more information, call Yvette Springer at (202) 482–2813.

Yvette Springer,

Committee Liaison Officer.

[FR Doc. 2017–25789 Filed 11–29–17; 8:45 am]

BILLING CODE 3510–JT–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XF611

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Waterfront Improvement Projects at Portsmouth Naval Shipyard

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

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

SUMMARY: NMFS has received a request from the U.S. Department of the Navy (Navy) for authorization to take marine mammals incidental to continued construction activities as part of waterfront improvement projects at several Portsmouth Naval Shipyard (the Shipyard) berths in Kittery, Maine. 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 will consider public comments prior to making any final decision on the issuance of the requested MMPA authorization and agency responses will be summarized in the final notice of our decision.

DATES: Comments and information must be received no later than January 2, 2018.

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 *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm* without change. All personal identifying information (*e.g.,* name, address) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or otherwise sensitive or protected information.

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

SUPPLEMENTARY INFORMATION:

Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 *et seq.*) direct the Secretary of Commerce (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 authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined ''negligible impact'' in 50 CFR 216.103 as impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

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

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

National Environmental Policy Act

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

Accordingly, NMFS has preliminarily determined that the issuance of the proposed IHA qualifies to be categorically excluded from further NEPA review. This action is consistent with categories of activities identified in CE B4 of the Companion Manual for NOAA Administrative Order 216–6A, which do not individually or cumulatively have the potential for significant impacts on the quality of the human environment and for which we have not identified any extraordinary circumstances that would preclude this categorical exclusion. 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 July 14, 2017, NMFS received a request from the Navy for an IHA to take marine mammals incidental to impact driving, vibratory pile driving, vibratory pile extraction, and drilling associated with an ongoing waterfront improvement project at the Shipyard. The application was considered adequate and complete on August 25, 2017. The Navy's request is for take of harbor porpoise (*Phocoena phocoena*), gray seal (*Halichoerus grypus*), harbor seal (*Phoca vitulina*), and harp seal (*Pagophilus groenlandicus*) by Level A and Level B harassment (authorization of Level A harassment is not proposed for the harp seal). Neither the Navy nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

This proposed IHA would cover the second year of a five-year project for which the Navy obtained a single prior IHA. The Navy intends to request take authorization for subsequent facets of the project. NMFS previously issued the first IHA to the Navy for this project effective from January 1, 2017 through December 31, 2017. The larger 5-year project involves restoring and modernizing infrastructure at the Shipyard. The Navy complied with all the requirements (*e.g.,* mitigation, monitoring, and reporting) of the previous IHA and information regarding their monitoring results may be found in the Effects of the Specified Activity on Marine Mammals and their Habitat section.

Description of Proposed Activity

Overview

The purpose of the proposed action is to modernize and maximize dry dock capabilities for performing current and future missions efficiently and with maximum flexibility. The need for the proposed action is to correct deficiencies associated with the pier structure at Berths 11, 12, and 13 and the Dry Dock 3 caisson and concrete seats to ensure that the Shipyard can continue to support its primary mission to service, maintain, and overhaul submarines. The proposed action covers the second year of activities (January 1, 2018 through December 31, 2018) associated with the waterfront improvement projects at the Shipyard in Kittery, Maine. The project includes impact and vibratory pile driving, vibratory pile removal, and drilling. Construction activities may occur at any time during the calendar year.

Dates and Duration

This authorization request covers in-water construction associated with the Year 2 activity as described above to occur from January 1, 2018–December 31, 2018. No seasonal limitations would be imposed on the construction timeline in 2018. Based on construction and Shipyard schedules, the Navy anticipates that structural repairs initiated during 2017 at Berths 11A, 11B and 11C will continue into 2018. Therefore, the proposed IHA would cover the in-water activities estimated to occur in 2018 at Berths 11A, 11B and 11C. For reference the planned schedule of activity for 2018, Year 2, is included below in Table 1.

TABLE 1—CONSTRUCTION TIMEFRAMES FOR THE PROPOSED WATERFRONT IMPROVEMENT PROJECTS

Project	Estimated construction start	Estimated construction end
Berths 11, 12, and 13 Structural Repairs	January 2017	October 2022.
Phase 1	January 2017	June 2019.
In-Water Work—Phase 1 (Berth 11)	April 2017	December 2018.
Dry Dock 3 Caisson Replacement (in progress)	February 2017	August 2018.
In-Water Work—Phase 2 (Berths 12 and 13)	To be determined based on availablity of berths.	To be determined based on availablity of berths.

Pile driving, pile extraction, and drilling are scheduled to take place during the timeframe covered by the proposed IHA. Note that pile driving days are not necessarily consecutive. There will be a maximum of 100 days of pile driving and/or drilling during this period. However, there could be up to 16 overlapping days when concurrent driving/drilling would take place simultaneously for a total of 84 driving days. The contractor could be working in more than one area of the berth at one time. Current schedule includes installation of king piles simultaneously with other construction activity including use of the vibratory hammer. A summary report will be issued for 2018 work with verified data of activity and days of duration of overlap.

Specific Geographic Region

The Shipyard is located in the Piscataqua River in Kittery, Maine. The Piscataqua River originates at the boundary of Dover, New Hampshire, and Elliot, Maine. (See Figure 1–1 in application). The river flows in a southeasterly direction for 13 miles before entering Portsmouth Harbor and then emptying into the Atlantic Ocean. The lower Piscataqua River is part of the Great Bay Estuary system and varies in width and depth. Many large and small islands break up the straight-line flow of the river as it continues toward the Atlantic Ocean. Seavey Island, the location of the Proposed Action, is located in the lower Piscataqua River approximately 547 yards from its southwest bank, 219 yards from its north bank, and approximately 2.5 miles from the mouth of the river.

Water depths in the project area range from 21 feet to 39 feet at Berths 11, 12, and 13. Water depths in the lower Piscataqua River near the project area range from 15 feet in the shallowest areas to 69 feet in the deepest areas. The river is approximately 3,300 feet wide near the project area, measured from the Kittery shoreline north of Wattlebury Island to the Portsmouth shoreline west of Peirce Island. The furthest direct line of sight from the project area would be 0.8 mile to the southeast and 0.26 mile to the northwest.

Benthic sediments and substrates in the project area were characterized during a benthic survey completed in May 2014 (CR Environmental, Inc. 2014). Surficial sediments were characterized using video transects and grab samples captured at five locations along Berths 11, 12, and 13. Sediment characteristics varied between the five locations. At the sample locations at both the north and south sides of the fitting-out pier (Berths 11 and 13), where the current was generally low energy, sediment consisted of soft mud, sand, pebbles, and old mussel shells. At the end of the pier (Berth 12), in an area of higher current flow, the substrate consisted of hard sand, pebbles/cobbles, and small boulders (CR Environmental, Inc. 2014).

Much of the shoreline in the project area has been characterized as hard shores (rocky intertidal). In general, rocky intertidal areas consist of bedrock that alternates between marine and terrestrial habitats, depending on the tide (Navy 2013). Rocky intertidal areas are characterized by ''bedrock, stones, or boulders that singly or in combination cover 75 percent or more of an area that is covered less than 30 percent by vegetation'' (Navy 2013).

Detailed Description of Specific Activity

In-water work anticipated for Year 2 work is planned as follows and is summarized in Table 2 below. Work will continue from the 2017 schedule with installation of the king pile template and support for excavation (SOE) system along Berth 11C and any remaining sections of Berth 11B and 11A. The end sheet wall sections (returns) will also be completed. The temporary SOE system with the H-pile is required due to site sediment conditions becoming potentially unstable. The Navy's contractor requested the use of alternative measures to provide a stable work area and protect worker safety. The SOE would be required to protect workers from underwater engulfment due to unstable sediments disturbed during drilling and dredging activity. The SOE will maintain an excavation face of up to ten feet to protect divers who must be in the area during installation of the shutter panel system.

It is anticipated that a significant amount of the temporary pile extraction work will be completed from behind the new shutter panel wall during low-water situations which is anticipated to reduce the noise generated from use of the vibratory hammer during extraction; however, work to be conducted from behind the new shutter panel wall has not been included in the calculations for this application as it was not feasible to determine exact amounts of activity which would be accomplished from behind the new shutter panel wall during low water conditions. During Year 2 activity, concurrent work utilizing a vibratory hammer during drilling operations is possible. This potential concurrent activity could occur during installation of the rock sockets for up to 16 days. The vibratory hammer may be working to install SOE sheets or H-pile as the drilling work is being conducted.

The Navy plans to continue the project in 2018 with the installation of a king pile and concrete shutter panel bulkhead at Berth 11C. The bulkhead would extend from the western end of Berth 11B to the southern end of Berth 12. The in-water construction process would be the same as the process described below and utilized in 2017. See Figure 1–2 in the application depicting the layout of the berths at the Shipyard.

The contractor will install templates for the king pile and work in increments along the berth from a jack-up barge. The contractor will set the template (including temporary piles and horizontal members), which may take approximately 1 day. The contractor would then drill the rock sockets, which is estimated to take about one day per socket. King piles would be regularly spaced along the berths and grouted into sockets drilled into the bedrock (*i.e.,* ''rock-socketed'').

The SOE system will then be installed within the current work area for the king pile (between king piles). The SOE system consists of an H-pile secured to a road plate. The H-pile will be placed utilizing the vibratory hammer to a depth sufficient to contain material, which could be dislodged during dredging activity, containing the activity to the permitted work area. The SOE system will not be utilized the full length of the berth. Soil borings and field conditions will determine need. The days and pile number for SOE installation are conservatively estimated from soil boring data obtained in 2017.

