DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 230104–0003]

RIN 0648–BL78

Taking and Importing Marine Mammals; Taking Marine Mammals Incidental to U.S. Navy Construction at Portsmouth Naval Shipyard, Kittery, Maine

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 construction at the Portsmouth Naval Shipyard in Kittery, Maine, over the course of five years (2023–2028). Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is proposing regulations to govern that take and requests comments on the proposed regulations. NMFS responses to comments will be included in the notice of the final decision.

DATES: Comments and information must be received no later than February 17, 2023.

ADDRESSES: A copy of the Navy's application and any supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/action/incidental-take-authorization-us-navy-construction-portsmouth-naval-shipyard-kittery-maine-0.* In case of problems accessing these documents, please call the contact listed below.

Submit all electronic public comments via the Federal e-Rulemaking Portal. Go to *www.regulations.gov* and enter NOAA–NMFS–2022–0133 in the Search box. Click on the ''Comment'' icon, complete the required fields, and enter or attach your comments.

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: Reny Tyson Moore, Office of Protected Resources, NMFS, *ITP.tyson.moore@noaa.gov,* (301) 427–8401.

SUPPLEMENTARY INFORMATION:

Purpose and Need for Regulatory Action

We received an application from the Navy requesting 5-year regulations and authorization to take multiple species of marine mammals. This proposed rule would establish a framework under the authority of the MMPA (16 U.S.C. 1361 *et seq.*) to allow for the authorization of take by Level A and Level B harassment of marine mammals incidental to the Navy's construction activities related to the multifunctional expansion and modification of Dry Dock 1 at the Portsmouth Naval Shipyard in Kittery, Maine. Please see ''Background'' 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 5 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 and other means of effecting the ''least practicable adverse impact'' on the affected species or stocks and their habitat (see the discussion below in the Proposed Mitigation section), 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 5-year regulations, and for any subsequent Letters of Authorization (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 the Navy's construction activities. These measures include:

• Required monitoring of the in-water construction areas to detect the presence of marine mammals before beginning in-water construction activities;

• Shutdown of in-water 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; and

• Implementation of a bubble curtain during rock hammering and down-the-hole (DTH) cluster drilling to reduce underwater noise impacts.

Background

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

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

National Environmental Policy Act

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

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

Information in the Navy's application and this document collectively provide the environmental information related to the proposed issuance of these regulations and subsequent incidental take authorization for public review and comment. We will review all comments submitted in response to this document prior to concluding our review process under NEPA and making a final decision on the request for an incidental take authorization.

Summary of Request

On May 9, 2022, NMFS received a request from the Navy for authorization to take marine mammals incidental to construction activities related to the multifunctional expansion and modification of Dry Dock 1 at Portsmouth Naval Shipyard in Kittery, Maine. We provided comments on the application, and the Navy submitted revised versions and responses to our comments on July 5, 2022, August 15, 2022, August 19, 2022, and August 25, 2022, with the latter version deemed adequate and complete. On September 1, 2022, we published a notice of receipt of the Navy's application in the **Federal Register** (87 FR 53731), requesting comments and information related to the request. During the 30-day comment period, we received two supportive letters from private citizens.

On October 19 and 25, 2022, NMFS was notified by the Navy of project modifications and shifting Fleet submarine schedules that required the resequencing of certain activities associated with the construction at Dry Dock 1 in order to accommodate the modifications and meet the new vessel docking demands. On October 31, 2022, the Navy submitted an addendum to its application describing these changes. The requested regulations would be valid for 5 years, from April 1, 2023 through March 31, 2028. The Navy's request is to be authorized to take five species by Level A and Level B harassment. Neither the Navy nor NMFS expect serious injury or mortality to result from this activity.

NMFS previously issued five IHAs to the Navy for waterfront improvement work at the Portsmouth Naval Shipyard: in 2016 (81 FR 85525; November 28, 2016), 2018 (83 FR 3318; January 24, 2018), 2019 (84 FR 24476; May 28, 2019), a renewal of the 2019 IHA (86 FR 14598; March 17, 2021), and in 2022 (87 FR 19886; April 6, 2022). The most recent IHA (87 FR 19886) provided authorization to take marine mammals during the first year of the construction project described in this notice. As required, the applicant provided monitoring reports (available at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-construction-activities*) which confirm that the applicant has implemented the required mitigation and monitoring, and which also shows that no impacts of a scale or nature not previously analyzed or authorized have occurred as a result of the activities conducted.

