Matters To Be Considered: The meeting will focus on ongoing committee priorities, and developing the next set of recommendations. The latest version of the agenda will be posted at *http://ioos.noaa.gov/community/u-s-ioos-advisory-committee/.*

Special Accomodations: These meetings are physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Krisa Arzayus, Designated Federal Official at 240–533–9455 by August 16, 2019.

Dated: July 10, 2019.

Carl C. Gouldman,

Director, U.S. IOOS Program, National Ocean Service.

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XG910

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the Sand Island Pile Dike System Test Piles Project Near the Mouth of the Columbia River

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

ACTION: Notice; proposed incidental harassment authorization; request for comments on proposed authorization and possible Renewal.

SUMMARY: NMFS has received a request from U.S. Army Corps of Engineers, Portland District (Corps) for authorization to take marine mammals incidental to the Sand Island Pile Dike System Test Piles project near the Mouth of the Columbia River. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an incidental harassment authorization (IHA) to incidentally take marine mammals during the specified activities. NMFS is also requesting comments on a possible one-year Renewal that could be issued under certain circumstances and if all requirements are met, as described in *Request for Public Comments* at the end of this notice. NMFS will consider public comments prior to making any final decision on the issuance of the requested MMPA authorizations and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than September 5, 2019.

ADDRESSES: Comments 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 online at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection*-act without change. All personal identifying information (*e.g.,* name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

FOR FURTHER INFORMATION CONTACT: Rob Pauline, Office of Protected Resources, NMFS, (301) 427–8401. Electronic copies of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act.* In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

The MMPA prohibits the ''take'' of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (as delegated to NMFS) 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 incidental take authorization may be provided to the public for review.

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other ''means of effecting the least practicable adverse impact'' on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stocks for taking for certain subsistence uses (referred to in shorthand as ''mitigation''); and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

The definitions of all applicable MMPA statutory terms cited above are included in the relevant sections below.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*) and NOAA Administrative Order (NAO) 216–6A, NMFS must review our proposed action (*i.e.,* the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (incidental harassment authorizations with no anticipated serious injury or mortality) of the Companion Manual for NOAA Administrative Order 216–6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review.

We will review all comments submitted in response to this notice prior to concluding our NEPA process or making a final decision on the IHA request.

Summary of Request

On March 6, 2019, NMFS received a request from the Corps for an IHA to take marine mammals incidental to pile driving activities in the Columbia River Estuary. The application was deemed adequate and complete on June 20, 2019. The Corps' request is for take of a small number of harbor porpoises

(*Phocoena phocoena*), Steller sea lions (*Eumetopias jubatus*), California sea lions (*Zalophus californianus*), and harbor seals (*Phoca vitulina richardii*) by Level B harassment and Level A harassment. Neither the Corps nor NMFS expect serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of Proposed Activity

Overview

The Corps is proposing to drive test piles in order to investigate the feasibility of different construction methods at two of the four Sand Island pile dikes at the Mouth of the Columbia River (MCR) (Figure 1 in application). The Sand Island pile dikes are comprised of four pile dikes, which are named according to river mile (RM) location, at RMs 4.01, 4.47, 5.15, and 6.37 (the pile dike at RM 6.37 is also referred to as the Chinook pile dike). Three of the pile dikes are connected to West Sand Island and East Sand Island, and the fourth pile dike in open water runs parallel to the Chinook Channel on the upstream side (Figure 2 in application). The Sand Island pile dikes are part of the Columbia River pile dike system and were installed in the 1930's. The Corps intends to restore full functionality of pile dikes in the future but needs to drive test piles in order to inform possible design. The existing pile dikes have deteriorated greatly due to lack of maintenance. Impact and vibratory pile installation and vibratory pile removal would introduce underwater sounds at levels that may result in take, by Level A and Level B harassment, of marine mammals in the Columbia River Estuary. Construction activities are expected to last between 6 and 41 days.

Dates and Duration

The work is anticipated to take between 6 and 41 days with work occurring during standard daylight working hours, 8 to 10 hours per day, beginning on September 15, 2019. Work is planned to take place in September, October, or November.

Specific Geographic Region

The proposed work would occur at the Sand Island pile dikes in Clatsop County, Oregon. The Sand Island pile dikes are located near the MCR. The pile dike at RM 4.01 is located within Oregon, while the pile dike at RM 6.37 is in both Oregon and Washington. The MCR is the downstream terminus of the Columbia River tidal estuary which is dominated by freshwater inputs from the Columbia and Willamette rivers. This estuary stretches from the mouth upstream to Bonneville Dam at RM 146.

Detailed Description of Specific Activity

Records from previous timber pile dike repairs concluded that trying to drive new timber piles through the existing scour protection rock apron at the base of the pile dike was challenging and would likely not meet sufficient embedment depths or alignment tolerances needed for structural and functional requirements. Since timber piles had insufficient structural capacity to support necessary environmental loading, steel piles were selected for all potential design options.

Preliminary pile dike repair design revealed three options, hereafter described as the offset alignment, existing alignment, and sleeve existing piles. The Corps needs to drive test piles in order to evaluate which of these three designs could achieve the most favorable hydraulic and sediment transport functions, while also considering costs associated with construction and long-term maintenance.

The Sand Island Pile Dike System Test Piles project entails testing the three aforementioned designs at two pile dikes, each with 9 piles. The Corps has designed a specific testing sequence in which up to 3 tests could occur at each of those 18 piles, yielding a total of 41 pile driving events over a maximum of 41 days. The test sequence at any given location includes an attempt with a vibratory hammer or impact hammer with various shoes including ring, cone, or rock tip (See Table 1).

The maximum 41 days of work includes the following estimates for various pile driving activities:

- Up to 20 days of impact driving only (steel piles);
- Up to 18 days of impact driving AND vibratory installation/removal of steel piles; and
- Up to 3 days for vibratory removal of timber piles only.

Piles are generally installed by a rig which supports the pile leads, raises the pile, and operates a hammer. The rigs will use either impact hammers or vibratory drivers. Up to ten existing timber piles may be removed by vibratory methods, pulling, cutting or snapping at the approximate level of the enrockment. Removal with a vibratory hammer is expected to take approximately 5 minutes. After timber pile removal, one of the test methods would be attempted. When refusal criteria is reached, the attempt would cease and the next test method would be attempted as prescribed in the work summary.

The contractor may use barge-mounted cranes equipped with survey grade positioning software to ensure the piles are installed with precision. Driving shoes may also be used. Should unusually difficult driving conditions be encountered, the contractor will be allowed to temporarily excavate the minimum amount of existing scour protection rock needed in order to drive new piles. The contractor will then reinstall the rock to provide scour protection for new piles. Barges will transport all equipment and material to and from the site and serve as staging platforms for construction. Barges may be spudded or anchored into position. Test piles will be removed upon completion of the tests.

Pile driving for test piles may be done with either vibratory or impact hammer, but due to existing enrockment surrounding existing piles, it is anticipated that impact hammer will primarily be used. It is not possible to use bubble curtains or other noise-attenuating devices due to heavy tidal action.

TABLE 1—PILE DRIVING SUMMARY

Pile location and alignment	1st test	2nd test	3rd test	Number of timber piles for vibratory removal (maximum)	Number of steel pile driving events with vibratory hammer	Number of steel pile driving events with impact hammer	Number of steel piles for vibratory removal after testing (maximum)
4–1C Center	Pile Only [1]	Ring [3]	Cone [4]		1	2	1
4–1F Offset	Pile Only	Ring	Cone		1	2	1
4–2C Center	Ring	Cone				2	1
4–2F Offset	Cone	Rock Tip [5]				2	1
4–3C Center	Ring	Cone				2	1
4–3F Offset	Ring	Cone				2	1

TABLE 1—PILE DRIVING SUMMARY—Continued

Pile location and alignment	1st test	2nd test	3rd test	Number of timber piles for vibratory removal (maximum)	Number of steel pile driving events with vibratory hammer	Number of steel pile driving events with impact hammer	Number of steel piles for vibratory removal after testing (maximum)
4–4C Center	Cone	Rock Tip				2	1
4–4F Offset	Ring	Cone				2	1
4–S Center	Pile Only+Sleeve [2].	Ring			1	1	1
6–1C Center	Cone	Rock Tip				2	1
6–1F Offset	Pile Only	Ring	Cone		1	2	1
6–2C Center	Ring	Cone				2	1
6–2F Offset	Ring	Cone				2	1
6–3C Center	Cone	Rock Tip				2	1
6–3F Offset	Ring	Cone				2	1
6–4C Center	Pile Only	Ring	Cone		1	2	1
6–4F Offset	Pile Only	Ring	Cone		1	2	1
6–S Center	Pile Only+Sleeve	Ring			1	1	1
Totals				**10**	**7**	**34**	**18**

[1] Pile only consists of only the open steel pile without an end treatment.
[2] Pile only+sleeve consists of an attempt to drive the new test pile as a sleeve over the existing timber piles.
[3] Ring consists of the steel pile fitted with an open-ended cutting shoe.
[4] Cone consists of the steel pile fitted with a conical shoe.
[5] Rock tip consists of the steel pile fitted with a conical rock-breaking tip.