The concrete shutter panels would then be installed in stacks between the king piles along most of the length of Berth 11C and remaining portions of 11A and 11B. Installation of the concrete shutter panels is not included in the noise analysis because no pile driving would be required.

Along an approximately 16-foot section at the eastern end of Berth 11A and an additional 101 feet between Berths 11A and 11B, the depth to bedrock is greater, thus allowing a conventional sheet-pile bulkhead to be constructed. The steel sheet-piles would be driven to bedrock using a vibratory hammer. Note that this work was originally slated to occur in Year 1 but has been re-scheduled to occur in Year 2.

Sheet piles installed with a vibratory hammer also would be used to construct ''returns,'' which would be shorter bulkheads connecting the new bulkheads to the existing bulkhead under the pier. Installation of the sheeting with a vibratory hammer is estimated to take less than one hour per pair of sheets. The contractor would probably install two sheets at a time, and so the time required to install the sheeting (10 pairs = 20 sheets) using vibratory hammers would only be about 8 hours per 10 pairs of sheets. The activities described in Table 2 reflect those estimated installation durations. Time requirements for all other pile types were estimated based on information compiled from ICF Jones and Stokes and Illingworth and Rodkin, Inc. (2012).

Additional in-water work would be required to install steel H-type sister piles at the location of the inboard portal crane rail beam at Berth 11, including Berth 11C. The sister piles would provide additional support for the portal crane rail system and restore its load-bearing capacity. The sister piles would be driven into the bedrock below the pier, in water generally less than 10 feet deep, using an impact hammer. The timing of this work depends on operational schedules at the berths. The sister piles may be installed either before or after the bulkheads are constructed. Twenty-two (22) sister piles are (11C, 11A) planned for 2018. It is anticipated that this work will also be conducted behind the new shutter panel wall, providing for additional sound attenuation or completion of the work during low tide or ''out of water'' conditions.

In summary, vibratory hammers will be used to install the following:

- 15-inch timber piles used to reconstruct timber dolphins at the corners of Berth 11;
- 25-inch steel sheet piles used for the bulkhead at Berth 11;
- 14-inch H-pile for SOE system (road plate system) initial installation; and
- 25-inch sheet pile used for SOE in areas where the road plate system is not appropriate.

Extracted piles would include:

- 15-inch timber fender piles at Berth 11;
- 15-inch timber piles making up the existing dolphins at the corner of Berth 11; and
- 25-inch sheet pile and 14-inch H-pile road plate system for SOE.

Piles that would be installed through impact driving include 14-inch steel H-type piles used as sister piles at Berth 11. These piles must be fully installed with an impact hammer because the piles will not reach bearing depth or have the required load-bearing capacity if installed using vibratory methods only. The vibratory hammer will be used to set the pile with the impact hammer used to seat the pile for depth and assure load-bearing capacity. Estimated use of the impact hammer would be approximately four minutes per pile.

Table 2 shows the anticipated work effort (*e.g.,* days) and numbers planned for installation/extraction of each pile type while Table 3 shows estimated hours for each type of pile driving an drilling activity.

TABLE 2—YEAR 2 (2018) PLANNED CONSTRUCTION ACTIVITY

Activity/method	Timing	Number of days	Pile type	Number of piles installed	Number of piles extracted	Overlap days	Production estimates
Extract Timber Piles/Vibratory Hammer.	January–December 2018.	3	15″ Timber Piles		18		Estimated 6 piles per day.

TABLE 2—YEAR 2 (2018) PLANNED CONSTRUCTION ACTIVITY—Continued

Activity/method	Timing	Number of days	Pile type	Number of piles installed	Number of piles extracted	Overlap days	Production estimates
Install Casing & Drill Sockets/Auger Drilling.	January–December 2018.	56	36″ W-Section Steel	35			Estimated less than one pile completed per day. This includes setting the casing and rock socket drilling.
Install Sheet Pile (SKZ–20) SOE Piles/Vibro.	January–December 2018.	12	24″ Sheet Piles Steel	144		9/during rock sockets	Estimated 12 sheets per day.
Remove Sheet Pile (SKZ–20) SOE Piles/ Vibro.	January–December 2018.	6	24″ Sheet Piles Steel		144	4/during rock sockets	Estimated 24 sheets per day.
Install Road Plate/H-Pile Support of Excav. Vibro.	January–December 2018.	3	14 inch H-Pile	12		2/during rock sockets	Estimated 4 ea. road plates per day.
Remove Road Plate/H-Pile Support of Excav. Vibro.	January–December 2018.	2	14 inch H-Pile		12	1/during rock sockets	Estimated 8 ea. Road plates per day.
Install Sheet Pile (AZ50) Sheet wall Bulkhead.	January–December 2018.	6	24 inch Sheet Piles Steel.	74			Estimated 13 sheets per day.
Install H-Pile (AZ50) Bulkhead Return @ West End of 11C-Vibro.	January–December 2018.	2	14inch H-Pile Steel	4			Estimated 2 piles per day.
Install Sheet Pile (AZ50) Bulkhead Return @ West End of 11C-Vibro.	January–December 2018.	1	24inch Sheet Piles Steel.	2			Estimated 2 piles per day.
Install Support/Sister Pile/Vibro & Impact Hammer.	January–December 2018.		14inch H-Pile Steel	22			Estimated 2.6 piles per day. The vibro would be used to stick the pile and the impact would drive the pile to refusal.*
Totals		Expected total work days (including up to16 days of concurrent activities) = 84–100 days		293	174	16.	

* Depending on when these piles are driven in the tide cycle there is potential to install all 22 of the support piles in the dry which would further reduce the number of vibratory and impact hammer days. This pile quantity includes all the Support Pile in Berth 11C as well as 8 Support Pile remaining from Berth 11A.

TABLE 3—YEAR 2 (2018) HOURS ESTIMATED FOR EACH PILE DRIVING ACTIVITY

Driving type	Pile type	Number of piles	Days	Hours
Impact	14″ H-Pile (Sister Pile)	22 piles	9	1.5.
Vibratory	24″ and 36″ sheet pile, 15″ timber pile, 14″ H-pile	236 piles/sheet	27 install 8 remove	216 install 64 remove.
Drilling	36″ Installation/Rock Sockets	35 casings	56	448.

The project schedule will include dredging operations. However, dredging operations are not expected to result in the take of any animals and will not be discussed further.

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

Five marine mammal species, including one cetacean and four pinnipeds, may inhabit or transit the waters near the Shipyard in the lower Piscataqua River during the specified activity. These include the harbor porpoise (*Phocoena phocoena*), gray seal (*Halichoerus grypus*), harbor seal (*Phoca vitulina*), hooded seal (*Cystophora cristata*), and harp seal (*Pagophilus groenlandicus*). None of the marine mammals that may be found in the Piscataqua River are listed under the Endangered Species Act (ESA). Table 3 lists the marine mammal species that could occur near the Shipyard and their estimated densities within the project area. As there are no specific density data for any of the species in the Piscataqua River, density data from the nearshore zone outside the mouth the Piscataqua River in the Atlantic Ocean have been used instead. Therefore, it can be assumed that the density estimates presented here for each species are conservative and higher than densities that would typically be expected in an industrialized, estuarine environment such as the lower Piscataqua River in the vicinity of the Shipyard.

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 (SAR; *www.nmfs.noaa.gov/pr/sars/*) and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS's Web site (*www.nmfs.noaa.gov/pr/species/mammals/*).

Table 4 lists all species with expected potential for occurrence near the Shipyard 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 (2017). 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 comprise 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. Atlantic and Gulf of Mexico Marine Mammal Stock Assessment—2016 (Hayes *et al.* 2017). All values presented in Table 4 are the most recent available at the time of publication and are available in the 2016 SAR (Hayes *et al.* 2017) (available online at: *www.nmfs.noaa.gov/pr/sars/draft.htm*).

TABLE 4—MARINE MAMMAL SPECIES POTENTIALLY PRESENT IN THE PISCATAQUA RIVER IN THE VICINITY OF THE SHIPYARD

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]
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Phocoenidae (porpoises)						
Harbor Porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy stock.	-;N	79,883 (0.32; 61,415; 2011)	706	437
Order Carnivora—Superfamily Pinnipedia						
Family Phocidae (earless seals)						
Gray Seal	*Halichoerus grypus*	Western North Atlantic stock.	-;N	unknown 505,000 (best estimate 2014 Canadian population DFO 2014).	unknown	4,959
Harbor Seal	*Phoca vitulina*	Western North Atlantic stock.	-;N	75,834 (0.15; 66,884; 2012)	2,006	389
Hooded Seal [4]	*Cystophora cristata*	Western North Atlantic stock.	-;N	592,100 (-;512,000, 2005)	unknown	5,199
Harp Seal	*Pagophilus groenlandicus.*	Western North Atlantic stock.	-;N	7,100,000 (2012)	unknown	306,082

[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.

[4] Abundance estimates for these stocks are greater than eight years old and are, therefore, not considered current. PBR is considered undetermined for these stocks, as there is no current minimum abundance estimate for use in calculation. We nevertheless present the most recent abundance estimates and PBR values, as these represent the best available information for use in this document.

Note—*Italicized species are not expected to be taken or proposed for authorization.*

As described below, all five species temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we are proposing to authorize it. However, the temporal and/or spatial occurrence of hooded seals is such that take is not expected to occur, and they are not discussed further beyond the explanation provided here. While hooded seals have been recorded in the Piscataqua River, only two seals have been sighted near the shipyard with those observations occurring in 2009. We consider occurrence of the hooded seal in the Piscataqua River to be extralimital.