Description of Proposed Activity

Overview

Multifunctional Expansion of Dry Dock 1 (P–381) is one of three projects that support the overall expansion and modification of Dry Dock 1, located in the western extent of the Portsmouth Naval Shipyard. The two additional projects, construction of a super flood basin (P–310) and extension of portal crane rail and utilities (P–1074), are currently under construction. In-water work associated with these projects was completed under the aforementioned separate IHAs issued by NMFS. The projects have been phased to support Navy mission schedules. P–381 will be constructed within the same footprint of the super flood basin over an approximate 7-year period, during which 5 years of in-water work would occur. An IHA was issued by NMFS for the first year of P–381 construction activities between April 1, 2022 and March 31, 2023 (87 FR 19866; April 6, 2022). This request is associated with the remaining 4 years of P–381 in-water construction activities planned to occur from April 1, 2023 through March 31, 2028, as well as for additional in-water construction activities associated with the removal of emergency repair components of the super flood basin that will occur during the proposed period of effectiveness for the proposed regulations. Although the in-water construction described in this proposed rule is anticipated to be completed by December 2026, unanticipated schedule delays could result in the Navy conducting construction activity over the full 5 years.

The purpose of the proposed project (P–381) is to modify the super flood basin to create two additional dry docking positions (Dry Dock 1 North and Dry Dock 1 West) in front of the existing Dry Dock 1 East. The Navy's specified activity also includes emergency repairs of the P–310 super flood basin. Construction activities will include the excavation and/or installation of 1,118 holes, 198 shafts, and 580 sheet piles via impact and vibratory pile driving, hydraulic rock hammering, rotary drilling, and mono and cluster DTH. The construction activities are expected to require approximately 2,498 days if the activities are considered independently over the 5-year period. However, the actual construction duration is expected to be within four years as many of the construction activities will occur concurrently. Harbor porpoises (*Phocoena phocoena*), harbor seals (*Phoca vitulina*), gray seals (*Halichoerus grypus*), and harp seals (*Pagophilus groenlandicus*) have been observed in the proposed action area. In addition, hooded seals (*Cystophora cristata*) could occur in the proposed action area.

Dates and Duration

The in-water construction activities associated with this proposed rule are anticipated to begin in April 2023 and proceed to December 2026 (4 years); however, the request for incidental take authorization is for 5 years in the event of unexpected scheduled delays. In-water construction activities would occur consecutively over a 4-year period. The Navy plans to conduct all in-water work activities with expected potential for incidental harassment of marine mammals during daylight hours.

Table 1 provides the estimated schedule and production rates for P–381 construction activities. Many of the activities included in Table 1 would span across multiple construction years and/or would occur concurrently. Because of mission requirements and operational schedules at the dry docking positions and berths, this schedule is subject to change. In-water construction activities for P–381 would occur consecutively over a 4-year period. Note, for the purposes of this analysis, the proposed construction years are identified as years 2 through 5; Year 1 of the Navy's construction activities is currently ongoing in association with a previously issued IHA (87 FR 19886; April 6, 2022). Vibratory pile driving and extraction is assumed to occur for 141 days. Impact pile driving would occur for 34 days. DTH excavation (mono-hammer and cluster drill) would occur for 1,446 days. Rotary drilling would occur for 238 days (assuming that casings and sockets for cluster drills would be set, excavated, and removed in a single day). Rock hammering would occur for 277 days. Note that pile driving days are not necessarily consecutive, and certain activities may occur at the same time, decreasing the total number of actual in-water construction days. The contractor could be working in more than one area of the berths at a time.