Proposed mitigation, monitoring, and reporting measures are described in detail later in this document (please see *Proposed Mitigation* and *Proposed Monitoring and Reporting*).

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (SARs; *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS's website (*https://www.fisheries.noaa.gov/find-species*).

Table 2 lists all species with expected potential for occurrence near the test piles project area and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2016). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS's U.S. Pacific Marine Mammal SARs (Carretta *et al.,* 2019). All values presented in Table 2 are the most recent available at the time of publication and are available in the 2018 SARs (Carretta *et al.,* 2019).

TABLE 2—MARINE MAMMAL SPECIES LIKELY TO BE FOUND NEAR THE TEST PILES PROJECT AREA

Common name	Scientific name	Stock	ESA/MMPA status; strategic (Y/N) [1]	Stock abundance (CV, N_{min}, most recent abundance survey) [2]	PBR	Annual M/SI [3]
Order Cetartiodactyla—Cetacea—Superfamily Mysticeti (baleen whales)						
Family Eschrichtiidae:						
Gray whale	*Eschrichtius robustus*	Eastern North Pacific	-, -, N	26,960 (0.05, 25849, 2016)	801	139
Family Balaenopteridae (rorquals):						
Humpback whale	*Megaptera novaeangliae*	California/Oregon/Washington	-, -, Y	2,900 (0.05, 2,784, 2014)	16.7	40.2
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae:						
Killer whale	*Orcinus orca*	West Coast Transient	-, -, N	243 (N/A, 243, 2009)	2.4	0
Family Phocoenidae (porpoises):						
Harbor porpoise	*Phocoena phocoena*	Northern Oregon/Washington Coast.	-, -, N	21,487 (044, 15,123, 2011)	151	3.0

TABLE 2—MARINE MAMMAL SPECIES LIKELY TO BE FOUND NEAR THE TEST PILES PROJECT AREA—Continued

Common name	Scientific name	Stock	ESA/MMPA status; strategic (Y/N) [1]	Stock abundance (CV, N_{min}, most recent abundance survey) [2]	PBR	Annual M/SI [3]
Order Carnivora—Superfamily Pinnipedia						
Family Otariidae (eared seals and sea lions):						
California sea lion	*Zalophus californianus*	U.S. Stock	-, -, N	257,606 (N/A, 233,515, 2014)	14,011	>320
Steller sea lion	*Eumetopias jubatus*	Eastern U.S.	-, -, N	41,638 (See SAR, 41,638, 2015).	2,498	108
Family Phocidae (earless seals):						
Harbor seal	*Phoca vitulina richardii*	Oregon and Washington Coast	-, -, N	UNK (UNK, UNK, 1999)	UND	10.6

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

[2] NMFS marine mammal stock assessment reports online at: *www.nmfs.noaa.gov/pr/sars/*. CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable.

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

All species that could potentially occur in the proposed project area are included in Table 2. However, the temporal and/or spatial occurrence of gray, humpback, and killer whales is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here.

Gray whales have not been documented near the proposed project area although anecdotal evidence indicates they have been seen at the MCR. However, they are not a common visitor as they mostly remain in the vicinity of the offshore shelf-break (Griffith 2015). They migrate along the Oregon coast in three discernible phases from early December through May (Herzing and Mate 1984). Therefore, they are unlikely to occur near the project area in September, October, or November. Additionally, NMFS issued an IHA to the Corps for incidental take of marine mammals associated with vibratory driving activities occurring at Jetty A which is located approximately 2.5 km east of RM 4.01 (80 FR 53777, September 8, 2015). The Level B harassment zone established for that project overlaps with the proposed Level B harassment zone for this proposed test piles project. A marine mammal monitoring report submitted to NMFS on August 1, 2016 included 5 days of observation in June and July of 2016. During that time there were no gray whale sightings. A subsequent marine mammal monitoring report was submitted by the Corps on December 7, 2017 as part of the reporting requirements for a Letter of Authorization (LOA) issued for the rehabilitation of the entire Columbia River Jetty System (82 FR 15046; March 23, 2017). Monitoring by two PSOs during work on Jetty A for two days in July 2017 resulted in no gray whale sightings. Given the size of these whales they could be readily identifiable at a considerable distance. If a gray whale were to approach the established Level B harassment isopleths, shutdown would be initiated to avoid take. The Corps plan to employ at least one vessel-based PSO who would be able to adequately monitor these zones. Therefore, NMFS does expect take to occur.

Humpback whales have been observed in the vicinity of the project area in recent years. They have been arriving in the lower Columbia estuary as early as mid-June and have been observed as late as mid-November with a peak of abundance coinciding with the peak abundance of forage fish in mid-summer. While it is possible that humpback whales could pass through the project area during the construction period, there is a decreased chance of their presence in September, October, and November. The 2016 Jetty A monitoring report recorded nine sightings of humpback whale during the five-day in-water construction period but only a single sighting occurred within the Level B harassment zone. Furthermore, these sightings occurred at the peak of forage fish abundance in June and July. The 2017 LOA monitoring report did not record any sightings. The Corps would initiate shutdown if a humpback was observed approaching the Level B harassment zones. Humpbacks are readily identifiable from a distance, and the Corps will be placing Protected Species Monitors (PSOs) on at least one boat to ensure complete coverage of harassment zones. Therefore, take of humpback whales is not anticipated.

Killer whales from the Southern Resident and West Coast transient stocks could occur near the MCR. Historically, killer whales were regular visitors in the vicinity of the estuary. However, they are much less common presently and are rarely seen in the interior of the Columbia River Jetty system (Wilson 2015). While not regularly seen in the project area, West Coast Transient killer whales have been observed near the MCR during the peak spring Chinook salmon migration in March and April but members of this stock are not likely to occur in the vicinity of the project area during the proposed construction period. Both the 2016 Corps monitoring report and 2017 monitoring report did not record any killer whale sightings. Due to the absence of killer whales observations in the project vicinity, the limited timeframe of proposed pile driving activities, it is highly unlikely that killer whales would be near the Sand Island pile dike system. Should any killer whales be observed approaching the Level B harassment zone, shutdown procedures would be implemented. Therefore, take of killer whales is not expected.

Harbor Porpoise

In the eastern North Pacific Ocean, harbor porpoise are found in coastal and inland waters from Point Barrow, along the Alaskan coast, and down the west coast of North America to Point Conception, California. Harbor porpoise are known to occur year-round in the inland trans-boundary waters of Washington and British Columbia, Canada and along the Oregon/

Washington coast. The Northern Oregon/Washington Coast stock of harbor porpoises ranges from Lincoln City, OR, to Cape Flattery, WA (Carretta *et al.* 2019).

Harbor porpoises are usually found in shallow water, most often nearshore, although they occasionally travel over deeper offshore waters (NOAA 2013a). West Coast populations have more restricted movements and do not migrate as much as East Coast populations (Halpin, OBIS–SEAMAP 2019). Most harbor porpoise groups are small, generally consisting of less than five or six individuals, though for feeding or migration they may aggregate into large, loose groups of 50 to several hundred animals (Halpin, OBIS–SEAMAP 2019). Behavior tends to be inconspicuous, compared to most dolphins, and they feed by seizing prey which consists of wide variety of fish and cephalopods ranging from benthic or demersal (Halpern, OBIS–SEAMAP 2019). Harbor porpoises are sighted year round in the MCR (Griffith 2015). Their abundance peaks with the abundance of anchovy presence in the river and nearshore.

California Sea Lion

California sea lions are found along the west coast from the southern tip of Baja California to southeast Alaska. They breed mainly on offshore islands from Southern California's Channel Islands south to Mexico. Non-breeding males often roam north in spring foraging for food. Since the mid-1980s, increasing numbers of California sea lions have been documented feeding on fish along the Washington coast and—more recently—in the Columbia River as far upstream as Bonneville Dam, 145 mi (233 km) from the river mouth. Large numbers of California sea lions use the nearby South Jetty for hauling out (Jeffries 2000). According to Oregon Department of Fish and Wildlife (ODFW 2014) counts most California sea lions are concentrated near the tip of the South Jetty. ODFW survey information (2007 and 2014) indicates that California sea lions are relatively less prevalent in the Pacific Northwest during June and July, though in the months just before and after their absence there can be several hundred using the South Jetty. More frequent Washington Department of Fish and Wildlife (WDFW 2014) surveys indicate greater numbers in the summer, and use remains concentrated to fall and winter months. Nearly all California sea lions in the Pacific Northwest are sub-adult and adult males (females and young generally stay in California).