Harbor Porpoise

The harbor porpoise is a member of the *phocoenidae* family. The Gulf of Maine/Bay of Fundy stock of the harbor porpoise is not listed under the ESA and is not considered strategic or depleted under the MMPA.

Line-transect surveys have been conducted in the Gulf of Maine between 1991 and 2011. Based on the 2011 aerial surveys, the best abundance estimate for the Gulf of Maine/Bay of Fundy stock of harbor porpoise is 79,883 animals (CV = 0.32). The aerial surveys included central Virginia to the lower Bay of Fundy. The minimum population estimate is 61,415 animals (Hayes *et al.* 2017).

Harbor porpoises are found commonly in coastal and offshore waters of both the Atlantic and Pacific Oceans. In the western North Atlantic, the species is found in both U.S. and Canadian waters. More specifically, the species can be found between West Greenland and Cape Hatteras, North Carolina (Hayes *et al.* 2017). Based on genetic analysis, it is assumed that harbor porpoises in the U.S. and Canadian waters are divided into four populations, as follows: (1) Gulf of St. Lawrence; (2) Newfoundland; (3) Greenland; and (4) Gulf of Maine/Bay of Fundy.

The Gulf of Maine/Bay of Fundy stock of the harbor porpoise is generally found over the Continental Shelf, ranging from the Gulf of Maine/Bay of Fundy region to North Carolina, in varying abundance and depending on the season (Waring *et al.* 2014). July through September are the primary months this species can be found concentrated in the Gulf of Maine and the southern Bay of Fundy area (Waring *et al.* 2014). During this time, harbor porpoises are generally found in less than approximately 150 m of water (Waring *et al.* 2014). During fall months (October through December) and spring months (April through June), this species is more dispersed throughout a larger region that ranges from Maine though New Jersey. During winter months (January through March), harbor porpoises are generally found in much lower densities between New York and Canada, as well as dispersed in more southerly locations between New Jersey and North Carolina (Waring *et al.,* 2014; CeTAP 1982). Harbor porpoises are known to occur in the Piscataqua River and are the most commonly observed cetacean species for the river.

Harbor porpoises are considered high-frequency cetaceans. Hearing capabilities for harbor porpoises have been tested both behaviorally and with the auditory evoked potential technique. Based on an audiogram developed from behavioral methods, detection thresholds were estimated between 250 hertz (Hz) and 180 kilohertz (kHz). Within that, the range of best hearing was from 16 to 140 kHz, and maximum sensitivity was recorded at 100 to 140 kHz (Kastelein *et al.,* 2002). Harbor porpoises are vocal animals, using echolocation for feeding and navigation and vocalizing for socialization (Southall *et al.,* 2007).

Gray Seal

Gray seals, which are members of the ''true seal'' family (*phocidae*), are a coastal species that generally remains within the Continental Shelf region. The western North Atlantic stock of the gray seal is not categorized as strategic or depleted under the MMPA.

Gray seals can be found on both sides of the North Atlantic. Within this area, the species is split into three primary populations: (1) Eastern Canada, (2) northwestern Europe, and (3) the Baltic Sea (Hayes *et al.* 2017). Gray seals within U.S. waters are considered the western North Atlantic stock and are expected to be part of the eastern Canadian population (Hayes *et al.* 2017) 2014). In general, this species can be found year-round in the coastal waters of the Gulf of Maine (Hayes *et al.* 2017). No known haul-out sites for gray seals are in the immediate vicinity of the project area. The closest known haul-out site for seals within the Piscataqua River is 1.5 miles downstream of the project area. Solitary seals could potentially haul out closer to the project area. In coastal Maine, gray seals are known to pup on Green Island and Sea Island and are year-round residents in southern Maine waters (Hayes *et al.* 2017). Gray seals are known to occur within the Piscataqua River but are not as commonly observed as harbor seals. During spring and summer months, gray seals are most commonly observed on offshore ledges off the central coast of Maine (Richardson *et al.* 1995).

Current estimates of the total western Atlantic gray seal population are not available; although estimates of portions of the stock are available for select time periods. The Canadian gray seal stock assessment (DFO 2014) reports gray seal pup production in 2014 for the three Canadian aggregations (Gulf of St. Lawrence, Sable Island, and Nova Scotia) as 93,000 animals; these are projected using population models to total population levels of 505,000 animals.

Gray seals, along with other members of the *phocidae* family, are capable of hearing in both air and water. In general, the estimated bandwidth for functional hearing for phocids in water is 50 Hz to 86 kHz and in air is 75 Hz to 30 kHz (Southall *et al.* 2007). Hearing capabilities for gray seals both in water and in air have been tested behaviorally and with the auditory evoked potential technique (Southall *et al.* 2007).

Harbor Seal

Harbor seals are members of the true seal family (*Phocidae*) and can be found in nearshore waters along both the North Atlantic and North Pacific coasts, generally at latitudes above 30° N. (Burns 2009). In the western Atlantic Ocean, the harbor seal's range extends from the eastern Canadian Arctic to New York; however, they can be found as far south as the Carolinas (Hayes *et al.* 2017). In New England, the species can be found in coastal waters year-round (Hayes *et al.* 2017). Overall, there are five recognized subspecies of harbor seal, two of which occur in the Atlantic Ocean. The western Atlantic harbor seal (*Phoca vitulina concolor*) is the subspecies likely to occur in the project area. There is some uncertainly about the overall population stock structure of harbor seals in the western North Atlantic Ocean. However, it is theorized that harbor seals along the eastern U.S. and Canada are all from a single population. The western North Atlantic stock of harbor seal is not categorized as strategic or depleted under the MMPA.

The best current abundance estimate of harbor seals is 75,834 (CV = 0.15) which is from a 2012 survey (Waring *et. al.* 2015). The minimum population estimate is 66,884 based on corrected available counts along the Maine coast in 2012. In the Piscataqua River, harbor seals are the most abundant pinniped species.

Harbor seals are capable of hearing in both air and water. In general, the estimated bandwidth for functional hearing for phocid (true seals) seals in water is 50 Hz to 86 kHz and in air is 75 Hz to 30 kHz (Southall *et al.* 2007). Harbor seals hear nearly as well in air as underwater (Kastak and Schusterman 1998). Kastak and Schusterman (1998) reported airborne low-frequency (100 Hz) sound detection thresholds at 65.4 decibels (dB) re 20 micropascals (μPa) for harbor seals. In air, they hear frequencies from 0.25 kHz to 30 kHz and are most sensitive to frequencies from 6 to 16 kHz (Richardson *et al.* 1995; Terhune and Turnbull 1995; Wolski *et al.* 2003). Adult males also produce underwater sounds during the breeding season that typically range from 0.025 to 4 kHz at a duration range of 0.1 second to multiple seconds (Hanggi and Schusterman 1994). Hanggi and Schusterman (1994) found that there is individual variation in the dominant frequency range of sounds between different males, and Van Parijs *et al.* (2003) reported oceanic, regional, population, and site-specific variation that could be vocal dialects. In water, the species hears frequencies from 1 to 75 kHz (Southall 2007) and can detect sound levels as weak as 60 to 85 dB re 1 μPa within that band. They are most sensitive at frequencies below 50 kHz; above 60 kHz, sensitivity rapidly decreases.

Harp Seal

Harp seals are members of the true seal family and are classified into three stocks, which coincide with specific pupping sites on pack ice, as follows: (1) Eastern Canada, including the areas off the coast of Newfoundland and Labrador and the area near the Magdalen Islands in the Gulf of St. Lawrence; (2) the West Ice off eastern Greenland, and (3) the ice in the White Sea off the coast of Russia (Waring *et al.* 2014). The harp seal is a highly migratory species, and its range can extend from the Canadian arctic to New Jersey. In U.S. waters, the species has an increasing presence in the coastal waters between Maine and New Jersey (Waring *et al.* 2014). In the U.S., they are considered members of the western North Atlantic stock and generally occur in New England waters from January through May in the winter and spring (Waring *et al.* 2014). Harp seals are not listed under the ESA and the western North Atlantic stock is not considered strategic or depleted under the MMPA.

Population abundance of harp seals in the western North Atlantic is derived from aerial surveys and mark-recapture (Waring *et al.* 2014). The most recent population estimate in the western North Atlantic was derived in 2012 from an aerial harp seal survey. The 2012 best population estimate for hooded seals is 7.1 million individuals (Waring *et al.* 2014). Currently, not enough data are available to determine what percentage of this estimate may represent the population within U.S. waters. Harp seals have been known to occur in the Piscataqua River; however, sightings are rare (Navy 2017).

Hearing capabilities of this species have not been directly tested as they have for other species. However, as harp seals are within the *phocidae* family, the functional hearing limit of these species is expected to be similar to that of other phocid seals. In general, the estimated bandwidth for functional hearing for phocids in water is 50 Hz to 86 kHz and in air is 75 Hz to 30 kHz (Southall *et al.* 2007). Pinnipeds in general are also known to produce a wide variety of low-frequency social sounds, with varying hearing capabilities in air and in water (Southall *et al.* 2007).

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; 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 (2016) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. The functional groups and the associated frequencies are indicated below (note that these frequency ranges correspond to the range for the composite group, with the entire range not necessarily reflecting the capabilities of every species within that group):

• Low-frequency cetaceans (mysticetes): Generalized hearing is estimated to occur between approximately 7 Hz and 35 kHz, with best hearing estimated to be from 100 Hz to 8 kHz;

• Mid-frequency cetaceans (larger toothed whales, beaked whales, and most delphinids): Generalized hearing is estimated to occur between approximately 150 Hz and 160 kHz, with best hearing from 10 to less than 100 kHz;

• High-frequency cetaceans (porpoises, river dolphins, and members of the genera Kogia and Cephalorhynchus; including two members of the genus Lagenorhynchus, on the basis of recent echolocation data and genetic data): Generalized hearing is estimated to occur between approximately 275 Hz and 160 kHz.