TABLE 1—IN-WATER CONSTRUCTION ACTIVITIES

Activity ID	Activity	Total amount and estimated dates (construction years *)	Activity component	Method	Daily production rate	Total production days
A1 [1]	Center Wall—Install Foundation Support Piles.	Drill 18 shafts Apr 23 [3] to Aug 23 (2).	Install 102-inch diameter outer casing.	Rotary drill	1 shaft/day,1 hour/day ...	[4] 18
A2 [1]			Pre-drill 102-inch diameter socket.	Rotary drill	1 shaft/day, 9 hours/day	[4] 18
A3 [1]			Remove 102-inch outer casing.	Rotary drill	1 casing/day,15 minutes/casing.	[4] 18
A4 [1]			Drill 78-inch diameter shaft.	Cluster drill DTH	6.5 days/shaft, 10 hours/day.	[4] 117
R [1]	Dry Dock 1 North Entrance—Install Temporary Cofferdam.	Install 48 sheet piles Apr 23 [3] to May 23 (2).	28-inch wide Z-shaped sheets.	Impact with initial vibratory set.	8 sheets/day, 5 minutes and 300 blows/pile.	[4] 6
1	Berth 11—Remove Shutter Panels.	Remove 112 panels Apr 23 [3] to May 23 (2).	Concrete shutter panels	Hydraulic rock hammering.	5 hours/day	[4] 56
2	Berth 1— Remove Sheet Piles.	Remove 168 sheet piles Apr 23 [3] to Jun 24 (2, 3).	25-inch-wide Z- shaped	Vibratory extraction	4 piles/day	[4] 42
3	Berth 1—Remove Granite Block Quay Wall.	2,800 cubic yards (cy) Apr 23 [3] to Jun 24 (2, 3).	Removal of granite blocks.	Hydraulic rock hammering.	2.5 hours/day	[4] 47
4	Berth 1—Top of Wall Removal for Waler Installation.	320 linear feet (lf) Apr 23 [3] to Jun 24 (2, 3).	Mechanical concrete removal.	Hydraulic rock hammering.	10 hours/day	[4] 74
5	Berth 1—Install southeast corner Support of Excavation (SOE).	Install 28 sheet piles Apr 23 to Jul 23 (2).	28-inch-wide Z-shaped ..	Impact with initial vibratory set.	4 piles/day, 5 minutes/pile and 300 blows/pile.	[4] 8
6	Berth 11—Mechanical Rock Removal at Basin Floor.	700 cy Apr 23 [3] to Aug 23 (2).	Excavate Bedrock	Hydraulic rock hammering.	12 hours/day	[34] 60
7	Berth 11 Face—Mechanical Rock Removal at Basin Floor.	Drill 924 relief holes Apr 23 [3] to Aug 23 (2).	4–6 inch diameter holes	DTH mono-hammer	27 holes/day, 22 min/hole.	[4] 35
8	Install Temporary Cofferdam Extension.	Install 14 sheet piles Apr 23 to Jun 23 (2).	28-inch-wide Z-shaped ..	Impact with initial vibratory set.	4 piles/day, 5 minutes/pile and 300 blows/pile.	4
9a	Gantry Crane Support Piles at Berth 1 West.	Drill 16 shafts Apr 23 to Aug 23 (2).	Set 102-inch diameter casing.	Rotary drill	1 shaft/day, 1 hours/day	16
9b			Pre-drill 102-inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	16
9c			Remove 102- inch casing.	Rotary drill	1 casing/day 15, minutes/casing.	16
9d			72-inch diameter shafts	Cluster drill DTH	5 days/shaft, 10 hours/day.	80
10 [2]	Berth 1—Mechanical Rock Removal at Basin Floor.	300 cy Apr 23 [3] to Sep 23 (2).	Excavate Bedrock	Hydraulic rock hammering.	13 cy/day 12 hours/day	[5] 25
11	Dry Dock 1 North Entrance—Drill Tremie Tie Downs.	Drill 50 rock anchors Apr 23 [3] to Oct 23 (2).	9-inch diameter holes	DTH mono-hammer	2 holes/day, 5 hours/hole	[4] 25
12	Center Wall—Install Tie-In to Existing West Closure Wall.	Install 15 sheet piles Apr 23 to Dec 23 (2).	28-inch wide Z- shaped	Impact with initial vibratory set.	4 piles/day 5 minutes/pile and 300 blows/pile.	4
13a	Dry Dock 1 North—Temporary Work Trestle Piles.	Drill 20 shafts May 23 to Nov 24 (2, 3).	Set 102-inch diameter casing.	Rotary drill	1 shaft/day, 1 hours/day	20
13b			Pre-drill 102- inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	20
13c			Remove 102- inch casing.	Rotary drill	1 casing/day, 15 minutes/casing.	20
13d			84-inch diameter shafts	Cluster drill DTH	3.5 days/shaft, 10 hours/day.	70
14	Dry Dock 1 North—Remove Temporary Work Trestle Piles.	Remove 20 piles May 23 to Nov 24 (2, 3).	84-inch diameter drill piles.	Rotary drill	1 day/pile, 15 minutes/pile.	20
15a	Dry Dock 1 North—Install Leveling Piles (Diving Board Shafts).	Drill 18 shafts May 23 to Nov 24 (2, 3).	Set 84-inch casing	Rotary drill	1 shaft/day, 1 hours/day	18
15b			Pre-drill 84-inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	18
15c			Remove 84-inch casing	Rotary drill	1 casing/day, 15 minutes/casing.	18