Steller Sea Lion

The range of the Steller sea lion includes the North Pacific Ocean rim from California to northern Japan. Steller sea lions forage in nearshore and pelagic waters where they are opportunistic predators. Steller sea lion populations that primarily occur east of 144° W (Cape Suckling, Alaska) comprise the Eastern Distinct Population Segment (DPS) (Carretta *et al.* 2019).

Large numbers of Steller sea lions use the nearby South Jetty for hauling out (Jeffries 2000) and are present, in varying abundances, all year. Use occurs chiefly at the concrete block structure at the terminus, or head of the jetty. According to ODFW (2014), during the summer months it is not uncommon to observe between 500–1,000 Steller sea lions present per day. Steller sea lions are most abundant in the vicinity during the winter months and tend to disperse elsewhere to rookeries during breeding season between May and July (Corps 2007). All population age classes, and both males and females, use the South Jetty to haul out.

While California sea lions also use this area and can intermingle with Steller sea lions, it appears that Steller out-compete California sea lions for the preferred haul out area. Previous monthly averages between 1995 and 2004 for Steller sea lions hauled out at the South Jetty head ranged from about 168 to 1,106 animals. ODFW data from 2000–2014 reflects a lower frequency of surveys, and numbers ranged from zero animals to 606 Steller sea lions (ODFW 2014). More frequent surveys by WDFW for the same time frame (2000–2014) put the monthly range at 177 to 1,663 animals throughout the year.

Harbor Seal

Harbor seals range from Baja California, north along the western coasts of the United States, British Columbia and southeast Alaska, west through the Gulf of Alaska, Prince William Sound, and the Aleutian Islands, and north in the Bering Sea to Cape Newenham and the Pribilof Islands. They are one of the most abundant pinnipeds in Oregon and can typically be found in coastal marine and estuarine waters of the Oregon coast throughout the year. On land, they can be found on offshore rocks and islands, along shore, and on exposed flats in the estuary (Harvey 1987). They haul out on rocks, reefs, beaches, and drifting glacial ice and feed in marine, estuarine, and occasionally fresh waters. Harbor seals generally are non-migratory, with local movements associated with tides, weather, season, food availability, and reproduction. Harbor seals do not make extensive pelagic migrations. (Carretta *et al.* 2019)

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, 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 directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 3.

TABLE 3—MARINE MAMMAL HEARING GROUPS
[NMFS, 2018]

Hearing group	Generalized hearing range *
Low-frequency (LF) cetaceans (baleen whales)	7 Hz to 35 kHz.
Mid-frequency (MF) cetaceans (dolphins, toothed whales, beaked whales, bottlenose whales)	150 Hz to 160 kHz.
High-frequency (HF) cetaceans (true porpoises, *Kogia,* river dolphins, cephalorhynchid, *Lagenorhynchus cruciger & L. australis*).	275 Hz to 160 kHz.
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz.
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz.

* Represents the generalized hearing range for the entire group as a composite (*i.e.,* all species within the group), where individual species' hearing ranges are typically not as broad. Generalized hearing range chosen based on ~65 dB threshold from normalized composite audiogram, with the exception for lower limits for LF cetaceans (Southall *et al.* 2007) and PW pinniped (approximation).

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 and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. Seven marine mammal species (three cetacean and three pinniped (two otariid and one phocid) species) have the reasonable potential to co-occur at the time of the proposed survey activities. Please refer to Table 2. Of the cetacean species that may be present, two are classified as low-frequency cetaceans (*i.e.,* all mysticete species), one is classified as a mid-frequency cetacean (*i.e.,* all delphinid and ziphiid species and the sperm whale), and one is classified as a high-frequency cetacean (*i.e.,* harbor porpoise and Kogia spp.).

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

This section includes a summary and discussion of the ways that components of the specified activity may impact marine mammals and their habitat. The *Estimated Take by Incidental Harassment* section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The *Negligible Impact Analysis and Determination* section considers 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 these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks.

Acoustic effects on marine mammals during the specified activity can occur from vibratory and impact pile driving as well vibratory pile removal. The effects of underwater noise from the Corps' proposed activities have the potential to result in Level A and Level B harassment of marine mammals in the vicinity of the project area.

Description of Sound Sources

This section contains a brief technical background on sound, on the characteristics of certain sound types, and on metrics used in this proposal inasmuch as the information is relevant to the specified activity and to a discussion of the potential effects of the specified activity on marine mammals found later in this document. For general information on sound and its interaction with the marine environment, please see, *e.g.,* Au and Hastings (2008); Richardson *et al.* (1995); Urick (1983).

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 or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the ''loudness'' of a sound and is typically described using the relative unit of the decibel (dB). A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure (for underwater sound, this is 1 microPascal (μPa)), and is a logarithmic unit that accounts for large variations in amplitude; therefore, a relatively small change in dB corresponds to large changes in sound pressure. The source level (SL) represents the SPL referenced at a distance of 1 m from the source (referenced to 1 μPa), while the received level is the SPL at the listener's position (referenced to 1 μPa).

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. Root mean square is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1983). Root mean square 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.

Sound exposure level (SEL; represented as dB re 1 μPa^2-s) represents the total energy in a stated frequency band over a stated time interval or event, and considers both intensity and duration of exposure. The per-pulse SEL is calculated over the time window containing the entire pulse (*i.e.,* 100 percent of the acoustic energy). SEL is a cumulative metric; it can be accumulated over a single pulse, or calculated over periods containing multiple pulses. Cumulative SEL represents the total energy accumulated by a receiver over a defined time window or during an event. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0-pk) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source, and is represented in the same units as the rms sound pressure.

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 a manner similar to ripples on the surface of a pond and may be either directed in a beam or beams or may radiate in all directions (omnidirectional sources), as is the case for sound produced by the pile driving activity considered here. 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, which is defined as environmental background sound levels lacking a single source or point (Richardson *et al.,* 1995). 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.,* wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.,* vessels, dredging, construction) sound. A number of sources contribute to ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kilohertz (kHz) (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of ambient sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total ambient sound 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.

The sum of the various natural and anthropogenic sound sources that comprise ambient sound at any given location and time depends not only on the source levels (as determined by current weather conditions and levels of biological and human 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.

Sounds are often considered to fall into one of two general types: pulsed and non-pulsed (defined in the following). 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. The distinction between these two sound types is not always obvious, as certain signals share properties of both pulsed and non-pulsed sounds. A signal near a source could be categorized as a pulse, but due to propagation effects as it moves farther from the source, the signal duration becomes longer (*e.g.,* Greene and Richardson, 1988).

Pulsed sound sources (*e.g.,* airguns, 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, 2005; Harris, 1998; NIOSH, 1998; ISO, 2003) 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 intermittent (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. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

The impulsive sound generated by impact hammers is characterized by rapid rise times and high peak levels. Vibratory hammers produce non-impulsive, continuous noise at levels significantly lower than those produced by impact hammers. Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (*e.g.,* Nedwell and Edwards, 2002; Carlson *et al.,* 2005).

Acoustic Effects on Marine Mammals

We previously provided general background information on marine mammal hearing (see ''Description of Marine Mammals in the Area of the Specified Activity''). Here, we discuss the potential effects of sound on marine mammals.

Note that, in the following discussion, we refer in many cases to a review article concerning studies of noise-induced hearing loss conducted from 1996–2015 (*i.e.,* Finneran, 2015). For study-specific citations, please see that work. Anthropogenic sounds cover a broad range of frequencies and sound levels and can have a range of highly variable impacts on marine life, from none or minor to potentially severe responses, depending on received levels, duration of exposure, behavioral context, and various other factors. The potential effects of underwater sound from active acoustic sources can potentially result in one or more of the following: temporary or permanent hearing impairment, non-auditory physical or physiological effects, behavioral disturbance, stress, and masking (Richardson *et al.,* 1995; Gordon *et al.,* 2004; Nowacek *et al.,* 2007; Southall *et al.,* 2007; Götz *et al.,* 2009). The degree of effect is intrinsically related to the signal characteristics, received level, distance from the source, and duration of the sound exposure. In general, sudden, high level sounds can cause hearing loss, as can longer exposures to lower level sounds. Temporary or permanent loss of hearing will occur almost exclusively for noise within an animal's hearing range. We first describe specific manifestations of acoustic effects before providing discussion specific to pile driving and removal activities.

