DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 160830798–6798–01]

RIN 0648–BG32

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to Waterfront Construction

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

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS has received a request from the U.S. Navy (Navy) for authorization to take marine mammals incidental to conducting waterfront construction at Naval Submarine Base Kings Bay, GA, over the course of five years (2017–2022). As required by the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations to govern that take, and requests comments on the proposed regulations.

DATES: Comments and information must be received no later than February 2, 2017.

ADDRESSES: You may submit comments on this document, identified by NOAA–NMFS–2016–0161, by any of the following methods:

- *Electronic submission:* Submit all electronic public comments via the federal e-Rulemaking Portal. Go to *www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2016-0161,* click the ''Comment Now!'' icon, complete the required fields, and enter or attach your comments.
- *Mail:* Submit written comments to Jolie Harrison, Chief, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910.

Instructions: Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public viewing on *www.regulations.gov* without change. All personal identifying information (*e.g.,* name, address), confidential business information, or otherwise sensitive information submitted voluntarily by the sender will be publicly accessible. NMFS will accept anonymous comments (enter ''N/A'' in the required fields if you wish to remain anonymous). Attachments to electronic comments will be accepted in Microsoft Word, Excel, or Adobe PDF file formats only.

FOR FURTHER INFORMATION CONTACT: Ben Laws, Office of Protected Resources, NMFS, (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Availability

A copy of Navy's application and any 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 (see **FOR FURTHER INFORMATION CONTACT**).

National Environmental Policy Act (NEPA)

The Navy is preparing an Environmental Assessment (EA) to consider the direct, indirect and cumulative effects to the human environment resulting from the waterfront construction activities. NMFS has reviewed the draft EA and believes it is appropriate to adopt the EA in order to assess the impacts to the human environment of issuance of regulations and subsequent Letters of Authorization (LOAs) to the Navy and subsequently sign our own FONSI. Information in the Navy's application, the Navy's EA, and this notice collectively provide the environmental information related to proposed issuance of these regulations for public review and comment. All documents are available at the aforementioned Web site. We will review all comments submitted in response to this notice as we complete the NEPA processes, including a final decision of whether to adopt the Navy's EA and sign a FONSI, prior to a final decision on the incidental take authorization request.

Purpose and Need for Regulatory Action

This proposed rule, to be issued under the authority of the Marine Mammal Protection Act (MMPA) (16 U.S.C. 1361 *et seq.*), would establish a framework for authorizing the take of marine mammals incidental to the Navy's waterfront construction activities at Naval Submarine Base Kings Bay, GA (NSB Kings Bay). The Navy proposes to repair (including direct repairs and repairs by component replacement) in-water structures at NSB Kings Bay, construct a new Transit Protection System Operational Support Facility, and extend the existing Layberth Pier in order to (1) address critical damage and mission and safety requirements, (2) limit further deterioration and increase the useful life of the structures, and (3) upgrade infrastructure to meet requirements of new submarine technology. Construction will include use of impact and vibratory pile driving, including installation and removal of steel, concrete, composite, and timber piles.

We received an application from the Navy requesting five-year regulations and authorization to take bottlenose dolphins. Take would occur by Level B harassment incidental to impact and vibratory pile installation and removal. The regulations would be valid from 2017 to 2022. Please see the ''Background'' section below for definitions of harassment.

Legal Authority for the Proposed Action

Section 101(a)(5)(A) of the MMPA (16 U.S.C. 1371(a)(5)(A)) directs the Secretary of Commerce to allow, upon request, the incidental, but not intentional taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region for up to five years if, after notice and public comment, the agency makes certain findings and issues regulations that set forth permissible methods of taking pursuant to that activity, as well as monitoring and reporting requirements. Section 101(a)(5)(A) of the MMPA and the implementing regulations at 50 CFR part 216, subpart I provide the legal basis for issuing this proposed rule containing five-year regulations, and for any subsequent LOAs. As directed by this legal authority, this proposed rule contains mitigation, monitoring, and reporting requirements.

Summary of Major Provisions Within the Proposed Rule

Following is a summary of the major provisions of this proposed rule regarding Navy waterfront construction activities. We have preliminarily determined that the Navy's adherence to the proposed mitigation, monitoring, and reporting measures described below would achieve the least practicable adverse impact on the affected marine mammals. These measures include:

- Required monitoring of the waterfront construction areas to detect the presence of marine mammals before beginning construction activities.
- Shutdown of construction activities under certain circumstances to avoid injury of marine mammals.
- Soft start for impact pile driving to allow marine mammals the opportunity

to leave the area prior to beginning impact pile driving at full power.

Background

Paragraphs 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1371 (a)(5)(A) and (D)) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review.

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

Except with respect to certain activities not pertinent here, section 3 of the MMPA (16 U.S.C. 1362) defines ''harassment'' as: Any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Summary of Request

On January 19, 2016, we received an adequate and complete request from Navy for authorization to take marine mammals incidental to waterfront construction activities. We received an initial draft of the request on August 27, 2015, followed by revised drafts on November 6 and December 2, 2015. On February 17, 2016 (81 FR 8048), we published a notice of receipt of Navy's application in the **Federal Register**, requesting comments and information related to the request for 30 days. We did not receive any comments. The Navy provided an interim revised draft incorporating minor revisions on March 8, 2016.

The Navy proposes to repair in-water structures at NSB Kings Bay, as well as to construct new facilities and modify existing facilities. These repairs, upgrades, and new construction would include use of impact and vibratory pile driving, including installation and removal of steel, concrete, composite, and timber piles. Hereafter (unless otherwise specified or detailed) we use the term ''pile driving'' to refer to both pile installation and pile removal. The use of both vibratory and impact pile driving is expected to produce underwater sound at levels that have the potential to result in behavioral harassment of marine mammals. Only the bottlenose dolphin (*Tursiops truncatus truncatus*) is expected to be present. The requested regulations would be valid for five years, from July 12, 2017, through July 11, 2022.

Description of the Specified Activity

Overview

NSB Kings Bay is the Navy's east coast home port for ballistic missile nuclear submarines supporting the Trident II (D–5) missile. NSB Kings Bay manages, maintains, and operates Trident ballistic missile (SSBN) and guided missile (SSGN) submarines, Trident II D–5 and Tomahawk Land Attack Missiles and systems, and infrastructure and quality of life facilities and programs. In 2010, the Navy found that conditions of water-based support facilities varied widely from good to seriously deteriorated. Continuous monitoring of these conditions by Navy at NSB Kings Bay has confirmed the advanced deterioration and critical nature of some issues that pose operational and safety risks. Additionally, other areas of initial deterioration were identified which require remedy in order to maintain the useful life of existing structures. Damage observed includes deteriorated concrete piles, pile caps, and deck components (cracked, spalled, delaminated, exposed/corroded internal reinforcing steel structures); marine pest (marine wood borer) damage on wooden piles; broken or unmaintained mooring fittings; and corrosion on steel piles and pile caps. In some cases, it is more cost effective to demolish older structures that are deteriorated and not well configured to fit existing and upcoming assets and replace them with new structures that are specifically designed to meet new mission requirements.

To ensure the Navy can continue its mission of supporting the Fleet Ballistic Missile System and Trident Submarine Program, the Navy proposes to repair (including direct repairs and repairs by component replacement) in-water structures at NSB Kings Bay, construct a new Transit Protection System Operational Support Facility, and extend the existing Layberth Pier. These repairs, upgrades, and new construction would (1) address critical damage and mission and safety requirements, (2) limit further deterioration and increase the useful life of the structures, and (3) upgrade infrastructure to meet requirements of new submarine technology. Construction will include use of impact and vibratory pile driving, including installation and removal of steel, concrete, composite, and timber piles. The specified activity is comprised of six distinct projects, four of which are comprised of multiple smaller projects. These projects and components are summarized in Table 1. Please see Figure 1–2 in the Navy's application for locations of facilities referred to in Table 1.

TABLE 1—SUMMARY OF PROPOSED WATERFRONT CONSTRUCTION PROJECTS

Project ID	Descriptor	Summary
Project 1: Port Operations Waterfront Facilities Repair		
1A	Tug Pier	Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier.
1B	General Access Pier Crab Island	Install new guide piles, and repair brow and handrails.

TABLE 1—SUMMARY OF PROPOSED WATERFRONT CONSTRUCTION PROJECTS—Continued

Project ID	Descriptor	Summary
Project 2: Unspecified Minor Construction Layberth Fender Pile Modification		
2	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project.	Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.
Project 3: Waterfront Repair and Replacement Maintenance Program		
3A	Explosive Handling Wharf #2 Pier w/Capstans (7).	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float.
3B	(Dry Dock) Interface Wharf	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H-pile fender system and sheet pile.
3C	Refit Wharf #1	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings.
3D	Refit Wharf #2	Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.
3E	Refit Wharf #3	Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.
3F	Warping Wharf w/Capstan (4)	Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.
3G	Tug Pier	Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.
Project 4: Transit Protection System (TPS) Pier and Off-Shore Supply Vessel Berthing Modification Project		
4A	New TPS Pier	Construct a new pier with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage collection; fuel; and telephone, cable, and Local Area Network services.
4B	Small Craft Berth Site VI	Once the new TPS pier is constructed, floating berthing slips would be constructed and provided with full hotel service capability. The berthing pier would consist of a pile supported reinforced concrete structure with floating sections. This project includes the installation of two 5,000-gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.
Project 5: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility with Crane		
5	Magnetic Silencing Facility with Cranes (Trident Refit Facility Waterfront Facilities Repair).	Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.
Project 6: Demolition of the Transit Protection System Pier and Layberth North Trestle		
6A	Demolition of TPS Pier	Remove the tip of the existing TPS Pier.
6B	Demolition of Layberth North Trestle	Demolish the North Layberth Trestle.

Dates and Duration

The specified activity may occur at any time during the five-year period of validity of the proposed regulations. Planned dates of individual projects and project components are shown in Table 2, however, project dates may shift. In-water construction activities would occur during daylight hours, defined here as one hour post-sunrise to one hour prior to sunset.

Specified Geographical Region

NSB Kings Bay is located in southeastern Georgia, approximately four miles inland (straight line distance) from the Atlantic Ocean, and approximately eight miles north of the Georgia-Florida border, along the western shore of Cumberland Sound (see Figure 2–1 in the Navy's application). NSB Kings Bay is an approximately 16,000 acre installation including the land areas and adjacent water areas along Kings Bay and Cumberland Sound between Marianna Creek to the north and Mill Creek to the south, and is restricted from general public access.

This estuarine environment receives salt water input from ocean waters through tidal exchange, and fresh water input from rivers, tributaries, and stormwater outfalls. The large tidal range and strong currents result in tidally mixed waters that are refreshed on a daily basis. Please see section 2 of the Navy's application for more information.

Detailed Description of Activities

The Navy plans to remove deteriorated timber, concrete, and steel piles and replace them with concrete, composite, and steel piles. New construction would involve installation of steel, concrete, and composite piles. Aspects of construction activities other than pile driving are not anticipated to have the potential to result in incidental take of marine mammals because they are either above water or do not produce levels of underwater sound with likely potential to result in marine mammal disturbance. Therefore, we do not discuss elements of construction activity other than pile driving. No concurrent pile driving would occur. Project specific pile totals are given in Table 2.

A vibratory hammer would be used for all pile removal work. If use of the vibratory hammer is not feasible for pile installation (*i.e.,* with steel piles), a Delmag Pile Hammer D62–22 or equivalent impact hammer would be used. The Delmag Pile Hammer D62–22 is a single acting diesel impact hammer with energy capacity of 76,899–153,799 foot-pounds. The most effective and efficient method of pile installation available would be implemented for each project. The method fitting these criteria may vary based on specific project requirements and local conditions. In some areas of Kings Bay a limestone layer can be found relatively close to the substrate/water interface. This type of layer requires impact driving because vibratory installation will not drive the piles to a sufficient depth. Impact driving, while generally producing higher levels of sound also minimizes the net amount of active driving time, thus reducing the amount of time during which marine mammals may be exposed to noise. Impact or vibratory pile driving could occur on any day, but would not occur simultaneously.