TABLE 1—IN-WATER CONSTRUCTION ACTIVITIES—Continued

Activity ID	Activity	Total amount and estimated dates (construction years *)	Activity component	Method	Daily production rate	Total production days
15d			78-inch diameter shaft	Cluster drill DTH	7.5 days/shaft, 10 hours/day.	135
16a	Wall Support Shafts for Dry Dock 1 North (Berth 11 Face and Head Wall).	Drill 20 shafts Jun 23 to Nov 24 (2, 3).	Set 102-inch diameter casing.	Rotary drill	1 shaft/day, 1 hours/day	20
16b			Pre-drill 102-inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	20
16c			Remove 102-inch casing	Rotary drill	1 casing/day, 15 minutes/casing.	20
16d			Drill 78-inch diameter shaft.	Cluster drill DTH	7.5 days/shaft, 10 hours/day.	150
17a	Foundation (Floor) Shafts for Dry Dock 1 North (Foundation Support Piles).	Drill 23 shafts Jun 23 to Nov 24 (Const. years 2, 3).	Set 126-inch diameter Casing.	Rotary drill	1 shaft/day, 1 hours/day	23
17b			Pre-drill 126-inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	23
17c			Remove 126-inch casing	Rotary drill	1 casing/day, 60 minutes/casing.	23
17d			Drill 108-inch diameter shafts.	Cluster drill DTH	8.5 days/shaft, 10 hours/day.	196
18	Berth 11 End Wall—Remove Temporary Guide Wall.	Remove 60 sheet piles Jul 23 to Aug 23 (2, 3).	28-inch wide Z- shaped	Vibratory extraction	8 piles/day, 5 minutes/pile.	[5] 10
19	Remove Berth 1 southeast corner SOE.	Remove 28 sheet piles Jul 23 to Sep 23 (2).	28-inch-wide Z-shaped	Vibratory extraction	8 piles/day, 5 minutes/pile.	[4] 5
20 [2]	Removal of Berth 1 Emergency Repair Sheet Piles.	Remove 108 sheet piles Apr 23 [3] to Jul 23 (2).	28-inch-wide Z-shaped	Vibratory extraction	6 piles/day, 5 minutes/pile.	18
21 [2]	Removal of Berth 1 Emergency Repair Tremie Concrete.	500 cy Apr 23 [3] to Aug 23 (2).	Mechanical concrete removal.	Hydraulic rock hammering.	4 hours/day	15
22	Center Wall Foundation—Drill in Monolith Tie Downs.	Install 72 rock anchors Aug 23 to May 24 (2, 3).	9-inch diameter holes	DTH mono- hammer	2 holes/day, 5 hours/hole	36
23	Center Wall—Remove Tie-In to Existing West Closure Wall (Dry Dock 1 North) [4].	Remove 16 sheet piles [6] Aug 23 to Aug 24 (2, 3).	28-inch-wide Z- shaped	Vibratory extraction	8 piles/day, 5 minutes/pile.	[5] 3
24	Center Wall East—Sheet Pile Tie-In to Existing Wall.	Install 23 sheet piles Aug 23 to Oct 24 (2, 3).	28-inch wide Z-shaped	Impact with initial vibratory set.	2 piles/day, 5 minutes/pile and 300 blows/pile.	12
25	Remove Tie-In to West Closure Wall (Dry Dock 1 West).	Remove 15 sheet pile Dec 23 to Dec 24 (2, 3).	28-inch wide Z- shaped	Vibratory extraction	8 piles/day, 5 minutes/pile.	[5] 3
26	Remove Center Wall East—Sheet Pile Tie-In to Existing Wall (Dry Dock 1 West).	Remove 23 sheet piles Dec 23 to Dec 24 (2, 3).	28-inch wide Z-shaped	Vibratory extraction	8 piles/day, 5 minutes/pile.	[5] 12
27	Dry Dock 1 North Entrance—Remove Temporary Cofferdam.	Remove 96 sheet piles Jan 24 to Sep 24 (Const. years 2, 3).	28-inch wide Z-shaped	Vibratory extraction	8 piles/day, 5 minutes/pile.	12
28	Remove Temporary Cofferdam Extension.	Remove 14 sheet piles Jan 24 to Sep 24 (2, 3).	28-inch wide Z-shaped	Vibratory extraction	8 piles/day, 5 minutes/pile.	2
29a	Dry Dock 1 West—Install Temporary Work Trestle Piles.	Drill 20 shafts Apr 24 to Feb 26 (3, 4).	Set 102-inch diameter casing.	Rotary drill	1 shaft/day, 1 hours/day	20
29b			Pre-drill 102-inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	20
29c			Remove 102-inch casing	Rotary drill	1 casing/day, 15 minutes/casing.	20
29d			84-inch diameter shafts	Cluster drill DTH	3.5 days/shaft, 10 hours/day.	70
30	Dry Dock 1 West—Remove Temporary Work Trestle Piles.	Remove 20 piles Apr 24 to Feb 26 (3, 4).	84-inch diameter piles	Rotary drill	1 day/pile, 15 minutes/pile.	20
31a	Wall Support Shafts for Dry Dock 1 West (Berth 1 Face).	Drill 22 shafts Jun 24 to Feb 26 (3, 4).	Set 102-inch diameter casing.	Rotary drill	1 shaft/day, 1 hours/day	22
31b			Pre-drill 102-inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	22
31c			Remove 102-inch casing	Rotary drill	1 casing/day, 15 minutes/casing.	22
31d			78-inch diameter shaft	Cluster drill DTH	7.5 days/shaft, 10 hours/day.	165