Richardson *et al.* (1995) described zones of increasing intensity of effect that might be expected to occur, in relation to distance from a source and assuming that the signal is within an animal's hearing range. First is the area within which the acoustic signal would be audible (potentially perceived) to the animal but not strong enough to elicit any overt behavioral or physiological response. The next zone corresponds with the area where the signal is audible to the animal and of sufficient intensity to elicit behavioral or physiological responsiveness. Third is a zone within which, for signals of high intensity, the received level is sufficient to potentially cause discomfort or tissue damage to auditory or other systems. Overlaying these zones to a certain extent is the area within which masking (*i.e.,* when a sound interferes with or masks the ability of an animal to detect a signal of interest that is above the absolute hearing threshold) may occur; the masking zone may be highly variable in size.

We describe the more severe effects (*i.e.,* certain non-auditory physical or physiological effects) only briefly as we do not expect that there is a reasonable likelihood that pile driving may result in such effects (see below for further discussion). Potential effects from explosive impulsive 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). Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to high level underwater sound or as a secondary effect of extreme behavioral reactions (*e.g.,* change in dive profile as a result of an avoidance reaction) caused by exposure to sound include neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.,* 2006; Southall *et al.,* 2007; Zimmer and Tyack, 2007). The construction activities considered here do not involve the use of devices such as explosives or mid-frequency tactical sonar that are associated with these types of effects.

Threshold Shift—Marine mammals exposed to high-intensity sound, or to lower-intensity sound for prolonged periods, can experience hearing threshold shift (TS), which is the loss of hearing sensitivity at certain frequency ranges (Finneran, 2015). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.,* 2007). Repeated sound exposure that leads to TTS could cause PTS. In severe cases of PTS, there can be total or partial deafness, while in most cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter, 1985).

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

Relationships between TTS and PTS thresholds have not been studied in marine mammals, and there is no PTS data for cetaceans, but such relationships are assumed to be similar to those in humans and other terrestrial mammals. PTS typically occurs at exposure levels at least several decibels above (a 40-dB threshold shift approximates PTS onset; *e.g.,* Kryter *et al.,* 1966; Miller, 1974) that inducing mild TTS (a 6-dB threshold shift approximates TTS onset; *e.g.,* Southall *et al.* 2007). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds for impulse sounds (such as impact pile driving pulses as received close to the source) are at least 6 dB higher than the TTS threshold on a peak-pressure basis and PTS cumulative sound exposure level thresholds are 15 to 20 dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.,* 2007). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, it is considerably less likely that PTS could occur.

TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals.

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

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin (*Tursiops truncatus*), beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*)) and three species of pinnipeds (northern elephant seal, harbor seal, and California sea lion) exposed to a limited number of sound sources (*i.e.,* mostly tones and octave-band noise) in laboratory settings (Finneran, 2015). TTS was not observed in trained spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to impulsive noise at levels matching previous predictions of TTS onset (Reichmuth *et al.,* 2016). In general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran, 2015). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. There are no data available on noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al.* (2007), Finneran and Jenkins (2012), Finneran (2015), and NMFS (2018).

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

Habituation can occur when an animal's response to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok *et al.,* 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. It is important to note that habituation is appropriately considered as a ''progressive reduction in response to stimuli that are perceived as neither aversive nor beneficial,'' rather than as, more generally, moderation in response to human disturbance (Bejder *et al.,* 2009). The opposite process is sensitization, when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. As noted, behavioral state may affect the type of response. For example, animals that are resting may show greater behavioral change in response to disturbing sound levels than animals that are highly motivated to remain in an area for feeding (Richardson *et al.,* 1995; NRC, 2003; Wartzok *et al.,* 2003). Controlled experiments with captive marine mammals have showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997; Finneran *et al.,* 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically airguns or acoustic harassment devices) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; see also Richardson *et al.,* 1995; Nowacek *et al.,* 2007). However, many delphinids approach low-frequency airgun source vessels with no apparent discomfort or obvious behavioral change (*e.g.,* Barkaszi *et al.,* 2012), indicating the importance of frequency output in relation to the species' hearing sensitivity.

Available studies show wide variation in response to underwater sound; therefore, it is difficult to predict specifically how any given sound in a particular instance might affect marine mammals perceiving the signal. If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, l*et al*one the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (*e.g.,* Lusseau and Bejder, 2007; Weilgart, 2007; NRC, 2005). However, there are broad categories of potential response, which we describe in greater detail here, that include alteration of dive behavior, alteration of foraging behavior, effects to breathing, interference with or alteration of vocalization, avoidance, and flight.

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

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

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

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

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

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

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

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

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

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

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

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

Auditory Masking—Sound can disrupt behavior through masking, or interfering with, an animal's ability to detect, recognize, or discriminate between acoustic signals of interest (*e.g.,* those used for intraspecific communication and social interactions, prey detection, predator avoidance, navigation) (Richardson *et al.,* 1995; Erbe *et al.,* 2016). Masking occurs when the receipt of a sound is interfered with by another coincident sound at similar frequencies and at similar or higher intensity, and may occur whether the sound is natural (*e.g.,* snapping shrimp, wind, waves, precipitation) or anthropogenic (*e.g.,* shipping, sonar, seismic exploration) in origin. The ability of a noise source to mask biologically important sounds depends on the characteristics of both the noise source and the signal of interest (*e.g.,* signal-to-noise ratio, temporal variability, direction), in relation to each other and to an animal's hearing abilities (*e.g.,* sensitivity, frequency range, critical ratios, frequency discrimination, directional discrimination, age or TTS hearing loss), and existing ambient noise and propagation conditions.

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

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

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

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

Airborne noise would primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels elevated above the acoustic criteria. We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with their heads above water. 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 the area and move further from the source. However, these animals would previously have been 'taken' because of exposure to underwater sound above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Potential Effects of the Corps' Proposed Activity—As described previously (see ''Description of Active Acoustic Sound Sources''), the Corps proposes to conduct impact and vibratory driving as well as vibratory removal. 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. With both types, it is likely that the pile driving could result in temporary, short term changes in an animal's typical behavioral patterns 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.

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 lead to effects on growth, survival, or reproduction, such as drastic changes in diving/surfacing patterns or significant habitat abandonment are extremely unlikely in this area (*i.e.,* relatively shallow waters in an area with considerable vessel traffic).

Whether impact or vibratory driving, sound sources would be active for relatively short durations, with relation to potential for masking. The frequencies output by pile driving activity are lower than those used by most species expected to be regularly present for communication or foraging. We expect insignificant impacts from masking, and any masking event that could possibly rise to Level B harassment under the MMPA would occur concurrently within the zones of behavioral harassment already estimated for vibratory and impact pile driving, and which have already been taken into account in the exposure analysis.

Anticipated Effects on Marine Mammal Habitat

The proposed activities would not result in permanent impacts to habitats used directly by marine mammals except the actual footprint of the project. The footprint of the project covers a small section of the Sand Island Pile Dike system.

The proposed activities may have potential short-term impacts to food sources such as forage fish. The proposed activities could also affect acoustic habitat (see masking discussion above), but meaningful impacts are unlikely. There are no known foraging hotspots, or other ocean bottom structures of significant biological importance to marine mammals present in the marine waters in the vicinity of the project areas. Therefore, the main impact issue associated with the proposed activity would be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously. The most likely impact to marine mammal habitat occurs from pile driving effects on likely marine mammal prey (*i.e.,* fish) near where the piles are installed. Impacts to the immediate substrate during installation and removal of piles would be minor since piles would be driven through existing enrockment structures. This could result in limited, temporary suspension of sediments, which could impact water quality and visibility for a short amount of time, but which would not be expected to have any effects on individual marine mammals. Impacts to substrate are therefore not discussed further.

Effects to Prey—Sound may affect marine mammals through impacts on the abundance, behavior, or distribution of prey species (*e.g.,* crustaceans, cephalopods, fish, zooplankton). Marine mammal prey varies by species, season, and location and, for some, is not well documented. Here, we describe studies regarding the effects of noise on known marine mammal prey.