• Pinnipeds in water: Phocidae (true seals): Generalized hearing is estimated to occur between approximately 50 Hz to 86 kHz, with best hearing between 1–50 kHz; and

• Pinnipeds in water: Otariidae (eared seals): Generalized hearing is estimated to occur between 60 Hz and 39 kHz, with best hearing between 2–48 kHz.

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (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 (2016) for a review of available information. Four marine mammal species (one cetacean and three pinniped (phocid) species) have the reasonable potential to co-occur with the proposed survey activities. Please refer to Table 4. Of the cetacean species that may be present, harbor porpoises are classified are classified as high-frequency cetaceans, while the three seal species belong within the pinnipeds in water (Phocidae) hearing group.

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.

Description of Sound Sources

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

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

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

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

- *Wind and waves:* The complex interactions between wind and water surface, including processes such as breaking waves and wave-induced bubble oscillations and cavitation, are a main source of naturally occurring ambient noise for frequencies between 200 Hz and 50 kHz (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Surf noise becomes important near shore, with measurements collected at a distance of 8.5 km from shore showing an increase of 10 dB in the 100 to 700 Hz band during heavy surf conditions;
- *Precipitation:* Sound from rain and hail impacting the water surface can become an important component of total noise at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times;
- *Biological:* Marine mammals can contribute significantly to ambient noise levels, as can some fish and shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz; and
- *Anthropogenic:* Sources of ambient noise related to human activity include transportation (surface vessels and aircraft), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies. Shipping noise typically dominates the total ambient noise for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly (Richardson *et al.,* 1995). Sound from identifiable anthropogenic sources other than the activity of interest (*e.g.,* a passing vessel) is sometimes termed background sound, as opposed to ambient sound.

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

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

Pulsed sound sources (*e.g.,* explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986; Harris, 1998, 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 non-continuous (ANSI, 1995; NIOSH, 1998). Some of these non-pulsed sounds can be transient signals of short duration but without the essential properties of pulses (*e.g.,* rapid rise time). Examples of non-pulsed sounds include those produced by vessels, aircraft, machinery operations such as drilling, vibratory pile driving, and active sonar systems (such as those used by the U.S. Navy). The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

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

Acoustic Impacts

Please refer to the information given previously (*Description of Sound Sources*) regarding sound, characteristics of sound types, and metrics used in this document.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Non-Auditory Physiological Effects—Non-auditory physiological effects or injuries that theoretically might occur in marine mammals exposed to strong underwater sound include stress, neurological effects, bubble formation, resonance effects, and other types of organ or tissue damage (Cox *et al.,* 2006; Southall *et al.,* 2007). Studies examining such effects are limited. In general, little is known about the potential for pile driving to cause auditory impairment or other physical effects in marine mammals. Available data suggest that such effects, if they occur at all, would presumably be limited to short distances from the sound source, where SLs are much higher, and to activities that extend over a prolonged period. The available data do not allow identification of a specific exposure level above which non-auditory effects can be expected (Southall *et al.,* 2007) or any meaningful quantitative predictions of the numbers (if any) of marine mammals that might be affected in those ways. However, the proposed activities do not involve the use of devices such as explosives or mid-frequency active sonar that are associated with these types of effects. Therefore, non-auditory physiological impacts to marine mammals are considered unlikely.

Underwater Acoustic Effects From the Proposed Activities

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

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

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

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

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

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

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

The most likely impact to fish from pile driving activities at the project area would be temporary behavioral avoidance. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species from the proposed project are expected to be minor and temporary due to the relatively short timeframe of between 84 and 100 days of pile driving, pile extraction and drilling.

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

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

Previous Monitoring Report—The Navy submitted a preliminary monitoring report covering the period between April 18, 2017 and October 27, 2017. During this period piles were installed using vibratory hammer, the impact hammer, and drilling. Work was conducted over 73 days. Drilling has accounted for 98.8% of the total noise-generating time spent on installation/extraction activities at the Shipyard; vibratory activity occurred during 1% of the total time; and impact driving took place <1% of the total time. During this time, observers noted 142 occurrences of marine mammals within designated zones, with all but one occurring within the Level B harassment zone as shown in Table 13.

TABLE 13—SUMMARY OF 2017 TAKES

	Harbor porpoise	Harbor seal	Gray seal	Harp seal	Hooded seal
Takes through October 28, 2018					
Level A	0	1	0	0	0
Level B	3	120	18	0	0

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 as well as drilling have the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) due to large predicted auditory injury zones. 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.

Described in the most basic way, 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. Below, we describe these components in more detail and present the proposed take estimate.

Acoustic Thresholds

NMFS recommends 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.,* 2011). 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 non-impulsive (*e.g.* vibratory pile-driving, drilling) and above 160 dB re 1 μPa (rms) for non-explosive impulsive (*e.g.,* impact pile driving, seismic airguns) or intermittent (*e.g.,* scientific sonar) sources.

The Navy's proposed activity includes the use of continuous (vibratory pile driving, drilling) 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 (Technical Guidance, 2016) 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 Navy's proposed activity includes the use of impulsive (impact pile driving) and non-impulsive (vibratory pile driving, drilling) sources.

These thresholds are provided in Table 5. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: *http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.*

TABLE 5—THRESHOLDS IDENTIFYING THE ONSET OF PERMANENT THRESHOLD SHIFT

(Received level)

Hearing group	PTS onset acoustic thresholds*	
	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 1 μPa²s. 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.

Pile driving generates underwater noise that can potentially result in disturbance to marine mammals in the project area. Transmission loss (TL) is the decrease in acoustic intensity as an acoustic pressure wave propagates out from a source. TL parameters vary with frequency, temperature, sea conditions, current, source and receiver depth, water depth, water chemistry, and bottom composition and topography. The general formula for underwater TL is:

TL = B * log10(R1/R2),

Where:
R1 = the distance of the modeled SPL from the driven pile, and
R2 = 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]). Although cylindrical spreading loss was applied to driving of 14-inch H-piles in the previous IHA, in an effort to maintain consistency NMFS utilized practical spreading loss (4.5 dB reduction in sound level for each doubling of distance) for all driving and drilling activities for this proposed IHA. A practical spreading value of 15 is often used under conditions, such as at the Shipyard dock, where water increases with depth as the receiver moves away from the shoreline, resulting in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions.

Underwater Sound—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. A number of studies have measured sound produced during underwater pile driving projects. These data are largely for impact driving of steel pipe piles and concrete piles as well as vibratory driving of steel pipe piles.

Source Levels

Source levels were collected for the four types of piles that would be installed and two pile-driving methods proposed for the project:

1. 14-inch steel H-type piles—Used as sister piles and for SOE system installation; installed/extracted via vibratory hammer and seated as needed with impact hammer.

2. 15-inch timber piles—Used for re-installation of dolphins at Berths 11, 12, and 13 and extracted via vibratory hammer.

3. 25-inch steel sheet piles—Used for the bulkhead at Berth 11 and for SOE installed/extracted via vibratory hammer.

Reference source levels for the project were determined using data for piles of similar sizes, the same pile-driving method as that proposed for the project, and at similar water depths. While the pile sizes and water depths chosen as proxies do not exactly match those for the project, they are the closest matches available, and it is assumed that the source levels shown in Table 6, 7 and 8 are the most representative for each pile type and associated pile-driving method.

The intensity of pile driving or sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment in which the activity takes place. Reference source levels for the proposed project were determined using data for piles of similar sizes, the same pile driving method as that proposed for the project, and at similar water depths. While the pile sizes and water depths chosen as proxies do not exactly match those for the project, they are the closest matches available, and it is assumed that the source levels shown in Table 6, 7, and 8 are the most representative for each pile type and associated pile driving method.

The Navy analyzed source level values associated with a number of projects involving impact driving of steel H-piles to approximate environmental conditions and driving parameters at the Shipyard (Caltrans 2015). Data from pertinent projects were used to obtain average SEL and rms values for H pile impact installation. To be sure all values were relevant to the site, the Navy eliminated all piles in waters greater than 5 m, as well as all readings measured at ranges greater than 10 m. The Navy used all H piles for which the diameter was not specified as well as the 14 to 15-inch H piles, converted the dB measurements to a linear scale before averaging, and re-converted the average measurements to the appropriate dB units. Piles driven at this project site will be driven in 0–11 feet of water (0–3.4 m). During low tide, piles will essentially be driven in the dry. This varies drastically from other Navy projects on the east coast, such as at the Naval Submarine Base New London, where 14-inch H piles will be driven in water depths of 25 feet (7.62 m). Results are shown in Table 6.