TABLE 1—IN-WATER CONSTRUCTION ACTIVITIES—Continued

Activity ID	Activity	Total amount and estimated dates (construction years *)	Activity component	Method	Daily production rate	Total production days
32a	Foundation (Floor) Shafts for Dry Dock 1 West (Foundation Support Piles).	Drill 23 shafts Jun 24 to Feb 26 (3, 4).	Set 126-inch casing	Rotary drill	1 shaft/day, 1 hours/day	23
32b			Pre-drill 126- inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	23
32c			Remove 126- inch casing.	Rotary drill	1 casing/day, 15 minutes/casing.	23
32d			Drill 108-inch diameter shaft.	Cluster drill DTH	8.5 days/shaft, 10 hours/day.	196
33a	Dry Dock 1 West—Install Leveling Piles (Diving Board Shafts).	Drill 18 shafts Jun 24 to Feb 26 (3, 4).	Set 84-inch casing	Rotary Drill	1 shaft/day, 1 hours/day	18
33b			Pre-drill 84-inch rock socket.	Rotary drill	1 shaft/day, 9 hours/day	18
33c			Remove 84-inch casing	Rotary drill	1 casing/day, 15 minutes/casing.	18
33d			Drill 78-inch diameter shaft.	Cluster drill DTH	7.5 days/shaft, 10 hours/day.	135
34	Dry Dock 1 North—Tie Downs.	Install 36 rock anchors Jul 24 to Jul 25 (3, 4).	9-inch diameter holes	DTH mono-hammer	2 holes/day, 5 hours/hole	18
35	Dry Dock 1 West—Install Tie Downs.	Install 36 rock anchors Dec 25 to Dec 26 (4, 5).	9-inch diameter hole	DTH mono-hammer	2 holes/day, 5 hours/hole	18
Total excavated holes/drilled shafts/sheet piles.		1,118/198/580				2,498

* Note, for the purposes of this analysis, the proposed construction years are identified as years 2 through 5; potential marine mammal takes incidental to Year 1 of the Navy's construction activities were authorized under a previously issued IHA (87 FR 19886; April 6, 2022).