Fish utilize the soundscape and components of sound in their environment to perform important functions such as foraging, predator avoidance, mating, and spawning (*e.g.,* Zelick *et al.,* 1999; Fay, 2009). Depending on their hearing anatomy and peripheral sensory structures, which vary among species, fishes hear sounds using pressure and particle motion sensitivity capabilities and detect the motion of surrounding water (Fay *et al.,* 2008). The potential effects of noise on fishes depends on the overlapping frequency range, distance from the sound source, water depth of exposure, and species-specific hearing sensitivity, anatomy, and physiology. Key impacts to fishes may include behavioral responses, hearing damage, barotrauma (pressure-related injuries), and mortality.

Fish react to sounds which are especially strong and/or intermittent low-frequency sounds, and behavioral responses such as flight or avoidance are the most likely effects. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.,* feeding, spawning, migration), and other environmental factors. 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). Several studies have demonstrated that impulse sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.,* Fewtrell and McCauley, 2012; Pearson *et al.,* 1992; Skalski *et al.,* 1992; Santulli *et al.,* 1999; Paxton *et al.,* 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.,* Pena *et al.,* 2013; Wardle *et al.,* 2001; Jorgenson and Gyselman, 2009; Cott *et al.,* 2012). More commonly, though, the impacts of noise on fish are temporary.

SPLs of sufficient strength have been known to cause injury to fish and fish mortality. However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al.* (2012a) showed that a TTS of 4–6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury caused by barotrauma can range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al.,* 2012b; Casper *et al.,* 2013).

The most likely impact to fish from pile driving activities at the project areas would be temporary behavioral avoidance of the area. The duration of fish avoidance of an area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the expected short daily duration of individual pile driving events and the relatively small areas being affected.

In summary, given the short duration of sound (5–60 minutes) associated with individual pile driving and removal events and the small area being affected relative to available nearby habitat, pile driving and removal activities associated with the proposed action are not likely to have a permanent, adverse effect on any fish habitat, or populations of fish species or other prey. Thus, we conclude that impacts of the specified activity are not likely to have more than short-term adverse effects on any prey habitat or populations of prey species. Further, any impacts to marine mammal habitat are not expected to result in significant or long-term consequences for individual marine mammals, or to contribute to adverse impacts on their populations.

The area impacted by the project is relatively small compared to the available habitat in the MCR area. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. As described in the preceding, the potential for the Corps' construction to affect the availability of prey to marine mammals or to meaningfully impact the quality of physical or acoustic habitat is considered to be insignificant. Effects to habitat will not be discussed further in this document.

Estimated Take

This section provides an estimate of the number of incidental takes proposed for authorization through this IHA, which will inform both NMFS' consideration of ''small numbers'' and the negligible impact determination.

Harassment is the only type of take expected to result from these activities. 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).

Authorized takes would primarily be by Level B harassment, as impact and vibratory pile driving has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for high frequency species and phocids because predicted auditory injury zones are larger than for low-frequency species, mid-frequency species and otariids. Auditory injury is unlikely to occur for low-frequency species, mid-frequency species and otariids. The proposed mitigation and monitoring measures are expected to minimize the severity of such taking to the extent practicable.

As described previously, no mortality is anticipated or proposed to be authorized for this activity. Below we describe how the take is estimated.

Generally speaking, we estimate take by considering: (1) Acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment; (2) the area or volume of water that will be ensonified above these levels in a day; (3) the density or occurrence of marine mammals within these ensonified areas; and, (4) and the number of days of activities. We note that while these basic factors can contribute to a basic calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.,* previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the proposed take estimate.

Acoustic Thresholds

Using the best available science, NMFS has developed acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals would be reasonably expected to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

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

The Corps' proposed activity includes the use of continuous (vibratory pile driving) and impulsive (impact pile driving) sources, and therefore the 120 and 160 dB re 1 μPa (rms) are applicable.

Level A harassment for non-explosive sources—NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The Corp's proposed activity includes the use of impulsive (impact pile driving) and non-impulsive (vibratory pile driving) source.

These thresholds are provided in the table below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.*

TABLE 4—THRESHOLDS IDENTIFYING THE ONSET OF PERMANENT THRESHOLD SHIFT

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

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

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa, and cumulative sound exposure level (L_E) has a reference value of 1μPa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (*i.e.,* varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

Here, we describe operational and environmental parameters of the activity that will feed into identifying the area ensonified above the acoustic thresholds, which include source levels and transmission loss coefficient.

Sound Propagation

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

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

where:

B = transmission loss coefficient (assumed to be 15)
R_1 = the distance of the modeled SPL from the driven pile, and
R_2 = the distance from the driven pile of the initial measurement.

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)). As is common practice in coastal waters, here we assume practical spreading loss (4.5 dB reduction in sound level for each doubling of distance). Practical spreading is a compromise that is often used under conditions where water depth increases as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions.

Sound Source Levels

The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. There are no source level measurements available the piles proposed for installation at part of the test piles project. Sound pressure levels for impact driving of 24-in steel piles were taken from Caltrans 2015. Vibratory driving source levels for 24-in steel piles came from the United States Navy (2015). There was no data available pertaining to vibratory removal of 24-in timber piles. NMFS recommended that the Corps use data derived from Washington Department of Transportation Seattle Pier 62 project collected by the Greenbusch Group (2018) for vibratory removal of 14-in timber piles. NMFS reviewed the Greenbusch Group (2018) report and determined that the findings were incorrectly derived by pooling together all steel pile and timber pile measurements at various distances. Furthermore, the data was not normalized to the standard 10 m distance. NMFS analyzed source measurements at different distances for all 63 individual timber piles that were removed and normalized the values to 10 m. The results showed that the median is 152 dB SPLrms. This value was used as the proxy source level for vibratory removal of 24-in timber piles as shown in Table 5.

TABLE 5—ESTIMATED UNATTENUATED UNDERWATER SOUND PRESSURE LEVELS ASSOCIATED WITH PILE INSTALLATION AND REMOVAL

Pile type & activity	Sound source level at 10 m		
24-Inch Steel Pile Impact Installation [1]	203 dB_{PK}	190 dB_{RMS}	177 dB_{SEL}.
24-Inch Steel Piles Vibratory Installation/Removal [2]	Not Available	161 dB_{RMS}	Not Available.
24-Inch Timber Pile Vibratory Removal [3]	Not Available	152 dB_{RMS}	Not Available.

[1] From CalTrans 2015 Table I.2–1. Summary of Near-Source (10-Meter) Unattenuated Sound Pressure Levels for In-Water Pile Driving Using an Impact Hammer: 0.61-meter (24-inch) steel pipe pile in water ~5 meters deep.

[2] From United States Navy. 2015. Prepared by Michael Slater, Naval Surface Warfare Center, Carderock Division, and Sharon Rainsberry, Naval Facilities Engineering Command Northwest. Revised January 2015. Table 2–2.

[3] Due to the lack of information for vibratory removal of 24″ diameter timber piles, an estimate based on removal of 14-inch timber piles is used as a proxy (Greenbusch Group, 2018)

Level A Harassment

When the NMFS Technical Guidance (2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which may result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources such as pile driving, NMFS User Spreadsheet predicts the closest distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would not incur PTS. Inputs used in the User Spreadsheet, and the resulting isopleths are reported below in Table 6.

TABLE 6—NMFS TECHNICAL GUIDANCE (2018) USER SPREADSHEET INPUT TO CALCULATE PTS ISOPLETHS

Inputs	24-in steel impact installation	24-in steel vibratory installation/removal	24-in timber pile removal
Spreadsheet Tab Used	E. (1) Impact Pile Driving	A. (1) Vibratory Pile Driving	A. (1) Vibratory Pile Driving.
Source Level (Single Strike/shot SEL)	177 dB SEL/203 dB Peak	161 dB RMS	152 dB RMS
Weighting Factor Adjustment (kHz)	2	2.5	2.5
Number of strikes per pile	550		
Number of piles per day	6	6	6
Duration to install/removal single pile (minutes)	60	30/5	5
Propagation (xLogR)	15	15	15
Distance of source level measurement (meters)	10	10	10

TABLE 7—LEVEL A HARASSMENT (PTS) ISOPLETHS

Activity	PTS Isopleth distance (meters)				
	LF cetacean	MF cetacean	HF cetacean	Phocid pinniped	Otariid pinniped
24″ Steel Pipe Pile Impact Installation	881.2	31.3	1,049.7	*471.6	34.3
24″ Steel Pipe Vibratory Installation	14.2	1.3	21.0	8.6	0.6
24″ Steel Pipe Vibratory Removal	5.6	0.5	8.3	3.4	0.2
24″ Timber Pile Removal Vibratory	1.4	0.1	2.1	0.9	0.1

Level B Harassment

Utilizing the practical spreading loss model, the Corps determined underwater noise will fall below the behavioral effects threshold of 160 dB and 120 dB rms for marine mammals at the distances shown in Table 8 with corresponding ensonified areas.