TABLE 2—PILE DRIVING SUMMARY

ID	Project start (fiscal year)	Water depth (ft)	Pile size (in)	Pile type	Total number		Installation method	Estimated number of strikes per pile	Total maximum in-water work days
					Installed	Removed			
1A	2017	24	18	Concrete	148	0	Impact	60	30
			24	Concrete	18	0	Impact	70	4
			16	Timber	0	159	n/a	n/a	31
1B	2017	15	16	Composite	2	0	Vibratory	n/a	1
			16	Timber	0	2	n/a	n/a	1
2	2017	46	14	Steel (H)	55	0	Impact	80	7
3A	2017	46	24	Steel	2	2	Impact	70	2
	2022		24	Concrete	3	3	Impact	75	2
			24	Steel	10	10	Impact	70	7
3B	2021	46	14	Steel (H)	99	99	Impact	60	15
3C	2018	46	24	Steel	6	0	Impact	70	1
			30	Steel	0	6	n/a	n/a	1
3D	2017	46	24	Steel	6	0	Impact	70	1
			30	Steel	0	6	n/a	n/a	1
3E	2018	46	24	Steel	6	0	Impact	70	1
			30	Steel	0	6	n/a	n/a	1
3F	2021	46	30	Steel	8	8	Impact	70	4
3G	2022	30	14	Steel (H)	77	77	Impact	60	16
4A	2020	35	24	Concrete	165	0	Impact	200	55
			18	Concrete	50	0	Impact	80	17
			24	Concrete	0	121	n/a	n/a	8
4B	2020	35	24	Steel	30	30	Impact	100	8
5	2017	46	18	Composite	18	0	Vibratory	n/a	3
			16	Timber	0	18	n/a	n/a	3
6A	2022	46	24	Concrete	0	649	n/a	n/a	41
6B	2022	46	24	Concrete	0	121	n/a	n/a	6

Vibratory hammers, which can be used to either install or extract a pile, contain a system of counter-rotating eccentric weights powered by hydraulic motors, and are designed in such a way that horizontal vibrations cancel out, while vertical vibrations are transmitted into the pile. The pile driving machine is lifted and positioned over the pile by means of an excavator or crane, and is fastened to the pile by a clamp and/or bolts. The vibrations produced cause liquefaction of the substrate surrounding the pile, enabling the pile to be extracted or driven into the ground using the weight of the pile plus the hammer. Impact hammers use a rising and falling piston to repeatedly strike a pile and drive it into the ground. Impact or vibratory driving could occur on any work day during the period of validity of these proposed regulations.

Steel piles are typically vibratory-driven for their initial embedment depths or to refusal and finished with an impact hammer for proofing or until the pile meets structural requirements, as necessary. Proofing involves striking a driven pile with an impact hammer to verify that it provides the required load-bearing capacity, as indicated by the number of hammer blows per foot of pile advancement. Non-steel piles are typically impact-driven for their entire embedment depth, in part because non-steel piles are often displacement piles (as opposed to pipe piles) and require some impact to allow substrate penetration.

Table 3 shows total piles planned for installation (I) and removal (R) by pile type and size in total and per year. Note that no pile driving is planned for fiscal year (FY) 2019. Below we provide further detail specific to individual projects and project components. For additional detail, please see Table 1 and section 1 of the Navy's application. As noted previously, all pile removal would be accomplished using a vibratory hammer and all impact driving would be accomplished using a Delmag Pile Hammer D62–22 or equivalent impact hammer.

TABLE 3—PILE TOTALS BY TYPE AND YEAR

Pile type	Size (in)	FY2017		FY2018		FY2020		FY2021		FY2022		Totals	
		I	R	I	R	I	R	I	R	I	R	I	R
Composite	16	2	0	0	0	0	0	0	0	0	0	2	0
	18	18	0	0	0	0	0	0	0	0	0	18	0
Concrete	18	148	0	0	0	50	0	0	0	0	0	198	0
	24	18	0	0	0	165	121	0	0	3	773	186	894
Steel (H)	14	55	0	0	0	0	0	99	99	77	77	231	176
Steel	24	8	2	12	0	30	30	0	0	10	10	60	42
	30	0	6	0	12	0	0	8	8	0	0	8	26
Timber	16	0	179	0	0	0	0	0	0	0	0	0	179
Totals		249	187	12	12	245	151	107	107	90	860	703	1,317

Project 1A: Tug Pier—The Navy plans to remove deteriorated timber fender piles and replace them with concrete piles. It is anticipated that 5 to 16 piles would be removed or installed per day with a total of up to 65 days of in-water work.

Project 1B: General Access Pier Crab Island—Timber guide piles at this pier are damaged and would be replaced by fiberglass reinforced plastic composite guide piles. Extraction and installation would both be performed using a vibratory hammer. It is anticipated that an average of two piles would be installed or removed per day for approximately two days of in-water work.

Project 2: Unspecified Minor Construction, Layberth Pier—The Navy plans to install additional steel H-piles to reduce the existing gaps between fender piles, which are considered too wide to adequately support the necessary fender system. No existing piles would need to be removed. It is anticipated that an average of eight piles would be installed per day for approximately seven days of in-water work.

The Waterfront Pile Repair and Replacement Maintenance Program (*i.e.,* Project 3) consists of repairing and/or replacing structurally unsound piles along the waterfront restricted area. This project includes multiple individual projects as follows:

Project 3A: Explosives Handling Wharf #2 Pier with Capstans—Upgrading Explosives Handling Wharf #2 would require the installation of two new steel piles and the removal of two guide piles in FY17. Additionally, three concrete piles and ten steel piles would be removed and subsequently replaced in 2022. It is anticipated that two piles would be installed or removed per day for a total of approximately 11 days of in-water work in FY17 and FY22.

Project 3B: (Dry Dock) Interface Wharf—Numerous fender piles are in an advanced state of deterioration. Repairing the Interface Wharf would require the installation of new steel H-piles and removal of existing steel H-piles. It is anticipated that an average of 14 piles would be removed or installed per day for approximately 15 days of in-water work.

Projects 3C–E: Refit Wharfs 1–3—All three Refit Wharfs are in disrepair and present a safety risk to the personnel and heavy equipment utilizing the piers. In each case, proposed repair work would involve the removal of existing fender piles and replacement with new steel piles. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work for each of the three projects.

Project 3F: Warping Wharf with Capstan—Repairing deterioration of the existing Warping Wharf would require the installation of new steel piles and the removal of eight existing fender piles. It is anticipated that an average of five piles would be removed or installed per day for approximately four days of in-water work.

Project 3G: Tug Pier—The same location subject to Project 1A, Project 3G represents anticipated future work at the Tug Pier (scheduled for FY22). A large quantity of steel fender piles would be removed and replaced. It is anticipated that an average of ten piles would be removed or installed per day for approximately sixteen days of in-water work.

Project 4 (Transit Protection System (TPS) Off-Shore Supply Vessel Berthing Modification Project) involves the construction of a new pier associated with TPS functions and the modification of the existing berthing pier on the north trestle.

Project 4A: New Facility—The construction of the new pier would require the installation of new square concrete piles and removal of existing concrete piles. It is anticipated that 16 to 22 piles would be removed and 3 to 12 piles would be installed per day for approximately 80 days of in-water work.

Project 4B: Small Craft Berth Site—The existing berthing pier on the north trestle would be relocated to align with the new pier associated with the proposed TPS Operational Facility and modified as needed. These modifications would require installation of new steel piles and the removal existing piles. It is anticipated that an average of eight piles would be installed or removed per day for approximately eight days of in-water work.

Project 5: Waterfront Facilities Repair, Magnetic Silencing Facility (MSF)—The MSF at Kings Bay is in a deteriorated condition and Navy plans to replace existing timber fender piles with fiberglass reinforced plastic composite piles. It is anticipated that an average of six piles would be extracted or installed per day for approximately six days of in-water work.

Following completion of Project 4, Project 6 would involve demolition of the existing TPS Pier and north trestle.

Project 6A–B: Demolition of TPS Pier and North Trestle—Both projects would involve vibratory removal of existing concrete piles. For the TPS Pier, it is anticipated that an average of 16 piles would be removed per day for approximately 41 days of in-water work. For the work at the north trestle, it is anticipated that an average of 20 piles would be removed per day for approximately 6 days of in-water work.

Proposed Mitigation

In order to issue an incidental take authorization under section 101(a)(5)(A) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to such activity, ''and other means of effecting the least practicable adverse 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 subsistence uses.'' NMFS's implementing 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)).

The mitigation strategies described below largely follow those required and successfully implemented under previous incidental take authorizations issued in association with similar construction activities. Measurements from similar pile driving events were coupled with practical spreading loss and other relevant information to estimate zones of influence (ZOI; see ''Estimated Take by Incidental Harassment''); these ZOI values were used to develop mitigation measures for pile driving activities at NSB Kings Bay. Background discussion related to underwater sound concepts and terminology is provided in the section on ''Description of Sound Sources,'' later in this preamble. Practical spreading loss is discussed in further detail in the section on ''Zones of Influence,'' later in this preamble. The ZOIs effectively represent the mitigation zone that would be established around each pile to prevent Level A harassment to dolphins, while providing estimates of the areas within which Level B harassment might occur. In addition to the specific measures described later in this section, the Navy would conduct briefings for 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. All relevant personnel would watch applicable sections of the Navy's Marine Species Awareness Training video. Relevant personnel would also follow NMFS's ''Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines,'' which are described in Attachment 1 of Navy's Monitoring Plan.

Monitoring and Shutdown for Pile Driving

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

Shutdown Zone—The purpose of a shutdown zone is to define an area within which shutdown of activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area), thus preventing some undesirable outcome, such as auditory injury or behavioral disturbance of sensitive species (serious injury or death are unlikely outcomes even in the absence of mitigation measures). For all pile driving activities, the Navy would establish a minimum shutdown zone with radial distance of 15 meters (m). This minimum zone is intended to prevent the already unlikely possibility of physical interaction with construction equipment and to establish a precautionary minimum zone with regard to acoustic effects.

Using NMFS's user spreadsheet, an optional companion spreadsheet associated with the alternative implementation methodology provided in Appendix D of NMFS's acoustic guidance (NMFS, 2016), we calculated project, pile type, and pile driving methodology-specific zones within which auditory injury (*i.e.,* Level A harassment) could occur. The user spreadsheet is publicly available online at *www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.* In using the spreadsheet, we assumed practical spreading loss and used supplementary information provided by the Navy regarding assumed number of piles driven per day and number of pile strikes necessary to install a pile (for impact pile driving) and daily duration of pile driving (for vibratory pile driving). Assumed source levels are provided in Table 7.

In most cases, this minimum shutdown zone of 15 m is expected to contain the area in which auditory injury could occur. All predicted auditory injury zones are less than the minimum 15 m shutdown zone (radial distance range: 0.5–13.1 m), with the exception of impact driving of 30-inch (in) steel piles associated with Project 3F (radial distance of 38 m) and impact driving of 24-in steel piles associated with Project 4B (radial distance of 16.6 m). In all cases, predicted injury zones are calculated on the basis of cumulative sound exposure, as peak pressure source levels are below the injury threshold for mid-frequency cetaceans. For these two scenarios we propose shutdown zones of 40 m and 20 m radial distance, respectively.

Injury zone predictions generated using the optional user spreadsheet are precautionary due to a number of simplifying assumptions. For example, the spreadsheet tool assumes that marine mammals remain stationary during the activity and does not account for potential recovery between intermittent sounds. In addition, the tool incorporates the acoustic guidance's weighting functions through use of a single-frequency weighting factor adjustment intended to represent the signal's 95 percent frequency contour percentile (*i.e.,* upper frequency below which 95 percent of total cumulative energy is contained; Charif *et al.,* 2010). This will typically result in higher predicted exposures for broadband sounds, since only one frequency is being considered, compared to exposures associated with the ability to fully incorporate the guidance's weighting functions.

Disturbance Zone—Disturbance zones are the areas in which sound pressure levels (SPLs) equal or exceed 160 and 120 dB root mean square (rms) (for impulsive and non-impulsive, continuous sound, respectively). Disturbance zones provide utility for monitoring conducted for mitigation purposes (*i.e.,* shutdown zone monitoring) by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring of disturbance zones enables observers to be aware of and communicate the presence of marine mammals in the project area but outside the shutdown zone, and thus prepare for potential shutdowns of activity. However, the primary purpose of disturbance zone monitoring is for documenting incidents of Level B harassment; disturbance zone monitoring is discussed in greater detail later (see ''Proposed Monitoring and Reporting''). Nominal radial distances for disturbance zones are shown in Table 8.