1 These activities were not included in the original application made available for public review during the Notice of Receipt comment period (NOR; 87 FR 53731), but have been added due to changes needed in the proposed construction schedule.

2 These activities were included in the original application, but the amount of activity proposed has been modified due to changes needed in the proposed construction schedule.

3 These activities began in construction year 1.

4 These activities began in year 1. Only the number of production days occurring in construction years 2 through 6 are presented.

5 Additional production days are included to account for equipment repositioning.

6 Sheet piles were installed in construction year 1.

Specific Geographic Region

The shipyard is located in the Piscataqua River in Kittery, Maine. The Piscataqua River originates at the boundary of Dover, New Hampshire, and Eliot, Maine (Figure 1). The river flows in a southeasterly direction for 2,093 meters (m) (13 miles (mi)) before entering Portsmouth Harbor and emptying into the Atlantic Ocean. The lower Piscataqua River is part of the Great Bay Estuary system and varies in width and depth. Many large and small islands break up the straight-line flow of the river as it continues toward the Atlantic Ocean. Seavey Island, the location of the proposed activities, is located in the lower Piscataqua River approximately 500 m, 1640 feet (ft) from its southwest bank, 200 m (656 ft) from its north bank, and approximately 4 kilometers (km) (2.5 mi) from the mouth of the river.

Water depths in the proposed project area range from 6.4 m (21 ft) to 11.9 m (39 ft) at Berths 11, 12, and 13. Water depths in the lower Piscataqua River near the proposed project area range from 4.6 m (15 ft) in the shallowest areas to 21 m (69 ft) in the deepest areas. The river is approximately 914 m (3,300 ft) wide near the proposed project area, measured from the Kittery shoreline north of Wattlebury Island to the Portsmouth shoreline west of Peirce Island. The furthest direct line of sight from the proposed project area would be 1,287 m (0.8 mi) to the southeast and 418 m (0.26 mi) to the northwest.

The nearshore environment of the Shipyard is characterized by a mix of hard bottom, gravel, soft sediments, rock outcrops, and rocky shoreline associated with fast tidal currents near the installation. The nearshore areas surrounding Seavey Island are predominately hard bottom (65 percent of benthic habitat) and gravel (26 percent) habitat, with only 9 percent soft bottom sediments within the surveyed area around Seavey Island (Tetra Tech, 2016). Much of the shoreline in the proposed project area is composed of hard shores (rocky intertidal). In general, rocky intertidal areas consist of bedrock that alternates between marine and terrestrial habitats, depending on the tide. Rocky intertidal areas consist of ''bedrock, stones, or boulders that singly or in combination cover 75 percent or more of an area that is covered less than 30 percent by vegetation'' (Federal Geographic Data Committee, 2013).

The lower Piscataqua River is home to Portsmouth Harbor and is used by commercial, recreational, and military vessels. Between 150 and 250 commercial shipping vessels transit the lower Piscataqua River each year (Magnusson *et al.,* 2012). Commercial fishing vessels are also very common in the river year-round, as are recreational vessels, which are more common in the warmer summer months. The shipyard is a dynamic industrial facility situated on an island with a narrow separation of waterways between the installation and the communities of Kittery and Portsmouth (Figure 2). The predominant noise sources from Shipyard industrial operations consist of dry dock cranes; passing vessels; and industrial equipment (*e.g.,* forklifts, loaders, rigs, vacuums, fans, dust collectors, blower belts, heating, air conditioning, and ventilation (HVAC) units, water pumps, and exhaust tubes and lids). Other components such as construction, vessel ground support equipment for maintenance purposes, vessel traffic across the Piscataqua River, and vehicle traffic on the shipyard's bridges and on local roads in Kittery and Portsmouth produce noise, but such noise generally represents a transitory contribution to the average noise level environment (Blue Ridge Research and Consulting (BRRC), 2015; ESS Group, 2015). Ambient sound levels recorded at the shipyard are considered typical of a large outdoor industrial facility and vary widely in space and time (ESS Group, 2015).