TABLE 6—SOURCE LEVELS FOR IN-WATER IMPACT HAMMER 14-INCH STEEL H-TYPE (SISTER) PILES

Pile size and type	Water depth (m)	Distance measured (m)	Peak	RMS (dB)	SEL (dB)
15-inch steel H pile	2–3	10	187	164	154
15-inch steel H pile	2–3	10	180	165	155
15-inch steel H pile	2–3	10	194	177	170
Unspecified steel H pile	0.5–2	10	172	160	147
14-inch steel H pile	1–5	10	205	184	174
14-inch steel H pile	1–5	10	206	182	172
14-inch steel H pile	1–5	10	206	184	174
14-inch steel H pile	1–5	10	210	190	180
14-inch steel H pile	1–5	10	212	192	182
14-inch steel H pile	1–5	10	210	189	179
14-inch steel H pile	1–5	10	212	190	180
14-inch steel H pile	1–5	10	205	190	180
14-inch steel H pile	1–5	10	207	187	177
Unspecified steel H pile	0–0.9	10		151	142
Unspecified steel H pile	0–0.9	10		154	144
Unspecified steel H pile	0–0.9	10		170	159
Unspecified steel H pile	0–0.9	10		147	136
Unspecified steel H pile	0–0.9	10		147	136
Unspecified steel H pile	0–0.9	10		150	143
Unspecified steel H pile	0–0.9	10		153	142
Unspecified steel H pile	0–0.9	10		151	142
Unspecified steel H pile	0–0.9	10		156	146
Unspecified steel H pile	0–0.9	10		172	162
Unspecified steel H pile	0–0.9	10		161	150
Unspecified steel H pile	0–0.9	10		155	145
Unspecified steel H pile	0–0.9	10		163	152
Unspecified steel H pile	0–0.9	10		178	145
Unspecified steel H pile	0–0.9	10		165	154
Averages			200.4	181.4	171.3

Source: Caltrans 2015.

While the average rms value is 181.4, the Navy rounded up to 182 dB rms to be conservative.

Table 7 shows the source levels that were utilized to calculate isopleths for vibratory driving of 24-inch steel sheet piles, and 15-inch timber piles. An average value of 163 dB rms was used for 24-inch AZ steel sheet and 150 dB rms for 15-inch timber pile. For Year 1 work at the Shipyard Berth 11 the contractor has obtained initial acoustic readings associated with vibratory driving of 14'' H-Pile of 148 dB rms at 10 m. Additional details are found in Appendix A in the application. NMFS will use 148 dB as the source level since it is site-specific and more conservative than the 145 dB value depicted in WSDOT 2012.

TABLE 7—SOURCE LEVELS FOR IN-WATER VIBRATORY HAMMER 24-INCH STEEL SHEET PILES, AND 15-INCH TIMBER PILES

Pile size and pile type	Water depth (m)	Distance measured (m)	Peak (dB)	RMS (dB)	SEL (dB)	Location
24-inch AZ Steel Sheet [1]	15	10	177	163	162	Berth 23, Port of Oakland, CA.
24-inch AZ Steel Sheet [1]	15	10	175	162	162	Berth 30, Port of Oakland, CA.
24-inch AZ Steel Sheet [1]	15	10	177	163	163	Berth 35/37, Port of Oakland, CA.
24-inch AZ Steel Sheet—Typical [1]	15	10	175	160	160	CA (Specific location unknown).
24-inch AZ Steel Sheet—Loudest [1]	15	10	182	165	165	CA (Specific location unknown).
24-inch AZ Steel Sheet (Average) [1]	15	10	178	163	163	CA (Specific location unknown).
15-inch Timber Pile [2]	10	16	164	150	....	WSF Port Townsend Ferry Terminal, WA.
14-inch H-type Pile [3]	6	10	155	148	145	CA (Specific location unknown).

Source:
[1] ICF Jones & Stokes and Illingsworth & Rodkin 2012.
[2] WSDOT 2010.
[3] WSDOT 2012.

Using the data presented in Table 6 and Table 7, underwater sound levels were estimated using the practical spreading model to determine over what distance the thresholds would be exceeded.

Drilling is considered a continuous, non-impulsive noise source, similar to vibratory pile driving. Very little information is available regarding source levels of in-water drilling activities associated with nearshore pile installation such as that proposed for the Berths 11, 12, and 13 structural repairs project. Dazey *et al.* (2012) attempted to characterize the source levels of several marine pile-drilling activities. One such activity was auger drilling (including installation and removal of the associated steel casing). Auger drilling will be employed as part of the Shipyard Project. The average sound pressure levels re 1 μPa rms were displayed for casing installation, auger drilling (inside the casing), and casing removal. For the purposes of this plan, it is assumed that the casing installation and removal activities would be conducted in a manner similar to that described in Dazey *et al,* (2012), primarily via oscillation. These average source levels are reported in Table 8.

TABLE 8—AVERAGE SOURCE LEVELS FOR AUGER DRILLING ACTIVITIES DURING PILE INSTALLATION

Drilling activity	Water depth (m)	Distance measured (m)	RMS (dB)	Location
Casing Installation	1–5	1	157	Bechers Bay Santa Rosa Island, CA.
Auger Drilling	1–5	1	151	Bechers Bay Santa Rosa Island, CA.
Casing Removal	1–5	1	152	Bechers Bay Santa Rosa Island, CA.
Average Drilling Activity	1–5	1	154	

Source: Dazey *et al.,* 2012.
Note: All source levels are referenced to 1 microPascal (re 1 μPa).

IHA applications for other construction projects have reported that, due to a lack of information regarding pile drilling source levels, it is generally assumed that pile drilling would produce less in-water noise than both impact and vibratory pile driving. Based on the general lack of information about these activities and the assumption that in-water noise from pile drilling would be less than either impact or vibratory pile driving, it is assumed that the source levels presented in Table 7 are the most applicable for acoustic impact analysis at Berths 11, 12, and 13. For the purposes of this proposed IHA, however, we will conservatively assume that drilling has identical source levels to vibratory driving when calculating zones of influence. This includes instances where drilling is underway in the absence of any concurrent driving.

During the proposed Year 2 activity, concurrent work utilizing a vibratory hammer during drilling operations is possible. This potential concurrent activity could occur during installation of the rock sockets for approximately 16 days. The vibratory hammer may be working to install SOE sheets or H-Pile as the drilling work is being conducted. Under concurrent driving conditions, the Navy will use the larger of the two source level values to calculate size of entire ensonified area. Since the vibratory source level is greater than the level associated with drilling, it will be utilized.

With limited source level data available for vibratory pile extraction of 24-inch steel sheet piles, NMFS used the same values for both vibratory installation and extraction assuming that the two activities would produce similar source levels if water depth, pile size, and equipment remain constant.

When 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, an User Spreadsheet was developed 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 will result in some degree of overestimate of Level A 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 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 9 and Table 10.

TABLE 9—TABLE INPUT FOR LEVEL A ISOPLETH PTS CALCULATIONS

User spreadsheet input	14″ steel H impact	14″ steel vibro	15″ timber vibro	25″ steel sheet vibro	Drilling
Spreadsheet Tab Used	(E.1) Impact pile driving.	(A) Non-Impulsive, Stationary, Continuous.	(A) Non-Impulsive, Stationary, Continuous.	(A) Non-Impulsive, Stationary, Continuous.	(A) Non-Impulsive, Stationary, Continuous.
Source Level (Single Strike/shot SEL)	171 SEL	148 rms	150 rms	163	154 rms.
Weighting Factor Adjustment (kHz)	2	2.5	2.5	2.5	2.5.
Number of strikes per pile	160	NA	NA	NA	NA.
Activity duration within 24-h period OR number of piles per day.	4 piles	4 hours	4 hours	4 hours	8 hours.
Propagation (xLogR)	15LogR	15LogR	15LogR	15LogR	15LogR.
Distance of source level measurement (meters)+.	10	10	16	10	10.

TABLE 10—USER SPREADSHEET OUTPUT FOR LEVEL A ISOPLETH AND ENSONIFIED AREA PTS CALCULATIONS

Source type	PTS Isopleth	
	High-frequency cetaceans	Phocid pinnipeds
14″ Steel H Impact	140 m	63 m.
14″ Steel Vibro	3.5 m	1.4 m.
15″ Timber Vibro	7.5 m	1.9 m.
25″ Steel Sheet Vibro	34.6 m	14.2 m.
Drilling (8 hours/day) within Shutdown Zone* utilizing 163 dB rms value	54.9 m	22.6 m.
Daily Ensonified Area		
14″ Steel H Impact	0.0615 km²	0.0125 km².
14″ Steel H Vibro	38.46 m²	6.15 m².
15″ Timber Vibro	179.9 m²	11.33 m².
25″ Steel Sheet Vibro	0.0038 km²	0.00062 km².
Drilling (8 hours/day) within Shutdown Zone* utilizing 163 dB rms value	0.0095 km²	0.0016 km².

*While 154 dB rms is shown for drilling activity source level, take estimates and calculation of the ensonified area have been based on 163 dB rms (vibratory drilling) as these activities may run concurrently.

Using the same source level and transmission loss inputs discussed in the Level A isopleths section above, the Level B distance was calculated for both impact and vibratory driving (Table 11). The attenuation distance for impact hammer use associated with the installation of the sister pile/support pile with a source level of 182 dB rms resulted in an isopleth of 293 meters (m). The attenuation distance for vibratory hammer use with a source level of 163 dB rms resulted in an isopleth of 7.35 kilometers (km). The Level B area associated with the 120-dB isopleth for vibratory driving and which is used in the take calculations is 0.9445 square kilometers (km²). Note that these attenuation distances are based on sound characteristics in open water. The project area is located in a river surrounded by topographic features. Therefore, the actual attenuation distances are constrained by numerous land features and islands.

TABLE 11—PILE-DRIVING SOUND EXPOSURE DISTANCES (IN-WATER) LEVEL B ZONE OF INFLUENCE

Drilling activity	Behavioral thresholds for cetaceans and pinnipeds	Propagation model	Attenuation distance to threshold
Vibratory Hammer	120 dB rms	Practical Spreading Loss	7.35 km (4.57 mi).
Impact Hammer (rms)	160 dB rms	Practical Spreading Loss	293 m (961 ft).