In order to document observed incidents of harassment, monitors record all marine mammal observations, regardless of location. The observer's location and the location of the pile being driven are known, and the location of the animal may be estimated as a distance from the observer and then compared to the location from the pile. It may then be estimated whether the animal was exposed to sound levels constituting incidental harassment on the basis of predicted distances to relevant thresholds in post-processing of observational data, and a precise accounting of observed incidents of harassment created. This information may then be used to extrapolate observed takes to reach an approximate understanding of actual total takes, in cases where the entire zone was not monitored and/or all days of activity were not monitored.

Monitoring Protocols—Monitoring would be conducted before, during, and after pile driving activities. In addition, observers will record all incidents of marine mammal occurrence, regardless of distance from activity, and monitors will 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 will 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 install or remove a single pile or series of piles, as long as the time elapsed between uses of the pile driving equipment is no more than thirty minutes. Observation of shutdown zones will always occur, but observation of the larger disturbance zones will occur on a subset of days associated with each specific project (see project-specific details provided in ''Proposed Monitoring and Reporting,'' later in this document). Please see the Monitoring Plan, developed by the Navy in agreement with NMFS, for full details of the monitoring protocols.

The following additional measures apply to visual monitoring:

(1) Monitoring will be conducted by designated observers, who will be placed at the best vantage point(s) practicable (as defined in the Monitoring Plan) to monitor for marine mammals and implement shutdown/delay procedures when applicable by calling for the shutdown to the hammer operator. Observers would have no other construction-related tasks while conducting monitoring. Observers should have 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;
- Ability to conduct field observations and collect data according to assigned protocols;
- Experience or training in the field identification of bottlenose dolphins, including the identification of behaviors;
- Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations;
- Writing skills sufficient to document 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 of marine mammals from construction noise 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.

(2) 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.

(3) 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 fifteen minutes have passed without re-detection of the animal. Monitoring will be conducted throughout the time required to drive a pile and for thirty minutes following the conclusion of pile driving.

Soft Start

The use of a soft start procedure is believed to provide additional protection to marine mammals by warning marine mammals or providing them with a chance to leave the area prior to the hammer operating at full capacity, and typically involves a requirement to initiate sound from the hammer at reduced energy followed by a waiting period. This procedure is repeated two additional times. It is difficult to specify the reduction in energy for any given hammer because of variation across drivers and, for impact hammers, the actual number of strikes at reduced energy will vary because operating the hammer at less than full power results in ''bouncing'' of the hammer as it strikes the pile, resulting in multiple ''strikes.'' The Navy will utilize soft start techniques for impact pile driving. We require an initial set of three strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then 2 subsequent 3-strike sets. Soft start will be required at the beginning of each day's impact pile driving work and at any time following a cessation of impact pile driving of thirty minutes or longer; the requirement to implement soft start for impact driving is independent of whether vibratory driving has occurred within the prior 30 minutes.

We have carefully evaluated the Navy's proposed mitigation measures and considered a range of other measures in the context of ensuring that we prescribed the means of effecting the least practicable adverse impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another: (1) The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals, (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation.

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

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

(2) A reduction in the number (total number or number at biologically important time or location) of individual marine mammals exposed to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing takes by behavioral harassment only).

(3) A reduction in the number (total number or number at a biologically important time or location) of times any individual marine mammal would be exposed to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing takes by behavioral harassment only).

(4) A reduction in the intensity of exposure to stimuli expected to result in incidental take (this goal may contribute to 1, above, or to reducing the severity of behavioral harassment only).

(5) Avoidance or minimization of adverse effects to marine mammal habitat, paying particular attention to the prey base, blockage or limitation of passage to or from biologically important areas, permanent destruction of habitat, or temporary disturbance of habitat during a biologically important time.

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

Based on our evaluation of the Navy's proposed measures, we have preliminarily determined that the proposed mitigation measures provide the means of effecting the least practicable adverse impact on marine mammal species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Description of Marine Mammals in the Area of the Specified Activity

We have reviewed the Navy's species descriptions—which summarize available information regarding status and trends, distribution and habitat preferences, behavior and life history, and auditory capabilities of the potentially affected species and stocks—for accuracy and completeness, and refer the reader to Sections 3 and 4 of Navy's application, as well as to NMFS's Stock Assessment Reports (SARs; *www.nmfs.noaa.gov/pr/sars/*), instead of reprinting the information here. Additional general information (*e.g.,* physical and behavioral descriptions) and information on the U.S. regulatory status of species under the MMPA and ESA may be found on NMFS's Web site (*www.nmfs.noaa.gov/pr/species/mammals/*). Table 4 lists all species and stocks with expected potential for occurrence in the specified geographical region where Navy proposes to conduct the specified activity, and summarizes information related to the population or stock, including potential biological removal (PBR). PBR, defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population, is considered in concert with known sources of ongoing anthropogenic mortality (as described in NMFS's SARs).

Only one species under NMFS's jurisdiction is considered to have the potential to co-occur with Navy activities: The bottlenose dolphin. However, multiple stocks of bottlenose dolphin have the potential to be present. The offshore stock of bottlenose dolphins are generally found in deeper waters farther from the coast; biopsy tissue sampling and genetic analysis demonstrated that bottlenose dolphins concentrated close to shore were of the coastal morphotype, while those in waters greater than 40 m depth were from the offshore morphotype (Garrison *et al.,* 2003). However, south of Cape Hatteras, North Carolina, the ranges of the coastal and offshore morphotypes overlap to some degree. Based on genetic analysis of tissue samples collected in nearshore and offshore waters from New York to central Florida, Torres *et al.* (2003) found the offshore morphotype exclusively seaward of 34 kilometers (km) and in waters deeper than 34 m. Within 7.5 km of shore, all animals were of the coastal morphotype. Garrison *et al.* (2003) found offshore morphotype animals as close as 7.3 km from shore in water depths of 13 m. Therefore, the offshore stock of bottlenose dolphins is considered extralimital to the project area and is not discussed further in this document. In addition, the West Indian manatee (*Trichechus manatus latirostris*) may be found in coastal waters of the Atlantic. However, manatees are managed by the U.S. Fish and Wildlife Service and are not considered further in this document. All stocks are assessed in NMFS's U.S. Atlantic SARs (*e.g.,* Waring *et al.,* 2016).

TABLE 4—MARINE MAMMALS POTENTIALLY PRESENT IN THE VICINITY OF NSB KINGS BAY

Species	Stock	ESA/MMPA status; Strategic (Y/N) [1]	Stock abundance (CV, N_{min}, most recent abundance survey) [2]	PBR [3]	Annual M/SI [4]	Relative occurrence in Kings Bay; season of occurrence [5]
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Bottlenose dolphin	Western North Atlantic Coastal, South Carolina/Georgia.	D; Y	4,377 (0.43; 3,097; 2009).	31	1.2–1.6	Likely; year-round.
	WNA Coastal, Northern Florida.	D; Y	1,219 (0.67; 730; 2009).	7	0.4	Rare; year-round.
	WNA Coastal, Southern Migratory.	D; Y	9,173 (0.46; 6,326; 2009).	63	0–12	Rare; January-March.
	Southern Georgia Estuarine System.	—; Y	194 (0.05; 185; 2009).	1.9	Unk	Likely; year-round.
	Jacksonville Estuarine System.	—; Y	Unknown	Undetermined	1.2	Rare; year-round.

[1] 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 (see footnote 3) or which is determined to be declining and likely to be listed under the ESA within the foreseeable future.

[2] CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. The most recent abundance survey that is reflected in the abundance estimate is presented; there may be more recent surveys that have not yet been incorporated into the estimate.

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

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

[5] The Navy considers "rare" to mean that there may be a few confirmed sightings or that the distribution of the stock is near enough to the area of interest that the species could occur there, and that overall the stock may occur but only infrequently or in small numbers. "Likely" is considered to mean that confirmed and regular sightings of the species occur year-round. Extralimital stocks are those that are considered unlikely to co-occur with the activity because the action area is outside the range of normal occurrence, but for which there may be some sighting or stranding records.

Bottlenose dolphins range widely in temperate and tropical waters and are found from deep, offshore to coastal areas, including bays, estuaries and river mouths. In the western North Atlantic, there are two morphologically and genetically distinct bottlenose dolphin morphotypes described as the coastal and offshore forms (Duffield *et al.,* 1983; Hersh and Duffield, 1990; Mead and Potter, 1995; Curry and Smith, 1997; Rosel *et al.,* 2009). These forms are genetically distinct based upon both mitochondrial and nuclear markers (Hoelzel *et al.,* 1998; Rosel *et al.,* 2009). As described above, the offshore form—which is distributed primarily along the outer continental shelf and continental slope—is considered extralimital to the project area and is not discussed here. The coastal morphotype is continuously distributed in nearshore coastal and estuarine waters along the U.S. Atlantic coast south of Long Island, New York, around the Florida peninsula and into the Gulf of Mexico. Primary habitat for coastal dolphins generally includes waters less than 20 m deep (*e.g.,* Garrison *et al.,* 2003).

Initially, a single stock of coastal bottlenose dolphins was thought to migrate seasonally between New Jersey (summer months) and central Florida based on seasonal patterns in strandings during a large scale mortality event occurring during 1987–1988 (Scott *et al.,* 1988). However, re-analysis of stranding data and extensive analysis of genetic, photo-identification, and satellite telemetry data demonstrate a complex mosaic of coastal bottlenose dolphin stocks (Zolman, 2002; McLellan *et al.,* 2002; Rosel *et al.,* 2009; Waring *et al.,* 2016). Integrated analysis of these multiple lines of evidence suggests that there are five coastal stocks of bottlenose dolphins, including the South Carolina/Georgia and northern Florida stocks that may be present in the action area.

The coastal morphotype inhabits inshore estuarine waters in addition to coastal nearshore and continental shelf waters, with multiple lines of evidence supporting demographic separation between bottlenose dolphins residing within different estuaries along the Atlantic coast (Wells *et al.,* 1987; Scott *et al.,* 1990; Wells *et al.,* 1996; Zolman, 2002; Speakman *et al.,* 2006; Stolen *et al.,* 2007; Balmer *et al.,* 2008; Mazzoil *et al.,* 2008). In some cases, studies have identified communities of resident dolphins that are seen within relatively restricted home ranges year-round, as well as year-round resident dolphins repeatedly observed across multiple years (Zolman, 2002; Speakman *et al.,* 2006; Stolen *et al.,* 2007; Mazzoil *et al.,* 2008). A few published studies demonstrate that these resident animals are genetically distinct from animals in nearby coastal waters and/or from animals residing in nearby estuarine areas (Caldwell, 2001; Rosel *et al.,* 2009; Litz *et al.,* 2012). However, the degree of spatial overlap between estuarine and coastal populations remains unclear, and the degree of movement of resident estuarine animals into coastal waters on seasonal or shorter time scales is poorly understood (Waring *et al.,* 2016). Bottlenose dolphins inhabiting primarily estuarine habitats are considered distinct stocks from those inhabiting coastal habitats.

The spatial extent of the coastal stocks, their potential seasonal movements, and their relationships with estuarine stocks are poorly understood (Waring *et al.,* 2016). Photo-identification studies documented dolphins in coastal waters off Charleston, South Carolina, that are not known resident members of the estuarine stock (Speakman *et al.,* 2006). Genetic analyses of samples from northern Florida and Georgia and central South Carolina, using both mitochondrial DNA and nuclear microsatellite markers, indicate significant genetic differences between these areas (NMFS, 2001; Rosel *et al.,* 2009). Therefore, NMFS defines separate stocks occurring in coastal Atlantic waters from the North Carolina/South Carolina border south to the Georgia/Florida border, and from the Georgia/Florida border south to 29.4°N. There is likely to be some overlap between actual stock ranges at these borders, which are defined for management purposes, and the action area is located adjacent to the Georgia/Florida border. Therefore, although we would expect that most coastal dolphins encountered would be from the Georgia/South Carolina stock, it is possible that animals from the northern Florida stock could be present.