TABLE 8—LEVEL B HARASSMENT ISOPLETHS

Activity	Isopleth distance (m)	Isopleth area (km²) *
24″ Steel Pipe Pile Impact Installation	1,000	3–4
24″ Steel Pipe Vibratory Installation	5,412	64–73
24″ Steel Pipe Vibratory Removal	5,412	64–73
24″ Timber Pile Removal Vibratory	1,359	0.6–0.7

* The lower limit represents the isopleth area for the pile dike at RM 4.01, which has a slightly smaller area due to land impedances. The upper limit of the range is the calculated isopleth area for the pile dike at RM 6.37.

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. Potential exposures to impact pile driving, vibratory pile driving and vibratory pile removal were estimated using group size estimates and local observational data. As previously stated, take by Level B harassment as well as small numbers of take by Level A harassment will be will be considered for this action. Take by Level B and Level A harassment are calculated differently for some species based on monthly or daily sightings data and average group sizes within the action area using the best available data. Take by Level A harassment is being proposed for two species where the Level A harassment isopleths are very large during impact pile driving (harbor porpoise and harbor seal). Distances to Level A harassment thresholds for other project activities (vibratory pile driving/removal) are considerably smaller compared to impact pile driving, and mitigation is expected to avoid Level A harassment from these other activities.

Cetaceans

Harbor Porpoise

Harbor porpoises are regularly observed in the oceanward waters near the MCR and are known to occur there year-round. Porpoise abundance peaks when anchovy (*Engraulis mordax*) abundance in the river and nearshore are highest, which is usually between April and August (Litz *et al.* 2008). The 2016 monitoring report indicated that there were sightings of a total of 6 porpoises during 5 sighting events (Grette Associates, 2016) while none were recorded as part of the 2017 LOA monitoring report. All of the porpoises described in the 2016 report were solitary except for one pod of two animals. While porpoises generally occur in groups of 2–3 or larger, most sightings contained in the report were of solitary animals. Therefore, for the purposes of this proposed IHA, NMFS will conservatively assume a sighting rate of one animal per day.

There are 3 days of vibratory removal of timber piles so we will assume all sightings are equivalent to takes by Level B harassment. Both impact and vibratory driving will occur on 18 days. We will assume all of these are by Level B harassment due to the larger Level B monitoring zone during vibratory driving activities. Due to their cryptic behavior, it is plausible that during the 20 days of impact only driving porpoises could enter into the shutdown zone without being detected by PSOs and remain long enough to experience PTS. NMFS will assume that a smaller subset of the 20 expected animals (one per day) will enter into the PTS zone for a period of time that would result in PTS. We will conservatively assume that every other day an animal would enter into the PTS zone. Therefore, NMFS proposes to authorize 10 takes of harbor porpoise by Level A harassment and 21 takes by Level B harassment.

Pinnipeds

Take calculations for Steller sea lions, California sea lions, and harbor seals are estimated using abundance estimates from the South Jetty recorded by the Washington Department of Fish and Wildlife (WDFW) between 2000 and 2014. The South Jetty is approximately four kilometers to the south of Sand Island. The Level B harassment area includes the entirety of the South Jetty where pinnipeds haul out. In order to estimate take, the average number of animals seen for the months of September, October, and November was used a basis for overall pinniped abundance as shown in Table 9. Since there was no data available for harbor seals during those three months, the December average was used to represent the average during the previous three months. We assumed animals counted at the South Jetty comprised the majority of pinnipeds present in the Lower Columbia River west of Interstate 101 between September and November. This total area, including the jetties, was approximately 275 km². We calculated the density of each pinniped species per km², then multiplied by the area of the harassment zone and number of workdays anticipated at each pile dike (Table10). These estimates likely represent take of the same individuals over multiple days throughout the construction period. Therefore, the take estimate serves as a good estimate of instances of take, but is likely an overestimate of individuals taken.

NMFS proposes to establish a 100-m shutdown zone and 475-m Level A harassment zone for harbor seals during impact pile driving activities. If a 475-m shutdown zone is adopted for harbor seals to avoid take by Level A harassment it was felt that there may be a high shutdown rate since harbor seals have been known to approach active construction sites. This would negatively impact the construction schedule and prolong the duration of heightened underwater noise levels. While the likelihood of this type of behavior by seals is unknown in the vicinity of the project area, authorizing limited take by Level A harassment should reduce the chances of unscheduled shutdown due to incursion of harbor seals into the delineated PTS zone.

TABLE 9—AVERAGE NUMBER OF PINNIPEDS PER MONTH ON SOUTH JETTY, 2000–2014

Month	Avg. number of Steller sea lions/month	Avg. number of California sea lions/month	Avg. number of harbor seals/month
September	209	249	
October	384	508	
November	1,663	1,214	
December			57
Construction Period Average	752	657	57

Source: Data from Washington Department of Fish and Wildlife 2014.

TABLE 10—ESTIMATED LEVEL B AND LEVEL A TAKE CALCULATIONS FOR PINNIPEDS

Species	Density (animals/km²)	Activity type	Level B Isopleth area RM 4.01	Level B Isopleth area RM 6.37	Take/day RM 4.01	Take/day RM 6.37	Total take RM 4.01	Total take RM 6.37	Estimated total takes (Level B)
Stellar Sea lion	2.73	Impact Installation [1]	3	4	8.19	10.92	82	109	3,563
		Vibratory Installation/Removal [2].	64	73	174.72	199.29	1572	1794	
		Timber Vibratory Removal [3]	0.6	0.7	1.64	1.91	2	3	
							1657	1906	
California Sea lion	2.39	Impact Installation	3	4	7.17	9.56	72	96	3,119
		Vibratory Installation/Removal	64	73	152.96	174.47	1377	1570	
		Timber Vibratory Removal	0.6	0.7	1.43	1.67	2	3	
							1450	1668	
Harbor Seal (Level B)	0.21	Impact Installation	3	4	0.61	0.5	6	5	270
		Vibratory Installation/Removal	64	73	13.44	15.33	121	138	
		Timber Vibratory Removal	0.6	0.7	0.13	0.15	0	0	
							127	143	
			Level A Isopleth area RM 4.01	Level A Isopleth area RM 6.37	Take/day RM 4.01	Take/day RM 6.37	Total Take RM 4.01	Total Take RM 6.37	
Harbor Seal (Level A)		Impact Installation	0.8	0.9	0.15	0.11	2	1	3 (Level A)

[1] Assumes 10 days each at RM 4.01 and RM 6.37 for all pinniped species.
[2] Assumes 9 days each at RM 4.01 and RM 6.37 for all pinniped species.
[3] Assumes 1.5 days each at RM 4.01 and RM 6.37 for all pinniped species.

Table 11 illustrates the stocks NMFS proposed to authorize for take, the numbers proposed for authorization, and the percentage of the stock taken.

TABLE 11—LEVEL A AND LEVEL B HARASSMENT TAKE ESTIMATES FOR THE SAND ISLAND PILE DIKES TEST PILES

Species	Level A take	Level B take	Stock abundance	Percentage of stock taken
Harbor porpoise	10	21	21,487	0.1
California Sea Lion		3,119	296,750	1.1
Stellar Sea Lion		3,563	61,746	5.8
Harbor Seal	3	270	24,732	1.1

Proposed Mitigation

In order to issue an IHA under Section 101(a)(5)(D) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, we carefully consider two primary factors:

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers

the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) the practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations, and, in the case of a military readiness activity, personnel safety, practicality of implementation, and impact on the effectiveness of the military readiness activity.

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

- Conduct briefings between construction supervisors and crews and the marine mammal monitoring team prior to the start of all pile driving activity, and when new personnel join the work, to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures;
- For in-water heavy machinery work other than pile driving/removal (*e.g.,* standard barges, tug boats), if a marine mammal comes within 25 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);
- Work may only occur during daylight hours, when visual monitoring of marine mammals can be conducted;
- For any marine mammal species for which take by Level B harassment has not been requested or authorized, in-water pile installation/removal will shut down immediately when the animals are sighted;
- If take by Level B harassment reaches the authorized limit for an authorized species, pile installation will be stopped as these species approach the Level B harassment zone to avoid additional take of them.

