Level B harassment (160 or 125 dB)	Population	Percentage of population
Harbor Seal	31	27,836	0.11.
Steller sea lion	6	49,497	<0.01.
Harbor porpoise	37	31,046	0.12.
Killer whale	8	2,347 Resident *	0.34 Resident.
		587 Transient	1.36 Transient.
Beluga whale	32	312	10.2.
Total	114		

* Percentage of population being requested for take is calculated out for the maximum of each killer stock. Eight takes are being requested total for both stocks.

Based on the methods used to estimate take, and taking into consideration the implementation of the mitigation and monitoring measures, we preliminarily find that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species for Taking for Subsistence Uses

Under section 101(a)(5)(D), NMFS must find that the taking will not have an unmitigable adverse impact on the availability of the affected species for taking for subsistence uses. NMFS' implementing regulations define ''unmitigable adverse impact'' as an impact resulting from the specified activity:

(1) That is likely to reduce the availability of the species to a level insufficient for a harvest to meet subsistence needs by:

(i) Causing the marine mammals to abandon or avoid hunting areas;

(ii) Directly displacing subsistence users; or

(iii) Placing physical barriers between the marine mammals and the subsistence hunters; and

(2) That cannot be sufficiently mitigated by other measures to increase the availability of marine mammals to allow subsistence needs to be met. (50 CFR 216.103).

The primary concern is the disturbance of marine mammals through the introduction of anthropogenic sound into the marine environment during the proposed Test Pile Program. Marine mammals could be behaviorally harassed and either become more difficult to hunt or temporarily abandon traditional hunting grounds. However, the proposed Test Pile Program will not have any impacts to beluga harvests as none currently occur in Cook Inlet. Additionally, subsistence harvests of other marine mammal species in the proposed project area are limited.

Endangered Species Act (ESA)

The Beluga whale is a marine mammal species listed as endangered under the ESA with confirmed or possible occurrence in the study area. NMFS' Permits and Conservation Division has initiated consultation with NMFS' Protected Resources Division under section 7 of the ESA on the issuance of an IHA to POA under section 101(a)(5)(D) of the MMPA for this activity. Consultation will be concluded prior to a determination on the issuance of an IHA.

National Environmental Policy Act (NEPA)

NMFS is also preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and will consider comments submitted in response to this notice as part of that process. The EA will be posted at *http://www.nmfs.noaa.gov/pr/permits/incidental/construction.htm* once it is finalized.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to POA for the POA Test Pile Program in Anchorage, Alaska, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. The proposed IHA language is provided next.

1. This Incidental Harassment Authorization (IHA) is valid from April 1, 2016 through March 31, 2017.

2. This Authorization is valid only for in-water construction work associated with the POA Test Pile Program in Anchorage, Alaska.

3. General Conditions

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

(b) The species authorized for taking are Steller sea lion (*Eumatopius jubatus*), harbor seal (*Phoca vitulina*), harbor porpoise (*Phocoena phocoena*), killer whale (*Orcinus orca*), and beluga whale (*Delphinapterus Leucas*)

(c) The taking, by Level B harassment only, is limited to the species listed in condition 3(b).

(d) The taking by injury (Level A harassment), serious injury, or death of any of the species listed in condition 3(b) of the Authorization or any taking of any other species of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA.

(e) POA shall conduct briefings between construction supervisors and crews, marine mammal monitoring team, and staff prior to the start of all in-water pile driving, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

4. Mitigation Measures

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

(a) Time Restriction: For all in-water pile driving activities, POA shall operate only during daylight hours.

(b) Pile Driving Weather Delays: Pile driving shall only take place when the 100 m shutdown zone cannot be can be adequately monitored.

(c) Establishment of Level A and B Harassment (ZOI)

(i) For all pile driving, POA shall implement a minimum shutdown zone of 100 m radius around the pile. If a marine mammal comes within or approaches the shutdown zone, such operations will cease. See Table 5 for minimum radial distances required for Level A and Level B disturbance zones.

(d) Shutdown for Large Groups of Beluga Whales.

(i) In-water pile driving operations shall be shut down if a group of five or more beluga whales is sighted approaching the Level B harassment 160 dB and 125 dB isopleths. If the group is not re-sighted within 20 minutes, pile driving shall resume.

(e) Shutdown for Beluga Whale Calves.

(i) If a calf is sighted approaching a harassment zone, in-water pile driving shall cease and shall not be resumed until the calf is confirmed to be out of the harassment zone and on a path away from the pile driving. If a calf is not re-sighted within 20 minutes, pile driving shall resume.

(f) Use of Soft-start

(i) The project shall utilize soft start techniques for both impact and vibratory pile driving. POA shall initiate sound from vibratory hammers for fifteen seconds at reduced energy followed by a 1-minute waiting period, with the procedure repeated two additional times. For impact driving, POA shall conduct an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period, then two subsequent three strike sets. Soft start shall be required at the beginning of each day's pile driving work and at any time following a cessation of pile driving of twenty minutes or longer (specific to either vibratory or impact driving).

(ii) Whenever there has been downtime of 20 minutes or more without vibratory or impact driving, the contractor shall initiate the driving with soft-start procedures described above.

(g) Standard mitigation measures

(i) For in-water heavy machinery work other than pile driving (using, *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.