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. For all species, the best scientific information available was considered for use in the marine mammal take assessment calculations. Density information was taken from the Navy Marine Mammal Density Database as shown in Table 12. (Craine 2015; Krause 2015). These data are generally used for broad-scale offshore activities; however, due to a lack of any other data within the general project area, these data are presented as the best available data for the Piscataqua River.

TABLE 12—MARINE MAMMAL SPECIES POTENTIALLY PRESENT IN THE PISCATAQUA RIVER NEAR THE SHIPYARD

Species	Relative occurrence in Piscataqua River	Season(s) of occurrence	Approximate density in the vicinity of the project area (individuals per km²) [1]			
			Winter	Spring	Summer	Fall
Harbor Porpoise Gulf of Maine/Bay of Fundy stock.	Occasional use	Spring to Fall (April to December).[2]	1.2122	1.1705	0.7903	0.9125
Gray Seal Western North Atlantic stock	Common	Year-round	0.2202	0.2202	0.2202	0.2202
Harbor Seal Western North Atlantic stock	Common	Year-round	0.1998	0.1998	0.1998	0.1998
Harp Seal Western North Atlantic stock	Rare	Winter to Spring (January–May)	0.0125	0.0125	0.0125	0.0125

Notes:
[1] Density data are taken from the Navy Marine Species Density Database (Crain 2015; Krause 2015).
[2] Densities shown for all seasons, even when species are unlikely to occur in the river.

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate.

The following assumptions are made when estimating potential incidences of take:

- All marine mammal individuals potentially available are assumed to be present within the relevant area, and thus incidentally taken;
- An individual can only be taken once during a 24-h period;
- While up to 16 days of concurrent driving/drilling could occur, NMFS will conservatively assume that there are zero (0) days resulting in a total of 100 pile driving/drilling days; and
- Exposures to sound levels at or above the relevant thresholds equate to take, as defined by the MMPA.

In this case, the estimation of marine mammal takes uses the following calculation:

Exposure estimate = n * ZOI * days of total activity

Where:

n = density estimate used for each species/season.

ZOI = sound threshold ZOI area; the area encompassed by all locations where the SPLs equal or exceed the threshold being evaluated.

The ZOI impact area is estimated using the relevant distances in Table 10 and Table 11, assuming that sound radiates from a central point in the water column at project site and taking into consideration the possible affected area due to topographical constraints of the action area (*i.e.,* radial distances to thresholds are not always reached) as shown in Figure 6–1 in the application.

There are a several reasons why estimates of potential incidents of take may be conservative, assuming that available density and estimated ZOI areas are accurate. We assume, in the absence of information supporting a more refined conclusion, that the output of the calculation represents the number of individuals that may be taken by the specified activity. In fact, in the context of stationary activities such as pile driving and in areas where resident animals may be present, this number more realistically represents the number of incidents of take that may accrue to a smaller number of individuals. While pile driving can occur any day throughout the period of validity, and the analysis is conducted on a per day basis, only a fraction of that time (typically a matter of hours on any given day) is actually spent pile driving. The potential effectiveness of mitigation measures in reducing the number of takes is typically not quantified in the take estimation process. For these reasons, these take estimates may be conservative.

Harbor Porpoise

Harbor porpoises may be present in the project area year-round. Based on density data from the Navy Marine Species Density Database, their presence is highest in winter and spring, decreases in summer, and slightly increases in fall. However, in general, porpoises are known to occasionally occur in the river. Average density for the predicted seasons of occurrence was used to determine abundance of animals that could be present in the area for exposure, using the equation abundance = n * ZOI. Estimated abundance estimate for harbor porpoises was 0.96 animals generated from the equation (0.9445 km² Level B ensonified area *1.02 animals/km²). The number of Level B harbor porpoise exposures within the ZOIs is (100 days * 0.96 animals/day) is 96. Therefore, NMFS proposed 96 Level B takes of harbor porpoise.

The injury zone for harbor porpoise was calculated to extend to a radius of 140 m from impact driven piles and a maximum of 55 m from vibratory or drilling activity. A 75-m shutdown zone is proposed (see ''Proposed Mitigation''); therefore, the area between the 75 m and 140 m isopleths is where Level A take may occur during impact hammer use. The area of the 75 m shutdown zone was subtracted from the full Level A injury zone to obtain the Level A take zone, 0.0132 km². The density of harbor porpoises is estimated at 1.02 harbor porpoises/km². Using the density of harbor porpoises potentially present (1.02 animal/km²) and the area of the Level A take zone, less than one (0.1218 mammals) harbor porpoise a day was estimated to be exposed to injury over the nine days of impact pile driving. Therefore, we assume that one harbor porpoise could be exposed to injurious noise levels during impact pile driving.

Harbor Seal

Harbor seals may be present year-round in the project vicinity, with constant densities throughout the year. Based on local anecdotal data, harbor seals are the most common pinniped in the Piscataqua River near the Shipyard. Average density for the predicted seasons of occurrence was used to determine abundance of animals that could be present in the area for exposure, using the equation abundance = n * ZOI. Abundance for harbor seals were 0.19/day. (Average year-round density = 0.1998). Therefore, Level B harbor seal exposures within the ZOI is (100 days * 0.19 animals/day) would be up to 19 Level B exposures of harbor seals within the ZOI. As described above in the gray seal section, however, the modeling of estimated takes may be underestimated. The data from the preliminary monitoring report indicated 120 Level B exposures of harbor seals over 73 work days resulting in 1.64 takes per day (120 takes/73 days). Therefore, NMFS is proposing to authorize 164 Level B harbor seal takes (1.64 takes/day * 100 days).

The injury zone for harbor seals was calculated to extend a radius of 63 m from impact driven piles and 14m for vibratory hammer use. The injury zone for drilling activity is estimated at 23 m. The Level A injury zone is within the shutdown zone, therefore no injurious takes of harbor seals are estimated to occur. However, as stated above for the gray seal take request, this may be an underestimate. The Navy has requested four Level A takes of harbor seal to coincide with the same number of Level A takes requested in Year 1. Preliminary monitoring report results support authorization of Level A take as one harbor seal was detected within 50 m of drilling activity. Therefore, NMFS is conservatively proposing four Level A takes of harbor seals so that operations will not have to be suspended due to exceeding authorized Level A takes.

Gray Seal

Gray seals are less common in the Piscataqua River than the harbor seal. Average density for the predicted seasons of occurrence was used to determine abundance of animals that could be present in the area for exposure, using the equation abundance = n * ZOI. The estimated abundance for gray seals is 0.21/day (average year-round density = 0.2202). Therefore, the number of Level B gray seal exposures within the ZOI is (100 days * 0.21 animals/day) resulting in up to 21 Level B exposures of gray seals within the ZOI.

However, current monitoring data indicate that this could be an underestimate. While there could be 21 Level B and 0 Level A takes for gray seal during construction activity monitoring of the zones, observations of gray seals have shown 18 Level B exposures over 73 days of activity through October 27, 2017. This comes out to 0.246 exposures per day (18/73 = 0.246). Therefore, the Navy has requested and NMFS is proposing to authorize 25 gray seal takes (0.246 takes/day * 100 days) under the proposed IHA.

The injury zone for gray seals was calculated to extend to a radius of 63m for impact driven piles and 14m for vibratory hammer use. Drilling activity is estimated at 23m from the activity. The injury zone for impact, vibratory and drilling activity remains within the shutdown zone of 75m for impact hammer use and 55 m for vibratory driving and drilling (see ''Proposed Mitigation''). These zones were utilized during Year 1. Based on these calculations and continued implementation of the shutdown zones, no injurious takes of gray seals are estimated to occur. The Navy, however, requests authorization of two Level A takes of gray seal to coincide with the same number of Level A takes requested in Year 1. This is partially supported by data collected in the preliminary Year 1 IHA monitoring report in which observers recorded one gray seal within 50 m of drilling activity. Because animals were observed within the shutdown zone during Year 1, NMFS is conservatively proposing authorization of two Level A gray seal takes, so that operations will not have to be suspended if animals unexpectedly occur in the Level A zones.

Harp Seal

Harp seals may be present in the project vicinity during the winter and spring, from January through February. In general, harp seals are much rarer than the harbor seal and gray seal in the Piscataqua River. These animals are conservatively assumed to be present within the underwater Level B ZOI during each day of in-water pile driving. Average density for the predicted seasons of occurrence was used to determine abundance of animals that could be present in the area for exposure, using the equation abundance = n * ZOI. Abundance for harp seals was 0.014/day (average year-round density = 0.0125). The number of Level B harp seal exposures within the ZOI is (100 days * 0.0125 animals/day) resulting in approximately 1 Level B exposure. Therefore, NMFS is proposing to authorize Level B take of 1 harp seal.

The injury zone for harp seals was calculated to extend a radius of 63m from impact driven piles and 14m for vibratory hammer use. Drilling activity is estimated at 23 m from the activity. These isopleths are within the shutdown zones and NMFS. Therefore, no Level A take is proposed as shown in Table 14.

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 and impact on operations.

Mitigation for Marine Mammals and Their Habitat

The mitigation strategies described below are similar to those required and implemented under the first IHA associated with this project. In addition to the measures described later in this section, the Navy would conduct briefings between construction supervisors and crews, marine mammal monitoring team, and Navy staff prior to the start of all pile driving activity, and when new personnel join the work, in order to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures.

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

Time Restrictions—Pile driving/removal (vibratory as well as impact) will only be conducted during daylight hours so that marine mammals can be adequately monitored to determine if mitigation measures are to be implemented.