Establishment of Shutdown Zones and Level A Harassment Zones—For all pile driving/removal and activities, the Corps establish a shutdown zone. The purpose of a shutdown zone is generally to define an area within which shutdown of activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). Shutdown zones will vary based on the type of driving/removal activity type and by marine mammal hearing group, (See Table 10). Here, shutdown zones are larger than the calculated Level A harassment isopleth shown in Table 7, except for harbor seals during impact driving when a 100-m shutdown zone and a 475-m Level A harassment zone will be visually monitored. The largest shutdown zones are generally for low frequency and high frequency cetaceans. The placement of (PSOs) during all pile driving/removal activities (described in detail in the Proposed Monitoring and Reporting Section) will ensure that the entirety of all shutdown zones are visible during pile installation.

TABLE 12—SHUTDOWN ZONES DURING PROJECT ACTIVITIES

Activity	Distance (meters)				
	LF cetacean	MF cetacean	HF cetacean	Phocid pinniped	Otariid pinniped
24″ Steel Pipe Pile Impact Installation	890	35	1,050	100	35
24″ Steel Pipe Vibratory Installation	25	25	25	25	25
24″ Steel Pipe Vibratory Removal	25	25	25	25	25
24″ Timber Pile Removal Vibratory	25	25	25	25	25

Establishment of Monitoring Zones for Level B Harassment—The Corps will establish monitoring zones, based on the Level B harassment zones which are areas where SPLs are equal to or exceed the 160 dB rms threshold for impact driving and the 120 dB rms threshold during vibratory driving/removal. Monitoring zones provide utility for observing by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring zones enable observers to be aware of and communicate the presence of marine mammals in the project area outside the shutdown zone and thus prepare for a potential cease of activity should the animal enter the shutdown zone. Distances to the Level B harassment zones are depicted in Table 13.

TABLE 13—DISTANCES TO LEVEL B HARASSMENT ZONES DURING PROJECT ACTIVITIES

Activity	Distance (m)
24″ Steel Pipe Pile Impact Installation	1,000
24″ Steel Pipe Vibratory Installation	5,420
24″ Steel Pipe Vibratory Removal	5,420
24″ Timber Pile Removal Vibratory	1,360

Soft Start—The use of a soft-start procedure are believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. For impact pile driving, contractors will be required to provide an initial set of strikes from the hammer at reduced percent energy, each strike followed by no less than a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins. Soft Start is not required during vibratory pile driving and removal activities. A soft start must be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer. If a marine mammal is present within the Level A harassment zone, soft start will be delayed until the animal leaves the Level A harassment zone. Soft start will begin only after the PSO has determined, through sighting, that the animal has moved outside the Level A harassment zone. If a marine mammal is present in the Level B harassment zone, soft start may begin and a Level B take will be recorded. Soft start up may occur when these species are in the Level B harassment zone, whether they enter the Level B zone from the Level A zone or from outside the monitoring area.

Pre-Activity Monitoring—Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, PSOs will observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone will be cleared when a marine mammal has not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes. If the Level B harassment zone has been observed for 30 minutes and marine mammals are not present within the zone, soft start procedures can commence and work can continue even if visibility becomes impaired within the Level B harassment zone. When a marine mammal permitted for take by Level B harassment is present in the Level B harassment zone, piling activities may begin and take by Level B will be recorded. As stated above, if the entire Level B harassment zone is not visible at the start of construction, pile driving/removal activities can begin. If work ceases for more than 30 minutes, the pre-activity monitoring of both the Level B harassment and shutdown zone will commence.

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

Proposed Monitoring and Reporting

In order to issue an IHA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth requirements pertaining to the monitoring and reporting of such taking. The MMPA implementing regulations at 50 CFR 216.104 (a)(13) indicate that requests for authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

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

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

Visual Monitoring

Monitoring would be conducted 30 minutes before, during, and 30 minutes after pile driving/removal activities. In addition, observers shall record all incidents of marine mammal occurrence, regardless of distance from activity, and shall document any behavioral reactions in concert with distance from piles being driven or removed. Pile driving activities include the time to install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than thirty minutes.

There will be at least two PSOs employed during all pile driving/removal activities. PSO will not perform duties for more than 12 hours in a 24-hour period. One PSO would be positioned close to pile driving/removal activities at the best practical vantage point. A second PSO would be vessel-based to provide best coverage of the appropriate Level A and Level B harassment zones. If waters exceed a sea-state which restricts the observers' ability to make boat-based observations for the full Level A shutdown zone (*e.g.,* excessive wind, wave action, or fog), impact pile installation will cease until conditions allow monitoring to resume. Contractors should ensure compliance with NOAA advisories for safe boat operations based on the size of vessel to be used by the marine mammal observer.

As part of monitoring, PSOs would scan the waters using binoculars, and/or spotting scopes, and would use a handheld GPS or range-finder device to verify the distance to each sighting from the project site. All PSOs would be trained in marine mammal identification and behaviors and are required to have no other project-related tasks while conducting monitoring. In addition, monitoring will be conducted by qualified observers, who will be placed at the best vantage point(s) practicable to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. Qualified observers are trained and/or experienced professionals, with the following minimum qualifications:

- Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with ability to estimate target size and distance; use of binoculars may be necessary to correctly identify the target;
- Independent observers (*i.e.,* not construction personnel);
- Observers must have their CVs/resumes submitted to and approved by NMFS;
- Advanced education in biological science or related field (*i.e.,* undergraduate degree or higher). Observers may substitute education or training for experience;
- Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience);
- At least one observer must have prior experience working as an observer;
- Experience or training in the field identification of marine mammals, including the identification of behaviors;

- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates and times when in-water construction activities were suspended to avoid potential incidental injury from construction sound of marine mammals observed within a defined shutdown zone; and marine mammal behavior; and
- Ability to communicate orally, by radio or in person, with project personnel to provide real-time information on marine mammals observed in the area as necessary.

Reporting

A draft marine mammal monitoring report must be submitted to NMFS within 90 days after the completion of pile driving/removal activities. This reports will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated PSO data sheets. Specifically, the reports must include:

- 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;
- An estimate of total take based on proportion of the monitoring zone that was observed; and
- Other human activity in the area.

If no comments are received from NMFS within 30 days, that phase's draft final report will constitute the final report. If comments are received, a final report for the given phase addressing NMFS comments 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 IHAs (if issued), such as an injury, serious injury or mortality, the Corps 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 West Coast Regional Stranding Coordinator. The report would include the following information:

- Description of the incident;
- Environmental conditions (*e.g.,* Beaufort sea state, visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

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

In the event that the Corps discovers an injured or dead marine mammal, and the lead PSO determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition as described in the next paragraph), the Corps would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator. 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 the Corps to determine whether modifications in the activities are appropriate.

In the event that the Corps discovers an injured or dead marine mammal and the lead PSO determines that the injury or death is not associated with or related to the activities authorized in these IHAs (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the Corps would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, NMFS, and the West Coast Regional Stranding Coordinator, within 24 hours of the discovery. The Corps would provide photographs, video footage (if available), or other documentation of the stranded animal sighting to NMFS and the Marine Mammal Stranding Network.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.,* population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be ''taken'' through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.,* intensity, duration), the context of any responses (*e.g.,* critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (*e.g.,* as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, our analysis applies to all species listed in Table 11, given that NMFS expects the anticipated effects of the proposed pile driving/removal to be similar in nature. Where there are meaningful differences between species or stocks, or groups of species, in anticipated individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, NMFS has identified species-specific factors to inform the analysis.

NMFS does not anticipate that serious injury or mortality would occur as a result of the Corps' proposed activity. As stated in the proposed mitigation section, shutdown zones that equal or exceed Level A harassment isopleths shown in Table 12 will be implemented. Take by Level A harassment is proposed for authorization for some species (harbor seals, harbor porpoises) to account for the slight possibility that these species escape observation by the PSOs within the Level A harassment zone. Further, any take by Level A harassment is expected to arise from, at most, a small degree of PTS because animals would need to be exposed to higher levels and/or longer duration than are expected to occur here in order to incur any more than a small degree of PTS. Additionally, as noted previously, some subset of the individuals that are behaviorally harassed could also simultaneously incur some small degree of TTS for a short duration of time. Because of the small degree anticipated, though, any PTS or TTS potentially incurred here would not be expected to adversely impact individual fitness.

Behavioral responses of marine mammals to pile driving and removal at the proposed test piles project sites are e expected to be mild, short term, and temporary. Marine mammals within the Level B harassment zone may not show any visual cues they are disturbed by activities or they could become alert, avoid the area, leave the area, or display other mild responses that are not observable such as changes in vocalization patterns. Given the short duration of noise-generating activities (between 6–41 days over 3-month period), any harassment would be likely be intermittent and temporary. Additionally, many of the species occurring near the MCR or in the Columbia River estuary would only be present temporarily based on seasonal patterns or during transit between other habitats. These temporarily present species would be exposed to even smaller periods of noise-generating activity, further decreasing the impacts.