(h) Visual Marine Mammal Monitoring and Observation

(i) Four MMOs shall work concurrently in rotating shifts to provide full coverage for marine mammal monitoring during in-water pile installation activities for the Test Pile Program. One MMO shall observe the Level A zone and two MMS shall scan the Level B zone. Four MMOs shall rotate through these three active positions every 30 minutes. The fourth MMO shall record data.

(ii) Before the Test Pile Program commences, MMOs and POA authorities shall meet to determine the most appropriate observation platform(s) for monitoring during pile driving.

(iii) MMOs shall begin observing for marine mammals within the Level A and Level B harassment zones for 20 minutes before in-water pile driving begins. If a marine mammal(s) is present within the 100-meter shutdown zone prior to pile driving or during the ''soft start'' the start of pile driving shall be delayed until the animal(s) leaves the 100-meter shutdown zone. Pile driving shall resume only after the MMOs have determined, through sighting or by waiting 20 minutes, that the animal(s) has moved outside the 100-meter shutdown zone.

(iv) If a marine mammal is traveling along a trajectory that could take it into the Level B harassment zone, the MMO shall record the marine mammal(s) as a ''take'' upon entering the Level B harassment zone. While the animal remains within the Level B harassment zone, that pile segment shall be completed without cessation, unless the animal approaches the 100-meter shutdown zone, at which point the MMO shall authorize the immediate shutdown of in-water pile driving before the marine mammal enters the 100-meter shutdown zone. Pile driving shall resume only once the animal has left the 100-meter shutdown zone on its own or has not been resighted for a period of 20 minutes.

(v) MMOs shall be placed on one of the vessels used for hydroacoustic monitoring, which will be stationed offshore.

(vi) The individuals shall scan the waters within each monitoring zone activity using binoculars (25x or equivalent), hand held binoculars (7x) and visual observation.

(vii) The waters shall be scanned 20 minutes prior to commencing pile driving at the beginning of each day, and prior to commencing pile driving after any stoppage of 20 minutes or greater. If marine mammals enter or are observed within the designated marine mammal buffer zone (the 100m radius) during or 20 minutes prior to impact pile driving, the monitors will notify the on-site construction manager to not begin until the animal has moved outside the designated radius.

(viii) The waters shall continue to be scanned for at least 20 minutes after pile driving has completed each day.

5. Monitoring and Reporting

The holder of this Authorization is required to submit a draft report on all monitoring conducted under the IHA 90 calendar days after the completion of the marine mammal monitoring or 60 days prior to the issuance of a subsequent authorization, whichever comes first. 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 informational elements described in the Monitoring Plan, at minimum (see attached), and shall also include:

(a) Acoustic Monitoring

(i) POA conduct acoustic monitoring for representative scenarios of pile driving activity, as described in the Monitoring Plan.

(b) Data Collection

(i) For all marine mammal and acoustic monitoring, information shall be recorded as described in the Monitoring Plan.

(c) Reporting Measures

(i) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner prohibited by the IHA, such as an injury (Level A harassment), serious injury or mortality (*e.g.,* ship-strike, gear interaction, and/or entanglement), POA shall immediately cease the specified activities and immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the Alaska Regional Stranding Coordinators. The report would 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. Status of all sound source use in the 24 hours preceding the incident;
6. Water depth;
7. Environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, and visibility);
8. Description of all marine mammal observations in the 24 hours preceding the incident;
9. Species identification or description of the animal(s) involved;
10. Fate of the animal(s); and
11. Photographs or video footage of the animal(s) (if equipment is available).

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

(iii) In the event that POA discovers an injured or dead marine mammal, and the lead MMO determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.,* in less than a moderate state of decomposition as described in the next paragraph), POA shall immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators. The report shall include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with POA to determine whether modifications in the activities are appropriate.

(iv) In the event that POA discovers an injured or dead marine mammal, and the lead MMO 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), POA shall report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the NMFS Alaska Stranding Hotline and/or by email to the Alaska Regional Stranding Coordinators, within 24 hours of the discovery. POA would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

6. 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

NMFS requests comment on our analysis, the draft authorization, and any other aspect of the Notice of Proposed IHA for POA's proposed Test Pile Program in Anchorage, Alaska. Please include with your comments any supporting data or literature citations to help inform our final decision on POA's request for an MMPA authorization.

Dated: December 11, 2015.

Perry Gayaldo,

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

[FR Doc. 2015–31620 Filed 12–15–15; 8:45 am]

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DEPARTMENT OF COMMERCE

Patent and Trademark Office

Submission for OMB Review; Comment Request; ''International Work Sharing''

The United States Patent and Trademark Office (USTPO) will submit to the Office of Management and Budget (OMB) for clearance the following proposal for collection of information under the provisions of the Paperwork Reduction Act (44 U.S.C. Chapter 35).

Agency: United States Patent and Trademark Office (USPTO).

Title: International Work Sharing.

OMB Control Number: 0651–0079.

Form Number(s):

- PTO/SB/437JP
- PTO/SB/437KR
- PTO/SB/CSP Survey 1

Type of Request: Regular.

Number of Respondents: 900.

Average Hours per Response: The USPTO estimates that it will take the