Establishment of Shutdown Zone—During pile driving and removal, shutdown zones shall be established to prevent injury to marine mammals as determined under acoustic injury thresholds. During all pile driving and removal activities, regardless of predicted sound pressure levels (SPLs), the entire shutdown zone will be monitored to prevent injury to marine mammals from their physical interaction with construction equipment during in-water activities. The shutdown zone during impact driving will extend to 75 m for all authorized species. The shutdown during vibratory driving and drilling will extend to 55 m for all authorized species. Pile driving and removal operations will cease if a marine mammal approaches the shutdown zone. Pile driving and removal operations will restart once the marine mammal is visibly seen leaving the zone or after 15 minutes have passed with no sightings.

Establishment of Level A Harassment Zone—The Level A harassment zone is an area where animals may be exposed to sound levels that could result in PTS injury. The primary purpose of the Level A zone is monitoring for documenting incidents of Level A harassment. The Level A zones will extend from the 75 m shutdown zone out to 140 m for harbor porpoises. Animals observed in the Level A harassment zone will be recorded as potential Level A takes.

Establishment of Disturbance/Level B Harassment Zone—During pile driving and removal, the Level B zone shall include areas where the underwater SPLs are anticipated to equal or exceed the Level B harassment criteria for marine mammals (160 dB rms isopleths for impact pile driving, 120 dB rms isopleth for vibratory pile-driving and drilling). The Level B zone will extend out to 293 m for impact driving and 7.35 km during vibratory driving and drilling and will include all waters in the sight line of the driving or drilling operation not constrained by land.

Shutdown Zone During Other In-Water Construction or Demolition Activities—During all in-water construction or demolition activities having the potential to affect marine mammals, in order to prevent injury from physical interaction with construction equipment, a shutdown zone 10 m will be implemented to ensure marine mammals are not present within this zone. These activities could include, but are not limited to: (1) The movement of a barge to the construction site, or (2) the removal of a pile from the water column/substrate via a crane (*i.e.,* a ''dead pull'').

Soft Start for Impact Pile Driving—The use of a soft-start procedure is believed to provide additional protection to marine mammals by providing a warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full capacity. The project will use soft-start techniques recommended by NMFS for impact pile driving. Soft start must be conducted at beginning of day's activity and at any time impact pile driving has ceased for more than 30 minutes. If an impact hammer is used, contractors are required to provide an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period, then two subsequent 3-strike sets.

Monitoring Protocols—Monitoring would be conducted before, during, and after pile driving 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. Observations made outside the shutdown zone will not result in shutdown; that pile segment would be completed without cessation, unless the animal approaches or enters the shutdown zone, at which point all pile driving activities would be halted. Monitoring will take place from 15 minutes prior to initiation through 30 minutes post-completion of pile driving activities. Pile driving activities include the time to 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 30 minutes.

Monitoring will be conducted within the Level A harassment shutdown zone during all pile-driving operations and the Level B harassment buffer zone during two-thirds of pile-driving days. If a marine mammal is observed approaching a Level A zone, operations will be shut down. If an animal is seen entering the Level B harassment zone, an exposure would be recorded and behaviors documented. The Navy will extrapolate data collected during monitoring days and calculate total takes for all pile-driving days.

Prior to the start of pile driving activity, the shutdown zone will be monitored for 15 minutes to ensure that it is clear of marine mammals. Pile driving will only commence once observers have declared the shutdown zone clear of marine mammals; animals will be allowed to remain in the shutdown zone (*i.e.,* must leave of their own volition) and their behavior will be monitored and documented. The shutdown zone may only be declared clear, and pile driving started, when the entire shutdown zone is visible (*i.e.,* when not obscured by dark, rain, fog, etc.). In addition, if such conditions should arise during impact pile driving that is already underway, the activity would be halted.

If a marine mammal approaches or enters the shutdown zone during the course of pile driving operations, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed. Monitoring will be conducted throughout the time required to drive a pile and for 30 minutes following the conclusion of pile driving.

Based on our evaluation of the applicant's proposed measures 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

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 30 minutes.

Marine mammal monitoring will include the following:

A minimum of two marine mammal observers (MMOs) will be on location during two-thirds of all pile driving/removal days. They 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 equipment operators. The observer will be trained on the observation zones, potential species, how to observe, and how to fill out the data sheets by the Navy Natural Resources Manager prior to any pile-driving activities. The supervisory observer will be a trained biologist; additional observers will be trained by that supervisor as needed.

Shutdown zones must be monitored at all times. When MMOs are not available during one-third of pile driving/removal days, project contractors/workers will be responsible for monitoring shutdown zones and will call for shutdown as appropriate. The following additional measures apply to visual monitoring during the ⅔ of days on which MMOs are present:

- Independent observers (*i.e.,* not construction personnel) are required;
- At least one observer must have prior experience working as an observer;
- Other observers (that do not have prior experience) may substitute education (undergraduate degree in biological science or related field) or training for experience;
- NMFS will require submission and approval of observer resumes.

Qualified observers are trained biologists 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;
- 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.

Monitoring will be conducted within the Level A harassment and shutdown zone during all pile-driving operations and the Level B harassment buffer zone during two-thirds of pile-driving days. Monitoring will take place from 15 minutes prior to initiation through 30-minutes post-completion of pile-driving/removal activities.

- During pile removal or installation the observers will monitor the shutdown zones to record take when marine mammals enter the relevant Level B harassment zones based on type of construction activity.
- Prior to the start of pile-driving/removal activity, the shutdown and safety zones will be monitored for 15 minutes to ensure that they are clear of marine mammals. Pile driving will only commence once observers have declared the shutdown zone clear of marine mammals; if present, animals will be allowed to remain in the ZOI and their behavior will be monitored and documented.
- In the unlikely event of conditions that prevent the visual detection of marine mammals, such as heavy fog, activities with the potential to result in Level A or Level B harassment will not be initiated. Impact pile driving would be curtailed, but vibratory pile driving or extraction would be allowed to continue if such conditions arise after the activity has begun.

A draft marine mammal monitoring report will be submitted to NMFS within 90 days after the completion of pile driving and removal activities or 60 days prior to the issuance of any subsequent IHA for this project, whichever comes first. It will include an overall description of work completed, a narrative regarding marine mammal sightings, and associated marine mammal observation data sheets. Specifically, the report 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; and
- Other human activity in the area.

If no comments are received from NMFS within 30 days, the draft final report will constitute the final report. If comments are received, a final report 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 IHA (if issued), such as serious injury or mortality, the Navy will 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 Northeast/Greater Atlantic 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 Navy to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The Navy would not be able to resume their activities until notified by NMFS via letter, email, or telephone.

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

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

Hydroacoustic Monitoring

The Navy will continue to implement its in situ acoustic monitoring efforts in 2018. During Year 2, the Navy will verify acoustic monitoring at the source (33 feet) and, where the potential for Level A harassment exists, at a second representative monitoring location at an intermediate distance between the cetacean and pinniped shutdown zones. A draft hydroacoustic monitoring plan will be submitted to NMFS for approval. A final report will be submitted to NMFS within 30 days of completing the verification monitoring. Results from the 2017 Hydroacoustic Monitoring Report may be found in Appendix A of the application.

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).

Pile driving, pile extraction and drilling activities associated with the Navy project as outlined previously have the potential to injure, disturb or displace marine mammals. Specifically, the specified activities may result in Level B harassment (behavioral disturbance) for all species authorized for take from underwater sound generated during pile driving. Level A harassment in the form of PTS may also occur to limited numbers of three marine mammal species. Potential takes could occur if individuals of these species are present in the ensonified zone when pile driving and removal occurs.

No serious injury or mortality is anticipated given the nature of the activities and measures designed to minimize the possibility of injury to marine mammals. The potential for these outcomes is minimized through the construction method and the implementation of the planned mitigation measures. Specifically, vibratory driving and drilling will be the primary methods of installation (impact driving will occur for only 1.5 hours over 84–100 days). During impact driving, implementation of soft start and shutdown zones significantly reduces any possibility of injury. Given sufficient ''notice'' through use of soft start (for impact driving), marine mammals are expected to move away from a sound source that is annoying prior to it becoming potentially injurious. Conditions at the Shipyard offer MMOs clear views of the shutdown zones, enabling a high rate of success in implementation of shutdowns to avoid injury.

The Navy's planned activities are highly localized. A small portion of the Piscataqua River may be affected which is only a subset of the ranges of species for which take is authorized. The project is not expected to have significant adverse effects on marine mammal habitat. No important feeding and/or reproductive areas for marine mammals are known to be near the project area. Project-related activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range, but because of the relatively small area of the habitat range utilized by each species that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

Exposures to elevated sound levels produced during pile driving activities may cause behavioral responses by an animal, but they are expected to be mild and temporary. Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (*e.g.,*Thorson and Reyff, 2006; Lerma, 2014). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. These reactions and behavioral changes are expected to subside quickly when the exposures cease. The pile driving activities analyzed here are similar to, or less impactful than, numerous construction activities conducted in other similar locations, which have taken place with no reported injuries or mortality to marine mammals, and no known long-term adverse consequences from behavioral harassment. Repeated exposures of individuals to levels of sound that may cause Level B harassment are unlikely to result in permanent hearing impairment or to significantly disrupt foraging behavior. Level B harassment will be reduced through use of mitigation measures described herein.