These five stocks also include migratory stocks that move south seasonally from mid-Atlantic coastal waters. In particular, the southern migratory stock, defined on the basis of satellite tag telemetry studies and stable isotope analysis, is thought to migrate south from waters of southern Virginia and north central North Carolina in the summer to waters south of Cape Fear and as far south as coastal Florida during winter months, where it could overlap with the South Carolina/Georgia coastal stock (and potentially occur in the action area) (Knoff, 2004; Waring *et al.,* 2016). Also based on tagging studies, the northern migratory stock is not thought to move south of Cape Lookout, North Carolina, during cold water months (Waring *et al.,* 2016). Telemetry data suggest this stock occupies waters of southern North Carolina (south of Cape Lookout) during October-December, before moving south during January-March (as far south as northern Florida). During April-June, the stock moves north back to North Carolina, and is presumed to remain in coastal waters north of Cape Lookout, North Carolina, from July-August (Waring et al., 2016). However, during its winter movements the southern migratory stock is thought to occur in waters from 10–30 m depth (*i.e.,* remain further offshore than it does in northern waters, where it is more likely to overlap with estuarine system stocks) (Waring et al., 2016). Therefore, we assume that rare occurrence of migratory stock dolphins during January to March may be possible.

There are two resident estuarine stocks of bottlenose dolphin that may occur in the action area: Those present in southern Georgia and Jacksonville estuarine systems (SGES and JES). Balmer *et al.* (2011) conducted photo-identification studies between 2004 and 2009 in two field sites in south-central Georgia, one in the Turtle/Brunswick River estuary and the second north of the Altamaha River/Sound including the Sapelo Island National Estuarine Research Reserve and extending north to Sapelo Sound. The data revealed strong site fidelity to the two regions and supported Altamaha Sound as an appropriate boundary between the two sites (Balmer *et al.,* 2013). Genetic analysis of mitochondrial DNA control region sequences and microsatellite markers of dolphins biopsied in southern Georgia showed significant genetic differentiation from animals biopsied in northern Georgia and southern South Carolina estuaries as well as from animals biopsied in coastal waters greater than 1 km from shore at the same latitude (Waring *et al.,* 2016). Caldwell (2001) investigated the social structure of bottlenose dolphins inhabiting the estuarine waters between the St. Mary's River (at the Georgia/Florida border) and Jacksonville Beach, Florida, using photo-identification and behavioral data. Multiple behaviorally-different communities were identified during the study, including those inhabiting estuarine waters to the north and south of the St. Johns River, which differed in density, habitat fidelity and social affiliation patterns. Dolphins to the north of the St. Johns River were isolated, with 96 percent of the groups observed containing dolphins that had been photographically identified only in this area, demonstrating strong year-round site fidelity (Caldwell, 2001). Cluster analyses suggested that dolphins using the northern area did not socialize with those using the area to the south of the St. Johns River (Caldwell, 2001).

The SGES stock is bounded in the south by the Georgia/Florida border at the Cumberland River out through Cumberland Sound and in the north by the Altamaha River out through Altamaha Sound, and encompasses all estuarine waters in between as well as coastal waters out to 1 km from shore. The southern boundary abuts the northern boundary of the JES stock, which is currently considered to extend south to Jacksonville Beach, Florida. Although both stocks may occur in the action area (the proposed construction site is just north of the shared SGES/JES stock boundary), we assume that animals from the JES stock would occur only rarely if at all due to the strong site fidelity exhibited within areas to the south of the St. Mary's River and Cumberland Sound.

The best available abundance estimate for the SGES stock is 194 animals (Table 4). However, seasonal mark-recapture, photo-identification surveys informing this estimate cover less than half of the assumed range of the stock and, therefore, the abundance estimate is negatively biased (Waring *et al.,* 2016). The portion of range surveyed did not include the proposed action area. There is no official abundance estimate for the JES stock because existing data are greater than eight years old. However, photo-identification data from 1994–1997 yielded 334 individually identified dolphins, including an unknown number of seasonal residents and transients (Gubbins *et al.,* 2003). Mark-recapture analyses including all individually identifiable dolphins yielded a population abundance estimate of 412 animals (CV = 0.06; Gubbins *et al.,* 2003). This is considered to be an overestimate because it included non-resident and seasonally resident dolphins (Waring *et al.,* 2016).

In summary, the SGES stock and the South Carolina/Georgia coastal stock are expected to be the two stocks most likely to be affected by the specified activity. Individual animals from the northern Florida and southern migratory (January to March only) coastal stocks and the JES stock may also occur rarely.

Biologically Important Areas—LaBrecque *et al.* (2015) recognize multiple biologically important areas (BIA) for small and resident populations of bottlenose dolphins in the mid- and south Atlantic. Small and resident population BIAs are areas and times within which small and resident populations occupy a limited geographic extent, and are therefore necessarily important areas for those populations. Here, these include areas defined for the SGES and JES populations and correspond with the stock boundaries described above.

Unusual Mortality Events (UME)—A UME is defined under the MMPA as ''a stranding that is unexpected, involves a significant die-off of any marine mammal population, and demands immediate response.'' Beginning in July 2013, elevated strandings of bottlenose dolphins were observed along the Atlantic coast from New York to Florida. The investigation was closed in 2015, with the UME ultimately being attributed to cetacean morbillivirus (though additional contributory factors are under investigation; *www.nmfs.noaa.gov/pr/health/mmume/midatldolphins2013.html;* accessed November 25, 2016). Dolphin strandings during 2013–2015 were greater than 6 times higher than the average from 2007–2012, with the most strandings reported from Virginia, North Carolina, and Florida. A total of approximately 1,650 bottlenose dolphins stranded from June 2013 to March 2015 and, additionally, a small number of individuals of several other cetacean species stranded during the UME and tested positive for morbillivirus (humpback whale, fin whale, minke whale, pygmy sperm whale, and striped dolphin). Approximately one hundred of the stranded dolphins were recovered along the Georgia coast, with at least 31 found on nearby Cumberland Island. Only one offshore ecotype dolphin has been identified, meaning that over 99 percent of affected dolphins were of the coastal ecotype (D. Fauquier; pers. comm.). Research, to include analyses of stranding samples and post-UME monitoring and modeling of surviving populations, will continue in order to better understand the impacts of the UME on the affected stocks. Notably, an earlier major UME in 1987–1988 was also caused by morbillivirus. Over 740 stranded dolphins were recovered during that event.

A second UME, declared in 2010, affected bottlenose dolphins in the St. Johns River (FL). Affected animals likely belonged to the JES stock; the cause of this UME is undetermined. For more information on UMEs, please visit: *www.nmfs.noaa.gov/pr/health/mmume/.*

Take Reduction Planning—Take reduction plans are designed to help recover and prevent the depletion of strategic marine mammal stocks that interact with certain U.S. commercial fisheries, as required by Section 118 of the MMPA. The immediate goal of a take reduction plan is to reduce, within six months of its implementation, the annual human-cause mortality and serious injury (M/SI) of marine mammals incidental to commercial fishing to less than the PBR level. The long-term goal is to reduce, within five years of its implementation, the M/SI of marine mammals incidental to commercial fishing to insignificant levels, approaching a zero serious injury and mortality rate, taking into account the economics of the fishery, the availability of existing technology, and existing state or regional fishery management plans. Take reduction teams are convened to develop these plans.

One take reduction plan has been developed to reduce deaths of Atlantic coastal bottlenose dolphins incidental to commercial fishing. The bottlenose dolphin take reduction plan contains both regulatory and non-regulatory conservation measures, including seasonal gillnet restrictions, gear proximity requirements, and gear length restrictions, as well as continued research and monitoring, enforcement, outreach, and partnership efforts. Gillnet restrictions are in place in Georgia waters. More information is available online at: *www.nmfs.noaa.gov/pr/interactions/trt/bdtrp.html.*

Potential Effects of the Specified Activity 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 preamble will include a quantitative analysis of the number of incidents of take expected to occur incidental to this activity. The ''Negligible Impact Analysis'' section will include an analysis of how this specific activity will impact marine mammals, and will consider the content of this section, the ''Estimated Take by Incidental Harassment'' section, and the ''Proposed Mitigation'' section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals, and from that on the affected marine mammal populations or stocks. In the following discussion, we provide general background information on sound and marine mammal hearing before considering potential effects to marine mammals from sound produced by pile driving.

Description of Sound Sources

This section contains a brief technical background on sound, on the characteristics of certain sound types, and on metrics used in this proposal inasmuch as the information is relevant to the specified activity and to a discussion of the potential effects of the specified activity on marine mammals found later in this document.

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the ''loudness'' of a sound and is typically described using the relative unit of the decibel (dB). A sound pressure level (SPL) in dB is described as the ratio between a measured pressure and a reference pressure (for underwater sound, this is 1 microPascal (μPa)), and is a logarithmic unit that accounts for large variations in amplitude; therefore, a relatively small change in dB corresponds to large changes in sound pressure. The source level (SL) represents the SPL referenced at a distance of 1 m from the source (referenced to 1 μPa), while the received level is the SPL at the listener's position (referenced to 1 μPa).

Root mean square (rms) is the quadratic mean sound pressure over the duration of an impulse. 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.

Sound exposure level (SEL; represented as dB re 1 μPa^2-s) represents the total energy contained within a pulse, and considers both intensity and duration of exposure. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0-p) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source, and is represented in the same units as the rms sound pressure.

When underwater objects vibrate or activity occurs, sound-pressure waves are created. These waves alternately compress and decompress the water as the sound wave travels. Underwater sound waves radiate in a manner similar to ripples on the surface of a pond and may be either directed in a beam or beams or may radiate in all directions (omnidirectional sources), as is the case for sound produced by the pile driving activity considered here. The compressions and decompressions associated with sound waves are detected as changes in pressure by aquatic life and man-made sound receptors such as hydrophones.

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound. 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.,* wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.,* vessels, dredging, construction) sound. A number of sources contribute to ambient sound, including 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 sound 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 sound 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 sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times.
- *Biological:* Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz.
- *Anthropogenic:* Sources of ambient sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, seismic surveys, sonar, explosions, and ocean acoustic studies. Vessel noise typically dominates the total ambient sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly. 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 human activity) but also on the ability of sound to propagate through the environment. In turn, sound propagation is dependent on the spatially and temporally varying properties of the water column and sea floor, and is frequency-dependent. As a result of the dependence on a large number of varying factors, ambient sound levels can be expected to vary widely over both coarse and fine spatial and temporal scales. Sound levels at a given frequency and location can vary by 10–20 dB from day to day (Richardson *et al.,* 1995). The result is that depending on the source type, its intensity, and the receivers' generalized hearing range, sound from a given activity may be a negligible addition to the local environment or could form a distinctive signal that may affect marine mammals.

The underwater acoustic environment at NSB Kings Bay is dominated by noise from day-to-day port and vessel activities. The base is sheltered from most wave noise, but is a high-use area for naval ships, tugs, submarines, and security vessels. When underway, these sources can create noise between 20 Hz and 16 kHz (Lesage *et al.,* 1999), with broadband noise levels up to 180 dB rms. Normal port operations, including transits, docking, and maintenance by multiple vessels would continue throughout the period proposed for the specified activity. As a result of measurements conducted in February 2015, the Navy found that background sound levels averaged around 135 dB rms (Acentech, 2015). Due to the existing loud environment and similarity to noise produced by existing activity, it is unlikely that noise produced by vibratory pile driving in particular would have any significant impact on marine mammals occurring in the vicinity of NSB Kings Bay. Details of source types are described in the following text.

Sounds are often considered to fall into one of two general types: pulsed and non-pulsed (defined in the following). The distinction between these two sound types is important because they have differing potential to cause physical effects, particularly with regard to hearing (*e.g.,* Ward, 1997 in Southall *et al.,* 2007). Please see Southall *et al.* (2007) for an in-depth discussion of these concepts.

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

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

Impact hammers operate by using a piston or weight to drive the pile into the substrate. The impulsive 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, which liquefies surrounding substrate, and allowing the weight of the hammer to push the pile into the sediment. Vibratory hammers produce non-impulsive, continuous noise at levels significantly lower than those produced by impact hammers. Peak SPLs may be 180 dB or greater, but are generally 10 to 20 dB lower than SPLs generated during impact pile driving of the same-sized pile (Oestman *et al.,* 2009). Rise time is slower, reducing the probability and severity of injury, and sound energy is distributed over a greater amount of time (Nedwell and Edwards, 2002; Carlson *et al.,* 2005).

Acoustic Effects

Here, we first provide background information on marine mammal hearing before discussing the potential effects of the use of active acoustic sources on marine mammals.

Marine Mammal Hearing—Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (*e.g.,* Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. 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. Functional groups for cetaceans 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.