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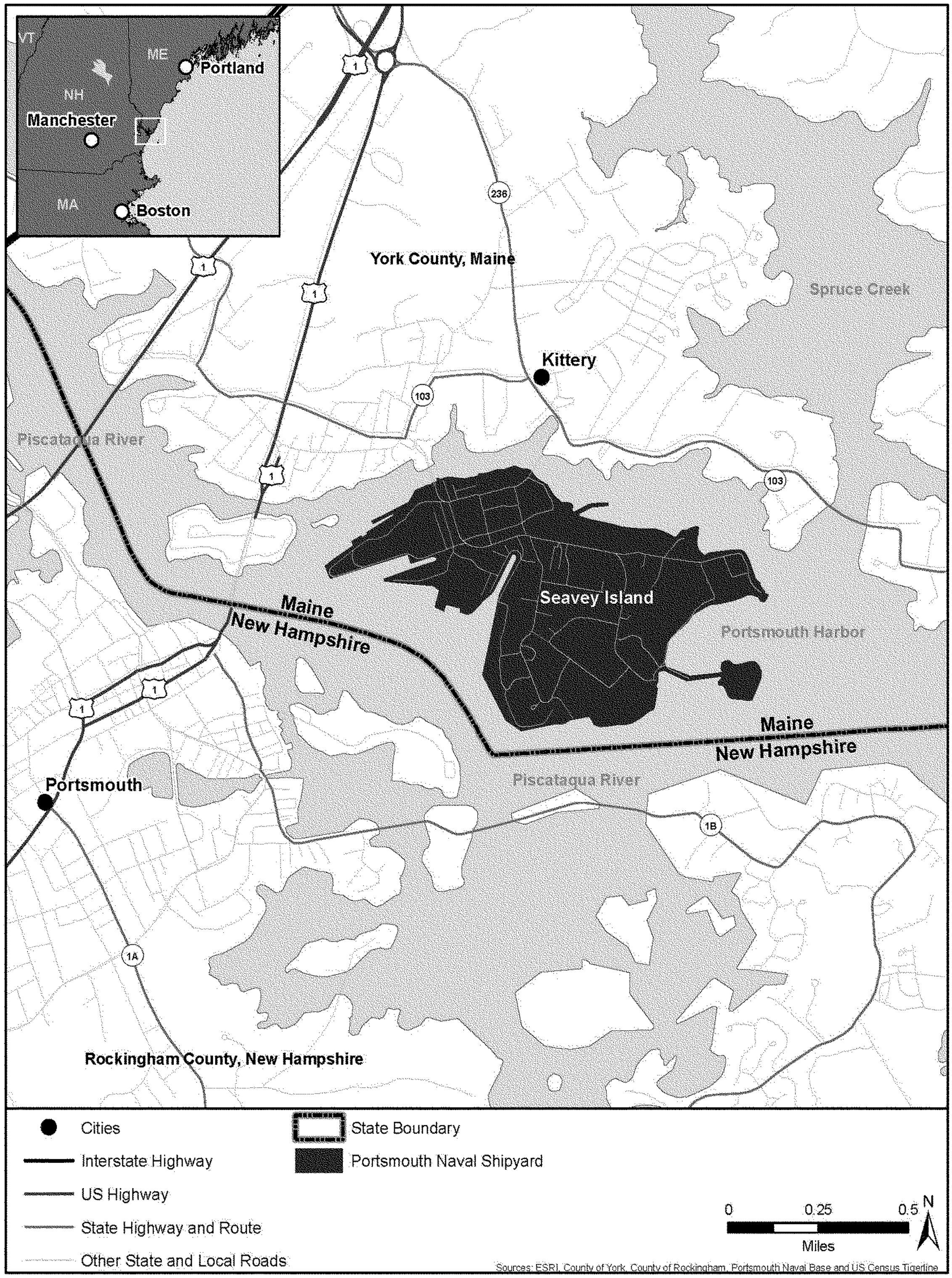

Figure 1. Site Location Map of the Project Area

Figure 2. Region of Influence for Underwater Noise for P-381 In-water Construction Activities

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Detailed Description of the Specified Activity

The Navy's proposed P–381 project would modify the super flood basin to create two additional dry docking positions (Dry Dock 1 North and Dry Dock 1 West) in front of the existing Dry Dock 1 East. The super flood basin provides the starting point for the P–381 work. Several steps are required to convert the super flood basin to a dry dock with two positions fully capable of supporting the maintenance of submarines while maintaining access to the existing interior dry dock (Dry Dock 1 East). The dry dock positions (including the center wall) will be constructed using large precast segments (referred to as monoliths) that require both sidewall and base support. The monoliths will be manufactured offsite and transported to the construction site. Segments will be floated and/or lifted into place to create the center wall, followed by Dry Dock 1 North, and finally Dry Dock 1 West. Once the monoliths are set and grouted in place, the respective dry docks can be dewatered allowing the remaining interior construction to be performed in dry conditions.