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 or serious injury is anticipated or authorized;
- The area of potential impacts is highly localized;
- No adverse impacts to marine mammal habitat;
- The absence of any significant habitat within the project area, including rookeries, or known areas or features of special significance for foraging or reproduction;
- Anticipated incidences of Level A harassment would be in the form of a small degree of PTS to a limited number of animals;
- Anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior;
- Very few individuals are likely to be affected by project activities (<0.01 percent of population for all authorized species); and
- The anticipated efficacy of the required mitigation measures 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 Section 101(a)(5)(D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers and so, in practice, 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 14—ESTIMATED NUMBER OF EXPOSURES AND PERCENTAGE OF STOCKS THAT MAY BE SUBJECTED TO LEVEL A AND LEVEL B HARASSMENT

Species	Proposed authorized take		% Population
	Level B	Level A	
Harbor porpoise	96	1	<0.01
Gray Seal	25	2	<0.01
Harbor Seal	164	4	<0.01
Harp Seal	1	0	<0.01

Table 14 illustrates the number of animals that could be exposed to Level A and Level B harassment from work associated with the waterfront improvement project. The analysis provided indicates that authorized takes account for <0.01 percent of the populations of the stocks that could be affected. These are small numbers of marine mammals relative to the sizes of the affected species and population stocks under consideration.

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 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)

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq.*) requires that each Federal agency insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat.

No incidental take of ESA-listed species is proposed for authorization or expected to result from this activity. Therefore, NMFS has determined that 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 Navy for conducting in-water construction activities at the Portsmouth Naval Shipyard in Kittery, Maine from January 1, 2018 through December 31, 2018 provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

1. This Incidental Harassment Authorization (IHA) is valid from January 1, 2018 through December 31, 2018. This IHA is valid only for pile driving, extraction, and drilling activities associated with the waterfront improvements project at the Shipyard.

2. General Conditions.

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

(b) The species authorized for taking are the harbor porpoise *(Phocoena phocoena),* gray seal *(Halichoerus grypus),* harbor seal *(Phoca vitulina),* and harp seal *(Pagophilus groenlandicus).*

(c) The taking, by Level A and Level B harassment, is limited to the species listed in condition 2(b). See Table 14 for numbers of Level A and Level B take authorized.

(d) The take of any other species not listed in condition 2(b) of marine mammal is prohibited and may result in the modification, suspension, or revocation of this IHA.

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

3. Mitigation Measures.

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

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

(b) Pile driving shall only take place when the shutdown and Level A zones are visible and can be adequately monitored. If conditions (*e.g.,* fog) prevent the visual detection of marine mammals, activities with the potential to result in Level A harassment (*i.e.,* impact driving) shall not be initiated. If such conditions arise after the activity has begun, impact pile driving shall be halted but vibratory pile driving or extraction is allowed to continue.

(c) Establishment of Shutdown Zones.

(i) The shutdown zone during impact driving shall extend to 75 m for all authorized species. The shutdown during vibratory driving or drilling shall extend to 55 m for all authorized species.

(ii) If a marine mammal comes within or approaches the shutdown zone, pile driving operations shall cease.

(iii) Pile driving and removal operations shall restart once the marine mammal is visibly seen leaving the zone or after 15 minutes have passed with no sightings.

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

(iv) Shutdown shall occur if a species for which authorization has not been granted or for which the authorized numbers of takes have been met approaches or is observed within the Level B harassment zone. The Navy shall then contact NMFS within 24 hours.

(d) Establishment of Level A and B Harassment Zones.

(i) The Level A take zones shall extend from the 75 m shutdown zone out to 140 m for harbor porpoises during all impact pile driving activities.

(ii) The Level B take zones shall extend from the 55 m shutdown zone out to 293 m during impact driving activities and from 55 m out to 7.35 km during vibratory driving activities.

(e) Use of Soft-Start for Impact Pile Driving.

(i) The project shall utilize soft start techniques for impact pile driving. The Navy shall conduct an initial set of three strikes from the impact hammer at 40 percent energy, followed by a 1-minute waiting period, then two subsequent three strike sets. Soft start shall be required for any impact driving, including at the beginning of the day, and at any time following a cessation of impact pile driving of 30 minutes or longer.

4. Monitoring.

The holder of this Authorization is required to conduct visual marine mammal monitoring and acoustic monitoring during pile driving activities.

(a) Visual Marine Mammal Observation—The Navy shall collect sighting data and behavioral responses to pile driving for marine mammal species observed in the region of activity during the period of activity. Visual monitoring shall include the following:

(i) A minimum of two marine mammal observers (MMOs) shall be in place during two-thirds of pile driving days.

(ii) Shutdown zones shall be monitored at all times. When MMOs are not on-site during one-third of pile driving/removal days, project contractors/workers shall be responsible for monitoring shutdown zones and shall call for shutdown as appropriate.

(iii) Monitoring shall take place from 15 minutes prior to initiation of pile driving activity through 30 minutes post-completion of pile driving activity.

(iv) MMOs shall be placed at the best vantage point(s) practicable to monitor for marine mammals during two-thirds of all pile driving days.

(b) The following additional measures apply to visual monitoring during two-thirds of all pile driving days:

(i) Independent observers (*i.e.,* not construction personnel) are required;

(ii) At least one observer must have prior experience working as an observer;

(iii) Other observers (that do not have prior experience) may substitute education (undergraduate degree in biological science or related field) or training for experience;

(iv) NMFS shall require submission and approval of observer resumes.

(v) 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;

(vi) Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;

(vii) 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

(viii) 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.

(c) Hydroacoustic Monitoring.

(i) During Year 2, the Navy shall verify acoustic monitoring at the source (33 feet) and, where the potential for Level A harassment exists, at a second representative monitoring location at an intermediate distance between the cetacean and pinniped shutdown zones.

(ii) A draft hydroacoustic monitoring plan shall be submitted to NMFS for approval.

(iii) A final report shall be submitted to NMFS within 30 days of completing the verification monitoring.

5. Reporting.

(a) A draft marine mammal monitoring report shall be submitted to NMFS within 90 days after the completion of pile driving and removal activities or 60 days prior to the issuance of any subsequent IHA for this project, whichever comes first. The report shall include an overall description of work completed, a narrative regarding marine mammal sightings, and associated marine mammal observation data sheets. Specifically, the report shall include.

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

(ii) Construction activities occurring during each observation period;

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

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

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

(vi) Description of any observable marine mammal behavior patterns, including bearing and direction of travel and distance from pile driving activity;

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

(viii) Locations of all marine mammal observations; and

(ix) Other human activity in the area.

(b) Reporting injured or dead marine mammals:

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

(1) Time and date of the incident;

(2) Description of the incident;

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

(4) Description of all marine mammal observations and active sound source use in the 24 hours preceding the incident;

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

(6) Fate of the animal(s); and

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

Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS shall work with the Navy to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The Navy may not resume their activities until notified by NMFS.

(ii) In the event that the Navy discovers an injured or dead marine mammal, and the lead observer determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition), the Navy shall immediately report the incident to the Office of Protected Resources, NMFS, and the Northeast/Greater Atlantic Regional Stranding Coordinator, NMFS.

The report must include the same information identified in 5(b)(i) of this IHA. Activities may continue while NMFS reviews the circumstances of the incident. NMFS shall work with the Navy to determine whether additional mitigation measures or modifications to the activities are appropriate.

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

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

Request for Public Comments

We request comment on our analyses, the draft authorization, and any other aspect of this Notice of Proposed IHA for proposed Waterfront Improvement Projects at Portsmouth Naval Shipyard. Please include with your comments any supporting data or literature citations to help inform our final decision on the request for MMPA authorization.

Dated: November 24, 2017.

Donna S. Wieting,

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

[FR Doc. 2017–25783 Filed 11–29–17; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XF827

Endangered Species; File No. 21260

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

ACTION: Notice; receipt of application.

SUMMARY: Notice is hereby given that NMFS Pacific Islands Fisheries Science Center [Responsible Party: Michael Seki, Ph.D.], 1845 Wasp Boulevard, Honolulu, Hawaii, 96818, has applied in due form for a permit to take green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and olive ridley (*Lepidochelys olivacea*) sea turtles for purposes of scientific research.

DATES: Written, telefaxed, or email comments must be received on or before January 2, 2018.

ADDRESSES: The application and related documents are available for review by selecting ''Records Open for Public Comment'' from the ''Features'' box on the Applications and Permits for Protected Species (APPS) home page, *https://apps.nmfs.noaa.gov,* and then selecting File No. 21260 from the list of available applications.

These documents are also available upon written request or by appointment in the Permits and Conservation Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910; phone (301) 427–8401; fax (301) 713–0376.

Written comments on this application should be submitted to the Chief, Permits and Conservation Division, at the address listed above. Comments may also be submitted by facsimile to (301) 713–0376, or by email to *NMFS.Pr1Comments@noaa.gov.* Please include the File No. in the subject line of the email comment.

Those individuals requesting a public hearing should submit a written request to the Chief, Permits and Conservation Division at the address listed above. The request should set forth the specific reasons why a hearing on this application would be appropriate.

FOR FURTHER INFORMATION CONTACT: Erin Markin or Amy Hapeman, (301) 427–8401.

SUPPLEMENTARY INFORMATION: The subject permit is requested under the authority of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq.*) and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR parts 222–226).

The Pacific Islands Fisheries Science Center proposes to continue long-term monitoring of sea turtles in the Pacific Islands Region to understand population status, abundance, and trends as well as age at maturity, growth rates, and foraging and movement ecology of green, hawksbill, leatherback, loggerhead, and olive ridley sea turtles. Annually, up to 250 green, 150 hawksbill, 100 loggerhead, 100 leatherback, and 100 olive ridley sea turtles would be captured for morphometric data, tagging (flipper and passive integrated transponder), biological samples, and instrument attachment (acoustic, satellite, and/or archival) prior to release. The permit would be valid for up to ten years from the date of issuance.

Dated: November 27, 2017.

Julia Harrison,

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

[FR Doc. 2017–25794 Filed 11–29–17; 8:45 am]

BILLING CODE 3510–22–P