In addition, for all species there are no known biologically important areas (BIAs) within the MCR or Columbia River estuary and there is no ESA-designated marine mammal critical habitat. The estuary represents a very small portion of the total available habitat to marine mammal species.

More generally, there are no known calving or rookery grounds within the project area, but anecdotal evidence from local experts shows that marine mammals are more prevalent during spring and summer associated with feeding on aggregations of fish. Because the Corps' activities would occur in the fall months, the project area represents a small portion of available foraging habitat, and the duration of noise-producing activities relatively is short, meaning impacts on marine mammal feeding for all species should be minimal.

Any impacts on marine mammal prey that would occur during the Corps' proposed activity would have at most short-terms effects on foraging of individual marine mammals, and likely no effect on the populations of marine mammals as a whole. Therefore, indirect effects on marine mammal prey during the construction are not expected to be substantial, and these insubstantial effects would therefore be unlikely to cause substantial effects on marine mammals.

In summary and as described above, the following factors primarily support our preliminary determination that the impacts resulting from this activity are not expected to adversely affect the species or stock through effects on annual rates of recruitment or survival:

- No mortality is anticipated or authorized;
- The Corps would implement mitigation measures including soft-starts for impact pile driving and shutdown zones that exceed Level A harassment zones for authorized species, except for harbor seals which will help to ensure that take by Level A harassment is at most a small degree of PTS;
- Anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior;
- There are no BIAs within the MCR and Columbia River estuary or other known areas of particular biological importance to any of the affected stocks are impacted by the activity;
- The project area represents a very small portion of the available foraging area for all marine mammal species and anticipated habitat impacts are minimal; and
- The required mitigation measures (*e.g.,* shutdown zones, soft-start) are expected to be effective in reducing the effects of the specified activity.

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 the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under Sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, where estimated numbers are available, NMFS compares the number of individuals taken to the most appropriate estimation of abundance of the relevant species or stock in our determination of whether an authorization is limited to small numbers of marine mammals. Additionally, other qualitative factors may be considered in the analysis, such as the temporal or spatial scale of the activities.

Table 11 in the *Marine Mammal Occurrence and Take Calculation and Estimation* section, present the number of animals that could be exposed to received noise levels that may result in take by Level A harassment or Level B harassment from the Corps' proposed activities. Our analysis shows that 6 percent or less of the best population estimates of each affected stock could be taken. Additionally, the proposed test piles project is located near the pinniped haulout at the South Jetty. Therefore, it is likely that many of these takes will be repeated takes of the same animals over multiple days. As such, the take estimate serves as a good estimate of instances of take, but is likely an overestimate of individuals taken, so actual percentage of stocks taken would be even lower.

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

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of the affected marine mammal stocks or species implicated by this action. Therefore, NMFS has preliminarily determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

No incidental take of ESA-listed species is proposed for authorization or expected to result from this activity. Therefore, NMFS has determined that formal consultation under section 7 of the ESA is not required for this action.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to the Corps for conducting test pile installation and removal, near the MCR, from one year from the date of issuance, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. A draft of the proposed IHA can be found at *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act.*

Request for Public Comments

We request comment on our analyses, the proposed authorization, and any other aspect of this Notice of Proposed IHA for the proposed Sand Island Pile Dike System Test Piles Project. We also request at this time comment on the potential renewal of this proposed IHA as described in the paragraph below. Please include with your comments any supporting data or literature citations to help inform decisions on the request for this IHA or a subsequent Renewal.

On a case-by-case basis, NMFS may issue a one-year IHA renewal with an additional 15 days for public comments when (1) another year of identical or nearly identical activities as described in the Specified Activities section of this notice is planned or (2) the activities as described in the Specified Activities section of this notice would not be completed by the time the IHA expires and a Renewal would allow for completion of the activities beyond that described in the Dates and Duration section of this notice, provided all of the following conditions are met:

- A request for renewal is received no later than 60 days prior to expiration of the current IHA;
- The request for renewal must include the following:

(1) An explanation that the activities to be conducted under the requested Renewal are identical to the activities analyzed under the initial IHA, are a subset of the activities, or include changes so minor (*e.g.,* reduction in pile size) that the changes do not affect the previous analyses, mitigation and monitoring requirements, or take estimates (with the exception of reducing the type or amount of take because only a subset of the initially analyzed activities remain to be completed under the Renewal);

(2) A preliminary monitoring report showing the results of the required monitoring to date and an explanation showing that the monitoring results do not indicate impacts of a scale or nature not previously analyzed or authorized; and

- Upon review of the request for renewal, the status of the affected species or stocks, and any other pertinent information, NMFS determines that there are no more than minor changes in the activities, the mitigation and monitoring measures will remain the same and appropriate, and the findings in the initial IHA remain valid.

Dated: July 31, 2019.

Donna S. Wieting,

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

[FR Doc. 2019–16706 Filed 8–5–19; 8:45 am]

BILLING CODE 3510–22–P

BUREAU OF CONSUMER FINANCIAL PROTECTION

[Docket No. CFPB–2019–0043]

Agency Information Collection Activities: Submission for OMB Review; Comment Request

AGENCY: Bureau of Consumer Financial Protection.

ACTION: Notice and request for comment.

SUMMARY: In accordance with the Paperwork Reduction Act of 1995 (PRA), the Bureau of Consumer Financial Protection (Bureau) is proposing to renew with change the Office of Management and Budget (OMB) approval for an existing information collection titled, ''Policy On No-Action Letters and Compliance Assistance Sandbox Policy.''

DATES: Written comments are encouraged and must be received on or before September 5, 2019 to be assured of consideration.

ADDRESSES: Comments in response to this notice are to be directed towards OMB and to the attention of the OMB Desk Officer for the Bureau of Consumer Financial Protection. You may submit comments, identified by the title of the information collection, OMB Control Number (see below), and docket number (see above), by any of the following methods:

- *Electronic: http://www.regulations.gov.* Follow the instructions for submitting comments.
- *Email: OIRA_submission@omb.eop.gov.*
- *Fax:* (202) 395–5806.
- *Mail:* Office of Management and Budget, New Executive Office Building, Room 10235, Washington, DC 20503.

In general, all comments received will become public records, including any personal information provided. Sensitive personal information, such as account numbers or Social Security numbers, should not be included.

FOR FURTHER INFORMATION CONTACT: Documentation prepared in support of this information collection request is available at *www.reginfo.gov* (this link becomes active on the day following publication of this notice). Select ''Information Collection Review,'' under ''Currently under review, use the dropdown menu ''Select Agency'' and select ''Consumer Financial Protection Bureau'' (recent submissions to OMB will be at the top of the list). The same documentation is also available at *http://www.regulations.gov.* Requests for additional information should be directed to Darrin King, PRA Officer, at (202) 435–9575, or email: *CFPB_PRA@cfpb.gov.* If you require this document in an alternative electronic format, please contact *CFPB_Accessibility@cfpb.gov.* Please do not submit comments to these email boxes.

SUPPLEMENTARY INFORMATION:

Title of Collection: Policy on No-Action Letters and Compliance Assistance Sandbox Policy.

OMB Control Number: 3170–0059.

Type of Review: Revision of a currently approved collection.

Affected Public: Private Sector.

Estimated Number of Respondents: 9.

Estimated Total Annual Burden Hours: 1,200.

Abstract: The Bureau is revising its initial 2016 Policy on No-Action Letters (Policy). The revised Policy will govern the process for persons to apply for Bureau no-action letters for proposed conduct, subject to specified conditions and limitations. Issuance of no-action letters under the Policy will be discretionary on the part of the Bureau. The information will be collected from persons, primarily businesses or other for-profit entities, who apply for no-action letters from the Bureau. The information will be used by the Bureau to determine whether issuance of a no-action letter is warranted.

The Bureau is also finalizing its Compliance Assistance Sandbox Policy (CASP). The CASP will govern the process for persons to apply for Bureau approvals, subject to specified conditions and limitations. Issuance of approvals will be discretionary on the part of the Bureau. The information will be collected from persons, primarily businesses or other for-profit entities, who apply for approvals from the Bureau. The information will be used by the Bureau to determine whether issuance of an approval is warranted.

Request for Comments: The Bureau issued a 60-day **Federal Register** notice on December 13, 2018, 83 FR 64036, Docket Number: CFPB–2018–0042. Comments were solicited and continue to be invited on: (a) Whether the collection of information is necessary for the proper performance of the functions of the Bureau, including whether the information will have practical utility; (b) The accuracy of the