For more detail concerning these groups and associated frequency ranges, please see NMFS (2016) for a review of available information. The bottlenose dolphin is classified as a mid-frequency cetacean.

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

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

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

1. *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 (Finneran, 2015). TS can be permanent (PTS), in which case the loss of hearing sensitivity is not fully recoverable, or temporary (TTS), in which case the animal's hearing threshold would recover over time (Southall *et al.,* 2007). Repeated sound exposure that leads to TTS could cause PTS. In severe cases of PTS, there can be total or partial deafness, while in most cases the animal has an impaired ability to hear sounds in specific frequency ranges (Kryter, 1985).

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

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

2. *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. Few data on sound levels and durations necessary to elicit mild TTS have been obtained for marine mammals.

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

Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin, beluga whale, harbor porpoise, and Yangtze finless porpoise [*Neophocoena asiaeorientalis*]) exposed to a limited number of sound sources (*i.e.,* mostly tones and octave-band noise) in laboratory settings (Finneran, 2015). In general, harbor porpoises have a lower TTS onset than other measured cetacean species (Finneran, 2015). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. There are no data available on noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al.* (2007), Finneran and Jenkins (2012), and Finneran (2015).

3. *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 shown pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997). 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, 2005). There are broad categories of potential response, which we describe in greater detail here, and that include alteration of dive behavior, alteration of foraging behavior, effects on breathing, interference with or alteration of vocalization, avoidance, and flight responses.

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; 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, 2005, 2006; Gailey *et al.,* 2007).

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

Avoidance is the displacement of an individual from an area or migration path as a result of the presence of a sound or other stressors, and is one of the most obvious manifestations of disturbance in marine mammals (Richardson *et al.,* 1995). For example, gray whales are known to change direction—deflecting from customary migratory paths—in order to avoid noise from 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.,* 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.

4. *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).

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

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

The frequency range of the potentially masking sound is important in determining any potential behavioral impacts. For example, low-frequency signals may have less effect on high-frequency echolocation sounds produced by odontocetes but are more likely to affect detection of mysticete communication calls and other potentially important natural sounds such as those produced by surf and some prey species. The masking of communication signals by anthropogenic noise may be considered as a reduction in the communication space of animals (*e.g.,* Clark *et al.,* 2009) and may result in energetic or other costs as animals change their vocalization behavior (*e.g.,* Miller *et al.,* 2000; Foote *et al.,* 2004; Parks *et al.,* 2007; Di Iorio and Clark, 2009; 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.

Potential Effects of Navy Activity—As described previously (see ''Description of Active Acoustic Sound Sources''), the Navy proposes to conduct pile driving, including impact and vibratory driving. The effects of pile driving on marine mammals are dependent on several factors, including the size, type, and depth of the animal; the depth, intensity, and duration of the pile driving sound; the depth of the water column; the substrate of the habitat; the standoff distance between the pile and the animal; and the sound propagation properties of the environment. With both types of pile driving, it is likely that the onset of pile driving could result in temporary, short term changes in an animal's typical behavior and/or avoidance of the affected area. These behavioral changes may include (Richardson *et al.,* 1995): changing durations of surfacing and dives, number of blows per surfacing, or moving direction and/or speed; reduced/increased vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); visible startle response or aggressive behavior (such as tail/fluke slapping or jaw clapping); avoidance of areas where sound sources are located; and/or flight responses.

The biological significance of many of these behavioral disturbances is difficult to predict, especially if the detected disturbances appear minor. However, the consequences of behavioral modification could be expected to be biologically significant if the change affects growth, survival, or reproduction. Significant behavioral modifications that could lead to effects on growth, survival, or reproduction, such as drastic changes in diving/surfacing patterns or significant habitat abandonment are extremely unlikely in this area (*i.e.,* shallow waters in a heavily altered industrial area).

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

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

Anticipated Effects on Marine Mammal Habitat

The proposed activities would not result in permanent impacts to habitats used directly by marine mammals, but may have potential short-term impacts to food sources such as forage fish. The proposed activities could also affect acoustic habitat (see masking discussion above), but meaningful impacts are unlikely. There are no known foraging hotspots, or other ocean bottom structures of significant biological importance to marine mammals present in the marine waters in the vicinity of the project area. Therefore, the main impact issue associated with the proposed activity would be temporarily elevated sound levels and the associated direct effects on marine mammals, as discussed previously in this preamble. The most likely impact to marine mammal habitat occurs from pile driving effects on likely marine mammal prey (*i.e.,* fish) near NSB Kings Bay and minor impacts to the immediate substrate during installation and removal of piles.

Effects to Prey—Impact pile driving would produce pulsed sounds, and fish react to sounds which 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 various received levels may cause subtle to noticeable changes in fish 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 of the area. The duration of fish avoidance of this area after pile driving stops is unknown, but a rapid return to normal recruitment, distribution and behavior is anticipated. In general, impacts to marine mammal prey species are expected to be minor and temporary due to the expected short daily duration of individual pile driving events and the relatively small areas being affected. It is also not expected that the industrial environment of NSB Kings Bay provides important fish habitat or harbors significant amounts of forage fish.

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

Estimated Take by Incidental Harassment

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

Anticipated takes would be by Level B harassment, as pile driving activity has the potential to result in disruption of behavioral patterns for individual marine mammals. Level A harassment by auditory injury is unlikely to occur as a result of this activity for bottlenose dolphins (*i.e.,* mid-frequency hearing specialists) and, although it is unlikely that take by Level A harassment would occur even in the absence of the proposed mitigation and monitoring measures, the proposed measures are expected to further minimize such potential. The Navy has requested authorization for the incidental taking by Level B harassment of bottlenose dolphins in the vicinity of NSB Kings Bay that may result from pile driving during waterfront construction activities described previously in this document.

Sound Thresholds

We have historically used generic sound exposure thresholds (see Table 5) to determine when an activity that produces sound might result in impacts to a marine mammal such that a take by harassment might occur. These thresholds should be considered guidelines for estimating when harassment may occur (*i.e.,* when an animal is exposed to levels equal to or exceeding the relevant criterion) in specific contexts; however, useful contextual information that may inform our assessment of effects is typically lacking and we consider these thresholds as step functions. For Level B harassment, the 160 dB and 120 dB rms criteria are used to estimate incidents of take resulting from impact and vibratory pile driving, respectively.

TABLE 5—HISTORICAL ACOUSTIC EXPOSURE CRITERIA

Criterion	Definition	Threshold
Level A harassment	Injury (onset PTS—any level above that which is known to cause TTS).	180 dB rms (cetaceans).
Level B harassment	Behavioral disruption	160 dB rms (impulse sources); 120 dB rms (non-impulsive, continuous sources).

In August 2016, NMFS released its ''Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing,'' which established new thresholds for predicting auditory injury (NMFS, 2016), and which equates to Level A harassment under the MMPA. For more information, please visit *www.nmfs.noaa.gov/pr/acoustics/guidelines.htm.* In the August 4, 2016, **Federal Register** notice announcing the guidance (81 FR 51694), NMFS explained the approach it would take during a transition period, wherein we balance the need to consider this new best available science with the fact that some applicants have already committed time and resources to the development of acoustic analyses based on our previous thresholds and have constraints that preclude the recalculation of take estimates, as well as with a consideration of where the agency is in the decision-making pipeline. In that notice, we included a non-exhaustive list of factors that would inform the most appropriate approach for considering the new guidance, including: how far in the MMPA process the applicant has progressed; the scope of the effects; when the authorization is needed; the cost and complexity of the analysis; and the degree to which the guidance is expected to affect our analysis.

The new guidance identifies the received levels, or thresholds, above which individual marine mammals are predicted to experience changes in their hearing sensitivity (either temporary or permanent) for all underwater anthropogenic sound sources, reflects the best available science, and is intended to better predict the potential for auditory injury than does NMFS's historical criteria. The guidance reflects the best available science on the potential for noise to affect auditory sensitivity by:

- Dividing sound sources into two groups (*i.e.,* impulsive and non-impulsive) based on their potential to affect hearing sensitivity;
- Choosing metrics that better address the impacts of noise on hearing sensitivity, *i.e.,* peak SPL (better reflects the physical properties of impulsive sound sources, to affect hearing sensitivity) and cumulative sound exposure level (cSEL) (accounts for not only level of exposure but also durations of exposure);
- Dividing marine mammals into functional hearing groups and developing auditory weighting functions based on the science supporting that not all marine mammals hear and use sound in the same manner.

NMFS's new guidance (NMFS, 2016) recommends specific thresholds under the dual metric approach (*i.e.,* peak SPL and cSEL) and recommends that marine mammals be divided into functional hearing groups based on measured or estimated functional hearing ranges. The premise of the dual criteria approach is that, while there is no definitive answer to the question of which acoustic metric is most appropriate for assessing the potential for injury, both the intensity and duration of received signals are important to an understanding of the potential for injury. Therefore, peak SPL is used to define a pressure criterion above which tissue injury is predicted to occur, regardless of exposure duration (*i.e.,* any single exposure at or above this level is considered to cause tissue injury), and cSEL is used to account for the total energy received over the duration of sound exposure (*i.e.,* both received level and duration of exposure) (Southall *et al.,* 2007; NMFS, 2016). As a general principle, whichever criterion is exceeded first would be used as the effective injury criterion (*i.e.,* the more precautionary of the criteria). Note that cSEL acoustic threshold levels incorporate marine mammal auditory weighting functions, while peak pressure thresholds do not. NMFS (2016) recommends 24 hours as a maximum accumulation period relative to cSEL thresholds. For further discussion of auditory weighting functions and their application, please see NMFS (2016). Table 6 displays relevant thresholds provided by NMFS (2016).

TABLE 6—EXPOSURE CRITERIA FOR AUDITORY INJURY [1]

Hearing group	Peak pressure [2]	Cumulative sound exposure level [3]
Mid-frequency cetaceans	230 dB	185 dB

[1] Onset PTS—any level above that which is known to cause TTS.

[2] Referenced to 1 μPa; unweighted within generalized hearing range.

[3] Referenced to 1 $\mu Pa^2 s$; weighted according to appropriate auditory weighting function.

NMFS considers these updated thresholds and associated weighting functions to be the best available information for assessing whether exposure to sound from specific activities is likely to result in changes in marine mammal hearing sensitivity. In this case, Navy submitted a timely request for authorization that was determined to be adequate and complete prior to availability of the guidance. The Navy's analysis considered the potential for auditory injury to marine mammals, but ultimately concluded that injury would be unlikely to occur due to their proposed mitigation measures; *i.e.,* Level A harassment mitigation zones calculated on the basis of NMFS's then-current thresholds for onset of permanent threshold shift (*i.e.,* 180 dB rms). Following release of the new guidance, we have considered the likely implications for potential auditory injury of marine mammals. Based on consideration of the guidance, potential injury zones are much smaller than previously expected, and are fully encompassed by Navy's revised proposed shutdown zones. In consideration of the small injury zones and the Navy's proposed mitigation, we believe that injury will be avoided. In summary, we have considered the new guidance and believe that the likelihood of injury is adequately addressed in this analysis, and appropriate protective measures are in place in the proposed regulations.

Zones of Influence

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

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

Where:
R_1 = the distance of the modeled SPL from the driven pile, and
R_2 = the distance from the driven pile of the initial measurement.

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

Sound Source Levels and Behavioral Zones—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. However, there are no measurements available from the specific environment of NSB Kings Bay. Numerous studies have examined sound pressure levels (SPLs) recorded from underwater pile driving projects in California and Washington, and the Navy has conducted a few studies on the east coast. In addition, the majority of studies are focused on steel pipe piles, with less data available for other pile types. In order to determine reasonable SPLs and their associated effects on marine mammals that are likely to result from pile driving at NSB Kings Bay, studies with similar properties to the specified activity were evaluated, and are displayed in Table 7. Where available, data from the east coast were prioritized due to the differences in bathymetry and sediment at west coast sites. For pile types for which data from the east coast were not available, averages of west coast data were used to approximate source levels. For fiberglass reinforced plastic composite piles, no measured data are available. The source level estimates for this type of pile were based on data from timber piles driven on the east coast of the U.S, assuming that this is the most similar pile material. In all cases, where data from the same pile size/type were not available, a more conservative proxy was used. Where appropriate, weighted project averages were considered. Values measured at distances greater than 10 m were normalized to 10 m before calculating averages. For full details of data considered, please see Appendix C of the Navy's application.

TABLE 7—SUMMARY OF PROXY MEASURED UNDERWATER SOUND PRESSURE LEVELS (SPLS)

Method	Pile size and material	Proxy	Proxy source levels (dB at 10 m)		
			rms	pk	SEL
Vibratory	16″ timber; 16–18″ composite	12–16″ timber [1]	161	n/a	n/a
Vibratory	18–24″ concrete	24″ steel pipe [2–5]	166	n/a	n/a
Vibratory	14″ steel H	14″ steel H [6]	163	n/a	n/a
Vibratory	24″ steel pipe	24″ steel pipe [2–5]	166	n/a	n/a
Vibratory	30″ steel pipe	30″ steel pipe [7–9]	166	n/a	n/a
Impact	18″ concrete	18″ concrete [4]	170	184	159
Impact	24″ concrete	24″ concrete [1 6]	174	184	165
Impact	14″ steel H	14″ steel H [4]	178	196	168
Impact	24″ steel pipe	24″ steel pipe [4 10–11]	190	206	179
Impact	30″ steel pipe	30″ steel pipe [4 8 10 12]	193	209	188

Sources: [1] Illingworth & Rodkin, 2015; [2] Illingworth & Rodkin, 2010; [3] Illingworth & Rodkin, 2012; [4] Caltrans, 2012; [5] Illingworth & Rodkin, 2013b; [6] Illingworth & Rodkin, 2013a; [7] Laughlin, 2010a; [8] Laughlin, 2010b; [9] Laughlin, 2011; [10] Laughlin, 2005a; [11] Laughlin, 2005b; [12] MacGillivray and Racca, 2005.

We consider the values presented in Table 7 to be representative of SPLs that may be produced by the specified activity. All calculated distances to and the total area encompassed by the marine mammal sound thresholds are provided in Table 8. Calculated radial distances to the 160 dB threshold assume a field free of obstruction.

However, the waters surrounding NSB Kings Bay do not represent open water conditions and the calculated zone-specific areas take landforms into consideration. Actual zones are depicted in Figures 6–1 through 6–26 of the Navy's application. Although calculated radial distances to threshold do not change, the actual zone sizes may vary depending on the specific project location.

TABLE 8—DISTANCES TO RELEVANT SOUND THRESHOLDS AND AREAS OF ENSONIFICATION

Project	Pile type	Distance to threshold (m) and associated area of emsonification (km²)			
		160 dB		120 dB	
1A	16″ timber	n/a	n/a	5,412	3.69
1A	18″ concrete	46.4	0.01	n/a	n/a
1A	24″ concrete	85.8	0.02	n/a	n/a
1B	16″ timber/composite	n/a	n/a	5,412	3.12
2	14″ steel H	159	0.06	n/a	n/a
3A (FY17)	24″ steel pipe	1,000	0.88	11,659	3.63
3A (FY22)	24″ concrete	85.8	0.02	11,659	3.63
3A (FY22)	24″ steel pipe	1,000	0.88	11,659	3.63
3B	14″ steel H	159	0.04	7,356	2.40
3C	24–30″ steel pipe	1,000	0.75	11,659	3.32
3D	24–30″ steel pipe	1,000	0.90	11,659	3.17
3E	24–30″ steel pipe	1,000	0.88	11,659	3.72
3F	30″ steel pipe	1,585	1.35	11,659	3.49
3G	14″ steel H	159	0.07	7,356	4.00
4A	18″ concrete	46.4	0.02	11,659	7.51
4A	24″ concrete	85.8	0.01	11,659	7.51
4B	24″ steel pipe	1,000	1.63	11,659	6.39
5	16″ timber/18″ composite	n/a	n/a	5,412	10.75
6A/6B	24″ concrete	n/a	n/a	11,659	9.34

Areas presented take into account attenuation and/or shadowing by land. Please see Figures 6–1 to 6–26 in the Navy's application.

Marine Mammal Density

The Navy conducted marine mammal surveys at NSB Kings Bay during 2006–2007 (McKee and Latusek, 2009). Transect lines were run in the waters around NSB Kings Bay during summer and fall 2006 and during winter and spring 2007. The survey area included estuarine waters extending from the mouth of the St. Marys River north through the Cumberland Sound to approximately eight nautical miles (nmi) inland along the Satilla River. The Crooked River and the Brickhill River, which flow into Cumberland Sound, were also part of the study area, though line transects were not possible in these locations, and census counts were substituted here. The geographic limits ranged from 30°40′ N. to 31°00′ N. and inland limits to 81°40′ W. Nearshore Atlantic waters were not included in the surveys.

Observations were made with 7x50 power binoculars and with the naked eye, scanning from 0–90° relative to the vessel's line of travel. Sightings, radial distance and angle to animal, and number of individuals were recorded. For census count areas, the vessel was driven along the center line of the river and distance and angle to sightings were noted. Commercially available software (Distance 5.0) was used to analyze the collected data, including area surveyed, and calculate a seasonal density. Seasonal densities were combined to calculate an average annual density of 1.12 dolphins per km².

Incidental Take Calculation

The species density described above (1.12 animals/km²) was multiplied by the activity-specific ZOIs shown in Table 8 to determine the estimated daily exposures. The Navy then rounded these daily exposure estimates to the nearest whole number before multiplying by activity-specific pile driving days, shown in Table 2, to yield the exposure estimates shown in Table 9. The Navy has requested authorization for a total of 881 incidents of Level B harassment of bottlenose dolphins over the five-year period of validity of these proposed regulations. Table 9 displays the total take estimate broken out by project and year. However, note that year assignments reflect only the projected project start years. Projects may continue into succeeding years, but neither exact start dates nor whether a project would in fact continue into the succeeding year are known at this time.

TABLE 9—INCIDENTAL TAKE TOTALS

Year	Project	Impact	Vibratory
FY17	1A	0	124
	1B	n/a	6
	2	0	n/a
	3A	1	4
	3D	1	4
	5	n/a	72
FY17 Totals	n/a	2	210
		212	
FY18	3C	1	4
	3E	1	4

TABLE 9—INCIDENTAL TAKE TOTALS—Continued

Year	Project	Impact	Vibratory
FY18 Totals	n/a	2	8
		10	
FY19	n/a		
FY20	4A	0	64
	4B	8	32
FY20 Totals	n/a	8	96
		104	
FY21	3B	0	21
	3F	4	8
FY21 Totals	n/a	4	29
		33	
FY22	3A	4	16
	3G	0	32
	6A	n/a	410
	6B	n/a	60
FY22 Totals	n/a	4	518
		522	
FY17–22 Totals	n/a	20	861
		881	

Analyses and Preliminary Determinations

Negligible Impact Analysis

NMFS has defined ''negligible impact'' in 50 CFR 216.103 as ''. . . an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.'' A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.,* population-level effects). An estimate of the number of 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 by mortality, serious injury, and Level A or Level B harassment, we consider other factors, such as the likely nature of any behavioral responses (*e.g.,* intensity, duration), the context of any such responses (*e.g.,* critical reproductive time or location, migration), as well as the number and nature of estimated Level A harassment takes (if any), and effects on habitat. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status (*i.e.,* the environmental baseline).

Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into these analyses via their impacts on the environmental baseline (*e.g.,* as reflected in the regulatory status of the species, population size and growth rate where known, sources of human-caused mortality).

Pile driving activities associated with the wharf construction projects, as described previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level B harassment (behavioral disturbance) only, from underwater sounds generated from pile driving. Potential takes could occur if individual bottlenose dolphins are present in the ensonified zone when pile driving is happening.

No serious injury or mortality would be expected even in the absence of the proposed mitigation measures. No Level A harassment is anticipated given the nature of the activities and measures designed to minimize the possibility of injury. The potential for injury is small, and is expected to be essentially eliminated through implementation of the planned mitigation measures—soft start (for impact driving) and shutdown zones. Impact driving, as compared with vibratory driving, has source characteristics (short, sharp pulses with higher peak levels and much sharper rise time to reach those peaks) that are potentially injurious or more likely to produce severe behavioral reactions. Given sufficient notice through use of soft start, marine mammals are expected to move away from a sound source that is annoying prior to its becoming potentially injurious or resulting in more severe behavioral reactions. Environmental conditions in waters surrounding NSB Kings Bay are expected to generally be good, with calm sea states, albeit with high turbidity. Nevertheless, we expect conditions would allow a high marine mammal detection capability, enabling a high rate of success in implementation of shutdowns to avoid injury.

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; HDR, Inc., 2012; Lerma, 2014). Most likely, individuals will simply move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. The pile driving activities analyzed here are similar to, or less impactful than, numerous other construction activities conducted in San Francisco Bay and in the Puget Sound region, which have taken place with no known long-term adverse consequences from behavioral harassment.

The Navy has conducted similar multi-year activities potentially affecting bottlenose dolphins in San Diego Bay and in the same general region at Mayport Florida, that have similarly reported no apparently consequential behavioral reactions or long-term effects on bottlenose dolphin populations (Lerma, 2014; Navy, 2015). Repeated exposures of individuals to relatively low levels of sound outside of preferred habitat areas are unlikely to significantly disrupt critical behaviors. Thus, even repeated Level B harassment of some small subset of the overall stock is unlikely to result in any significant realized decrease in viability for the affected individuals, and thus would not result in any adverse impact to the stock as a whole. Level B harassment will be reduced to the level of least practicable adverse impact through use of mitigation measures described herein and, if sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the area while the activity is occurring. While vibratory driving associated with some project components may produce sound at distances of multiple kilometers from the pile driving site, thus intruding on higher-quality habitat, the project sites themselves and the majority of sound fields produced by the specified activities are within a heavily impacted, industrialized area. Therefore, we expect that animals annoyed by project sound would simply avoid the area and use more-preferred habitats.

In summary, this negligible impact analysis is founded on the following factors: (1) The possibility of injury, serious injury, or mortality may reasonably be considered discountable; (2) the anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior; (3) the absence of any significant habitat within the project area, including known areas or features of special significance for foraging or reproduction; and (4) the presumed efficacy of the proposed mitigation measures in reducing the effects of the specified activity to the level of least practicable adverse impact. In addition, while some of the potentially affected stocks are considered depleted under the MMPA, it is unlikely that minor noise effects in a small, localized area would have any effect on the stocks' ability to recover. In combination, we believe that these factors, as well as the available body of evidence from other similar activities, demonstrate that the potential effects of the specified activities will have only minor, short-term effects on individuals. The specified activities are not expected to impact rates of recruitment or survival and will therefore not result in population-level impacts.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, we preliminarily find that the total marine mammal take from the Navy's waterfront construction activities will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers Analysis

Please see Table 9 for information relating to this small numbers analysis; as described previously, although we provide exposure estimates broken out by year and project component, we do not have specific information about when each project would be concluded or therefore how many takes may actually accrue in any given year during the five-year period of validity of these propose regulations. The annual average over the course of the five year period is 176 takes. Of these annual average 176 incidents of behavioral harassment predicted to occur for bottlenose dolphin, we have no information allowing us to parse the predicted incidents amongst the stocks of bottlenose dolphin that may occur in the project area. However, because they would be expected to occur only rarely and/or seasonally, we assume that only small numbers of individuals of the northern Florida coastal, southern migratory coastal, and Jacksonville estuarine system stocks would be potentially present and available to be taken.

The South Carolina/Georgia coastal and southern Georgia estuarine system stocks are expected to potentially be present more regularly. For the South Carolina/Georgia coastal stock, the annual average predicted number of incidents of take proposed for authorization would be considered small—approximately four percent—even if each estimated taking occurred to a new individual. This is an extremely unlikely scenario as, for bottlenose dolphins in estuarine and nearshore waters, there is likely to be some overlap in individuals present day-to-day.

The total number of authorized takes for bottlenose dolphins, if assumed to accrue solely to new individuals of the SGES stock, is higher relative to the total stock abundance, which is currently estimated at 194 individuals. As described previously, this estimate is the result of surveys covering only a portion of the stock range and is assumed to underestimate the stock abundance. Regardless, these numbers represent the estimated incidents of take, not the number of individuals taken. That is, it is highly likely that a relatively small subset of SGES bottlenose dolphins would be harassed by project activities. SGES bottlenose dolphins range from Cumberland Sound at the Georgia-Florida border north to the Altamaha Sound, Georgia, an area spanning approximately 70 linear km of coastline and including habitat consisting of complex inshore and estuarine waterways. SGES dolphins show strong site fidelity (Balmer *et al.,* 2013), and it is likely that the majority of SGES dolphins would not occur within waters ensonified by project activities. In summary, SGES dolphins are known to exhibit strong site fidelity (*i.e.,* individuals do not generally range throughout the recognized overall SGES stock range), and the specified activity will be stationary within a relatively enclosed industrial area not recognized as an area of any special significance that would serve to attract or aggregate dolphins. We therefore believe that the estimated numbers of take, were they to occur, likely represent repeated exposures of a much smaller number of bottlenose dolphins, and that these estimated incidents of take represent small numbers of bottlenose dolphins.

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

Proposed Monitoring and Reporting

In order to issue an incidental take authorization for an activity, section 101(a)(5)(A) of the MMPA states that NMFS must set forth ''requirements pertaining to the monitoring and reporting of such taking.'' The MMPA implementing regulations at 50 CFR 216.104(a)(13) indicate that requests for incidental take authorizations must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present in the proposed action area.

Any monitoring requirement we prescribe should improve our understanding of one or more of the following:

• Occurrence of marine mammal species in action area (*e.g.,* presence, abundance, distribution, density).

• Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (individual or cumulative, acute or chronic), through better understanding of: (1) Action or environment (*e.g.,* source characterization, propagation, ambient noise); (2) affected species (*e.g.,* life history, dive patterns); (3) co-occurrence of marine mammal species with the action; or (4) biological or behavioral context of exposure (*e.g.,* age, calving, or feeding areas).

• Individual responses to acute stressors, or impacts of chronic exposures (behavioral or physiological).

• How anticipated responses to stressors impact either: (1) long-term fitness and survival of an individual; or (2) population, species, or stock.

• Effects on marine mammal habitat and resultant impacts to marine mammals.

• Mitigation and monitoring effectiveness.

The Navy provided a separate Marine Mammal Monitoring Plan, which is available online at *www.nmfs.noaa.gov/pr/permits/incidental/construction.htm.*

Visual Marine Mammal Observations

The Navy will collect sighting data and behavioral responses to construction for marine mammal species observed in the region of activity during the period of activity. All observers will be trained in marine mammal identification and behaviors and are required to have no other construction-related tasks while conducting monitoring. The Navy would monitor all shutdown zones at all times, and would monitor disturbance zones during a varying subset of total project days. Approximately half of disturbance zone monitoring effort is proposed for allocation during the first two years of project activities in order to provide verification during the early stages of the project regarding assumed numbers of bottlenose dolphins present in the area. If compliance monitoring results suggest that the actual number of incidental take events may differ significantly from the number originally authorized, the Navy would consult with NMFS. The Navy would conduct monitoring before, during, and after pile driving, with observers located at the best practicable vantage points. Based on our requirements, the Navy would implement the following procedures for pile driving:

• Marine mammal observers would be located at the best vantage point(s) in order to properly see the entire shutdown zone and as much of the disturbance zone as possible.

• During all observation periods, observers will use binoculars and the naked eye to search continuously for marine mammals.

• If the shutdown zones are obscured by fog or poor lighting conditions, pile driving at that location will not be initiated until that zone is visible. Should such conditions arise while impact driving is underway, the activity would be halted.

• The shutdown zone around the pile would be monitored for the presence of marine mammals before, during, and after all pile driving activity, while disturbance zone monitoring would be implemented according to the schedule proposed here.

Notional marine mammal observation locations are depicted in Figures 3–14 of the Navy's monitoring plan. Total days planned for each project are provided above in Table 2. Project-specific disturbance zone monitoring proposals are described in the following list.

• Project 1A—A minimum of three observers would be deployed to monitor the disturbance zone on a minimum of ten days of vibratory pile driving.

• Project 1B—Only two total days of work are proposed as part of Project 1B, and no disturbance zone monitoring is proposed.

• Project 2—Only impact pile driving is proposed in association with Project 2; therefore, the disturbance zone would be visible during shutdown zone monitoring.

• Project 3A—This project is expected to occur in two phases, beginning in FY2017 and FY2022. During phase one, only two total days of work are proposed and no disturbance zone monitoring is proposed. During phase two, a minimum of three observers would be deployed to monitor the disturbance zone on a minimum of three days of vibratory pile driving.

• Project 3B—A minimum of three observers would be deployed to monitor the disturbance zone on a minimum of five days of vibratory pile driving.

• Projects 3C, 3D, and 3E—A minimum of two observers would be deployed to monitor the disturbance zone during all vibratory driving associated with these projects.

• Project 3F—A minimum of three observers would be deployed to monitor the disturbance zone on a minimum of two days of vibratory pile driving.

• Project 3G—A minimum of three observers would be deployed to monitor the disturbance zone on a minimum of four days of vibratory pile driving.

• Project 4A—A minimum of four observers would be deployed to monitor the disturbance zone on a minimum of eight days of vibratory pile driving.

• Project 4B—A minimum of four observers would be deployed to monitor the disturbance zone on a minimum of three days of vibratory pile driving.

• Project 5—A minimum of four observers would be deployed to monitor the disturbance zone on a minimum of three days of vibratory pile driving.

• Projects 6A and 6B—A minimum of five observers would be deployed to monitor the disturbance zone on a minimum of twelve days of vibratory pile driving.

Individuals implementing the monitoring protocol will assess its effectiveness using an adaptive approach. Monitoring biologists will use their best professional judgment throughout implementation and seek improvements to these methods when deemed appropriate. Any modifications to the protocol will be coordinated between NMFS and the Navy.

Data Collection

We require that observers use standardized data forms. Among other pieces of information, the Navy will record detailed information about any implementation of shutdowns, including the distance of animals to the pile and description of specific actions that ensued and resulting behavior of the animal, if any. We require that, at a minimum, the following information be collected on the sighting forms:

• Date and time that monitored activity begins or ends;

• Construction activities occurring during each observation period;

• Weather parameters (*e.g.,* wind speed, percent cloud 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;

• Description of implementation of mitigation measures (*e.g.,* shutdown or delay).

• Locations of all marine mammal observations; and

• Other human activity in the area.

Acoustic Monitoring

The Navy would implement a sound source level verification study during activities associated with specific project components of interest. Because data is relatively lacking for these pile types, data collection would be targeted towards impact and vibratory driving of concrete, timber and composite piles. A sample scope of work for acoustic monitoring is provided as Attachment 3 of the Navy's monitoring plan. The exact specifications of the acoustic monitoring work would be finalized in consultation with Navy personnel, subject to constraints related to logistics and security requirements. Reporting of measured sound level signals will include the average, minimum, and maximum rms value and frequency spectra for each pile monitored. Peak and single-strike SEL values would also be reported for impact pile driving. Acoustic monitoring would be conducted in association with Project 1A (impact driving of 18–24'' concrete piles and vibratory removal of 16'' timber piles); Project 2 (impact driving of 14'' steel H piles); Project 4A (impact driving of 18–24'' concrete piles and vibratory removal of 24'' concrete piles); and Projects 6A and 6B (vibratory removal of 24'' concrete piles).

Marine Mammal Surveys

Subject to funding availability, additional work would be performed to describe the spatial and temporal distributions of bottlenose dolphins and their densities in areas that may be affected by the specified activities. Surveys would be performed as soon as practicable.

Reporting

A draft report would be submitted to NMFS within 90 days of the completion of the monitoring period for each project. The report will include marine mammal observations pre-activity, during-activity, and post-activity during pile driving days, and will also provide descriptions of any behavioral responses to construction activities by marine mammals and a complete description of all mitigation shutdowns and the results of those actions and an extrapolated total take estimate based on the number of marine mammals observed during the course of construction. A final report must be submitted within thirty days following resolution of comments on the draft report. The Navy would also submit a comprehensive summary report following conclusion of the specified activities.

Adaptive Management

The regulations governing the take of marine mammals incidental to Navy waterfront construction activities would contain an adaptive management component.

The reporting requirements associated with this proposed rule are designed to provide NMFS with monitoring data from the previous year to allow consideration of whether any changes are appropriate. The use of adaptive management allows NMFS to consider new information from different sources to determine (with input from the Navy regarding practicability) on an annual or biennial basis if mitigation or monitoring measures should be modified (including additions or deletions). Mitigation measures could be modified if new data suggests that such modifications would have a reasonable likelihood of reducing adverse effects to marine mammals and if the measures are practicable.

The following are some of the possible sources of applicable data to be considered through the adaptive management process: (1) Results from monitoring reports, as required by MMPA authorizations; (2) results from general marine mammal and sound research; and (3) any information which reveals that marine mammals may have been taken in a manner, extent, or number not authorized by these regulations or subsequent LOAs.

Impact on Availability of Affected Species for Taking for Subsistence Uses

There are no relevant subsistence uses of marine mammals implicated by these actions. Therefore, we have determined that the total taking of affected species or stocks would not have an unmitigable adverse impact on the availability of such species or stocks for taking for subsistence purposes.

Endangered Species Act (ESA)

No marine mammal species listed under the ESA are expected to be affected by these activities. Therefore, we have determined that section 7 consultation under the ESA is not required.

National Environmental Policy Act (NEPA)

The Navy has prepared a draft EA in accordance with NEPA and the regulations published by the Council on Environmental Quality. We have posted it on the NMFS Web site concurrently with the publication of these proposed regulations. NMFS will independently evaluate the EA and determine whether or not to adopt it. We may prepare a separate NEPA analysis and incorporate relevant portions of the Navy's EA by reference. Information in the Navy's application, EA, and this notice collectively provide the environmental information related to proposed issuance of the regulations for public review and comment. We will review all comments submitted in response to this notice as we complete the NEPA process, including a decision of whether to sign a FONSI, prior to a final decision on the request for incidental take authorization.

Request for Information

NMFS requests interested persons to submit comments, information, and suggestions concerning the Navy's request and the proposed regulations (see **ADDRESSES**). All comments will be reviewed and evaluated as we prepare the final rule and make final determinations on whether to issue the requested authorizations. This notice and referenced documents provide all environmental information relating to our proposed action for public review.

Classification

Pursuant to the procedures established to implement Executive Order 12866, the Office of Management and Budget has determined that this proposed rule is not significant.

Pursuant to section 605(b) of the Regulatory Flexibility Act (RFA), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration that this proposed rule, if adopted, would not have a significant economic impact on a substantial number of small entities. Navy is the sole entity that would be subject to the requirements in these proposed regulations, and the U.S. Navy is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA. Because of this certification, a regulatory flexibility analysis is not required and none has been prepared.

This proposed rule does not contain a collection-of-information requirement subject to the provisions of the Paperwork Reduction Act (PRA) because the applicant is a Federal agency. Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the PRA unless that collection of information displays a currently valid OMB control number. These requirements have been approved by OMB under control number 0648–0151 and include applications for regulations, subsequent LOAs, and reports.

List of Subjects in 50 CFR Part 217

Exports, Fish, Imports, Indians, Labeling, Marine mammals, Penalties, Reporting and recordkeeping requirements, Seafood, Transportation.

Dated: December 22, 2016.

Samuel D. Rauch III,

Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

For reasons set forth in the preamble, 50 CFR part 217 is proposed to be amended as follows:

PART 217—REGULATIONS GOVERNING THE TAKING AND IMPORTING OF MARINE MAMMALS

■ 1. The authority citation for part 217 continues to read as follows:

Authority: 16 U.S.C. 1361 *et seq.*

Subpart X [Reserved]

■ 2. Add and reserve subpart X.

Subpart Y [Reserved]

■ 3. Add and reserve subpart Y.

■ 4. Add subpart Z to part 217 to read as follows:

Subpart Z—Taking Marine Mammals Incidental to Navy Waterfront Construction Activities at Naval Submarine Base Kings Bay

§ 217.250 Specified activity and specified geographical region.

(a) Regulations in this subpart apply only to the U.S. Navy (Navy) and those persons it authorizes or funds to conduct activities on its behalf for the taking of marine mammals that occurs in the area outlined in paragraph (b) of this section and that occurs incidental to waterfront construction activities.

(b) The taking of marine mammals by Navy may be authorized in a Letter of Authorization (LOA) only if it occurs within waters adjacent to Naval Submarine Base Kings Bay and Crab Island.

§ 217.251 Effective dates.

Regulations in this subpart are effective from [EFFECTIVE DATE OF FINAL RULE] through [DATE 5 YEARS AFTER EFFECTIVE DATE OF FINAL RULE].

§ 217.252 Permissible methods of taking.

(a) Under LOAs issued pursuant to §§ 216.106 and 217.256 of this chapter, the Holder of the LOA (hereinafter ''Navy'') may incidentally, but not intentionally, take marine mammals within the area described in § 217.250(b) of this chapter by Level B harassment associated with waterfront construction activities, provided the activity is in compliance with all terms, conditions, and requirements of the regulations in this subpart and the appropriate LOA.

§ 217.253 Prohibitions.

Notwithstanding takings contemplated in § 217.250 and authorized by a LOA issued under §§ 216.106 and 217.256 of this chapter, no person in connection with the activities described in § 217.250 of this chapter may:

(a) Violate, or fail to comply with, the terms, conditions, and requirements of this subpart or a LOA issued under §§ 216.106 and 217.256 of this chapter;

(b) Take any marine mammal not specified in such LOAs;

(c) Take any marine mammal specified in such LOAs in any manner other than as specified;

(d) Take a marine mammal specified in such LOAs if NMFS determines such taking results in more than a negligible impact on the species or stocks of such marine mammal; or

(e) Take a marine mammal specified in such LOAs if NMFS determines such taking results in an unmitigable adverse impact on the species or stock of such marine mammal for taking for subsistence uses.

§ 217.254 Mitigation requirements.

When conducting the activities identified in § 217.250 of this chapter, the mitigation measures contained in any LOA issued under §§ 216.106 and 217.256 of this chapter must be implemented. These mitigation measures shall include but are not limited to:

(a) General conditions: (1) A copy of any issued LOA must be in the possession of the Navy, its designees, and work crew personnel operating under the authority of the issued LOA.

(2) The Navy shall conduct briefings for construction supervisors and crews, marine mammal monitoring team, acoustic 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.

(b) Except for pile driving covered under subsections (c) and (d), for all pile driving activity, the Navy shall implement a minimum shutdown zone of 15 m radius around the pile. If a marine mammal comes within or approaches the shutdown zone, such operations shall cease.

(c) For impact pile driving associated with Project 3F (Warping Wharf with Capstan), the Navy shall implement a minimum shutdown zone of 40 m radius around the pile. If a marine mammal comes within or approaches the shutdown zone, such operations shall cease.

(d) For impact pile driving associated with Project 4B (Small Craft Berth Site VI), the Navy shall implement a minimum shutdown zone of 20 m radius around the pile. If a marine mammal comes within or approaches the shutdown zone, such operations shall cease.

(e) The Navy shall deploy marine mammal observers as indicated in the final Marine Mammal Monitoring Plan and as described in § 217.255 of this chapter.

(1) For all pile driving activities, a minimum of one observer shall be stationed at the active pile driving rig or reasonable proximity in order to monitor the shutdown zone.

(2) Monitoring shall take place from 15 minutes prior to initiation of pile driving activity through 30 minutes post-completion of pile driving activity. Pre-activity monitoring shall be conducted for 15 minutes to ensure that the shutdown zone is clear of marine mammals, and pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animals shall be allowed to remain in the shutdown zone (*i.e.,* must leave of their own volition) and their behavior shall be monitored and documented. Monitoring shall occur throughout the time required to drive a pile. The shutdown zone must be determined to be clear during periods of good visibility (*i.e.,* the entire shutdown zone and surrounding waters must be visible to the naked eye).

(3) If a marine mammal approaches or enters the shutdown zone, all pile driving activities at that location shall be halted. If pile driving is halted or delayed due to the presence of a marine

mammal, the activity may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or fifteen minutes have passed without re-detection of the animal.

(4) Monitoring shall be conducted by trained observers, who shall have no other assigned tasks during monitoring periods. Trained observers shall be placed from the best vantage point(s) practicable to monitor for marine mammals and implement shutdown or delay procedures when applicable through communication with the equipment operator.

(f) The Navy shall use soft start techniques for impact pile driving. Soft start for impact drivers requires contractors to provide an initial set of strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets. Soft start shall be implemented at the start of each day's impact pile driving and at any time following cessation of impact pile driving for a period of thirty minutes or longer.

(g) Pile driving shall only be conducted during daylight hours.

§ 217.255 Requirements for monitoring and reporting.

(a) Trained observers shall complete applicable portions of the Navy's Marine Species Awareness Training, as well as a general environmental awareness briefing conducted by Navy staff. At minimum, training shall include identification of bottlenose dolphins and relevant mitigation and monitoring requirements. All observers shall have no other construction-related tasks while conducting monitoring.

(b) For shutdown zone monitoring, the Navy shall report on implementation of shutdown or delay procedures, including whether the procedures were not implemented and why (when relevant).

(c) The Navy shall deploy additional observers to monitor disturbance zones according to the minimum requirements defined in this chapter. These observers 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, and shall communicate with the shutdown zone observer as appropriate with regard to the presence of marine mammals. All observers shall be trained in identification and reporting of marine mammal behaviors.

(1) During Project 1A (Tug Pier), Navy shall deploy a minimum of three additional marine mammal monitoring observers on a minimum of ten days of vibratory pile driving activity.

(2) During the fiscal year 2022 phase of Project 3A (Explosives Handling Wharf #2), Navy shall deploy a minimum of three additional marine mammal monitoring observers on a minimum of three days of vibratory pile driving activity.

(3) During Project 3B ((Dry Dock) Interface Wharf), Navy shall deploy a minimum of three additional marine mammal monitoring observers on a minimum of five days of vibratory pile driving activity.

(4) During Projects 3C, 3D, and 3E (Refit Wharves #1–3), Navy shall deploy a minimum of two additional marine mammal monitoring observers on all days of vibratory pile driving activity.

(5) During Project 3F (Warping Wharf with Capstan), Navy shall deploy a minimum of three additional marine mammal monitoring observers on a minimum of two days of vibratory pile driving activity.

(6) During Project 3G (Tug Pier), Navy shall deploy a minimum of three additional marine mammal monitoring observers on a minimum of four days of vibratory pile driving activity.

(7) During Project 4A (Transit Protection System (TPS) Pier), Navy shall deploy a minimum of four additional marine mammal monitoring observers on a minimum of eight days of vibratory pile driving activity.

(8) During Project 4B (Small Craft Berth Site VI), Navy shall deploy a minimum of four additional marine mammal monitoring observers on a minimum of three days of vibratory pile driving activity.

(9) During Project 5 (Magnetic Silencing Facility Repairs), Navy shall deploy a minimum of four additional marine mammal monitoring observers on a minimum of three days of vibratory pile driving activity.

(10) During Projects 6A (Demolition of TPS Pier) and 6B (Demolition of North Trestle), Navy shall deploy a minimum of five additional marine mammal monitoring observers on a minimum of twelve days of vibratory pile driving activity.

(d) The Navy shall conduct acoustic data collection (sound source verification), in accordance with NMFS's guidelines, in conjunction with Project 1A (Tug Pier), Project 2 (Unspecified Minor Construction Layberth Fender Pile Modification), and Projects 4A and 6A (TPS Pier).

(e) Reporting: (1) Annual reporting: (i) Navy shall submit an annual summary report to NMFS not later than ninety days following the end of in-water work for each project. Navy shall provide a final report within thirty days following resolution of comments on the draft report.

(ii) These reports shall contain, at minimum, the following:

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

(B) Construction activities occurring during each observation period;

(C) Weather parameters (*e.g.,* wind speed, percent cloud cover, visibility);

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

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

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

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

(H) Description of implementation of mitigation measures (*e.g.,* shutdown or delay);

(I) Locations of all marine mammal observations; and

(J) Other human activity in the area.

(2) Navy shall submit a comprehensive summary report to NMFS not later than ninety days following the conclusion of marine mammal monitoring efforts described in this chapter.

(3) Navy shall submit acoustic monitoring reports as necessary pursuant to § 217.255(d) of this chapter.

(f) Reporting of injured or dead marine mammals:

(1) In the unanticipated event that the activity defined in § 217.250 clearly causes the take of a marine mammal in a prohibited manner, Navy shall immediately cease such activity and report the incident to the Office of Protected Resources (OPR), NMFS, and to the Southeast Regional Stranding Coordinator, NMFS. Activities shall not resume until NMFS is able to review the circumstances of the prohibited take. NMFS will work with Navy to determine what measures are necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. Navy may not resume their activities until notified by NMFS. The report must include the following information:

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

(ii) Description of the incident;

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

(iv) Description of all marine mammal observations in the 24 hours preceding the incident;

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

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

(vii) Photographs or video footage of the animal(s). Photographs may be taken once the animal has been moved from the waterfront area.

(2) In the event that Navy discovers an injured or dead marine mammal and determines that the cause of the injury or death is unknown and the death is relatively recent (*e.g.,* in less than a moderate state of decomposition), Navy shall immediately report the incident to OPR and the Southeast Regional Stranding Coordinator, NMFS. The report must include the information identified in paragraph (f)(1) of this section. Activities may continue while NMFS reviews the circumstances of the incident. NMFS will work with Navy to determine whether additional mitigation measures or modifications to the activities are appropriate.

(3) In the event that Navy discovers an injured or dead marine mammal and determines that the injury or death is not associated with or related to the activities defined in § 217.250 (*e.g.,* previously wounded animal, carcass with moderate to advanced decomposition, scavenger damage), Navy shall report the incident to OPR and the Southeast Regional Stranding Coordinator, NMFS, within 24 hours of the discovery. Navy shall provide photographs or video footage or other documentation of the stranded animal sighting to NMFS. Photographs may be taken once the animal has been moved from the waterfront area.

§ 217.256 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to these regulations, Navy must apply for and obtain a LOA.

(b) A LOA, unless suspended or revoked, may be effective for a period of time not to exceed the expiration date of these regulations.

(c) If a LOA expires prior to the expiration date of these regulations, Navy may apply for and obtain a renewal of the LOA.

(d) In the event of projected changes to the activity or to mitigation and monitoring measures required by a LOA, Navy must apply for and obtain a modification of the LOA as described in § 217.257 of this chapter.

(e) The LOA shall set forth:

(1) Permissible methods of incidental taking;

(2) Means of effecting the least practicable adverse impact (*i.e.,* mitigation) on the species, its habitat, and on the availability of the species for subsistence uses; and

(3) Requirements for monitoring and reporting.

(f) Issuance of the LOA shall be based on a determination that the level of taking will be consistent with the findings made for the total taking allowable under these regulations.

(g) Notice of issuance or denial of a LOA shall be published in the **Federal Register** within thirty days of a determination.

§ 217.257 Renewals and modifications of Letters of Authorization.

(a) A LOA issued under §§ 216.106 and 217.256 of this chapter for the activity identified in § 217.250 shall be renewed or modified upon request by the applicant, provided that:

(1) The proposed specified activity and mitigation, monitoring, and reporting measures, as well as the anticipated impacts, are the same as those described and analyzed for these regulations (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section), and

(2) NMFS determines that the mitigation, monitoring, and reporting measures required by the previous LOA under these regulations were implemented.

(b) For a LOA modification or renewal requests by the applicant that include changes to the activity or the mitigation, monitoring, or reporting (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section) that do not change the findings made for the regulations or that result in no more than a minor change in the total estimated number of takes (or distribution by species or years), NMFS may publish a notice of proposed LOA in the **Federal Register**, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) A LOA issued under §§ 216.106 and 217.256 of this chapter for the activity identified in § 217.250 may be modified by NMFS under the following circumstances:

(1) Adaptive Management—NMFS may modify (including augment) the existing mitigation, monitoring, or reporting measures (after consulting with Navy regarding the practicability of the modifications) if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring set forth in the preamble for these regulations.

(i) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in a LOA:

(A) Results from Navy's monitoring from previous years.

(B) Results from other marine mammal and/or sound research or studies.

(C) Any information that reveals marine mammals may have been taken in a manner, extent or number not authorized by these regulations or subsequent LOAs.

(ii) If, through adaptive management, the modifications to the mitigation, monitoring, or reporting measures are substantial, NMFS will publish a notice of proposed LOA in the **Federal Register** and solicit public comment.

(2) Emergencies—If NMFS determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in a LOA issued pursuant to §§ 216.106 and 217.256 of this chapter, a LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the **Federal Register** within thirty days of the action.

§ 217.258 [Reserved]

§ 217.259 [Reserved]

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