P–381 years 2 through 5 (*i.e.,* the time period of the Navy's specified activity for this proposed rule) construction activities will complete bedrock removal and the preparation of the walls and floors of the super flood basin to support the placement of the monoliths and the construction of the two dry dock positions. Most of the in-water construction will occur behind the existing super flood basin walls that would act as a barrier to sound and would contain underwater noise to within a small portion of the Piscataqua River. However, the west closure wall will be removed in order to install the Dry Dock 1 North entrance structure and caisson. In addition, the caissons may not always be in place throughout in-water construction. As such, the analyses presented herein conservatively assume the west closure wall, as well as the future caissons, would not be present throughout in-water construction activities.

The Navy's request also considers emergency repairs of the P–310 super flood basin. During P–310 super flood testing in January 2022, excessive exfiltration (*i.e.,* transport of material outside of the basin) was observed along Berths 1 and 2 and between the west closure wall and super flood basin entrance structure. Emergency structural repairs were required to reduce excessive transport of material through the berths and west closure wall/entrance structure and prevent further damage. As a result, 216 28-inch Z-shaped sheet piles were installed along the Berth 1 face. After installation, these sheet piles were cut off approximately 10 ft above the mudline and concrete was tremie placed behind them to plug any gaps in the existing structure that contributed to the exfiltration. The removal of these 216 Berth 1 emergency repair piles and excess tremie concrete (approximately 382 cubic meters, 500 cubic yards (cy)) will be completed during this LOA period and are accounted for in the Navy's request. Similarly, 10 28-inch wide, Z-shaped sheet piles were installed between the super flood basin entrance structure and the west closure wall, cut off approximately 3 m (10 ft) above the mudline, and had concrete tremie placed behind them. These 10 sheet piles will be removed during the P–381 year 1 IHA period (covered under the IHA issued by NMFS for the first year of P–381 construction activities; 87 FR 19866; April 6, 2022).

Several additional preparatory activities (*e.g.,* torch cutting, dredging, etc) will not create noise expected to result in harassment of marine mammals. Noise created during dredging of sediment and demolition debris (*e.g.,* bedrock, granite blocks, concrete) is unlikely to exceed that generated by other normal shipyard activities and is not expected to result in incidental take of marine mammals. Activities such as grouting (*i.e.,* pouring of concrete) and torch cutting are not noisy by design and would not result in incidental take of marine mammals. These activities are not addressed in the analyses of noise producing actions in the Navy's request, and are not considered by NMFS in our analysis, but are included in the work descriptions to clarify the construction progression.

P–381 In-Water Construction Activities

The proposed work remaining for P–381 can be generally grouped into five categories for ease of explanation: temporary structures, mechanical bedrock removal, continued demolition of super flood basin wall components, center wall tie-downs, and dry dock foundation and gantry crane support. Each category involves one or more activities expected to generate noise that could result in injury or harassment of marine mammals. Some of these activities are a continuation of work started in year 1, which were covered under a separate IHA issued by NMFS on April 6, 2022 (87 FR 19886).

Temporary Structures—Several temporary structures would be installed and removed to facilitate the construction of the dry docks. The conversion of the existing west closure wall to the Dry Dock 1 North entrance requires reinforcement of the section of the west closure wall that will become the new dry dock entrance. The existing west closure wall structure will be surrounded by a temporary cofferdam. The cofferdam will be constructed with 48 28-inch wide, Z-shaped sheet piles. The sheet piles will be installed using an initial vibratory set followed by driving with impact hammers to refusal.

The temporary guide wall along the Berth 11 end wall installed during year 1 (60 28-inch wide, Z-shaped sheet piles) would be removed with a vibratory hammer. An extension to the temporary cofferdam around the Dry Dock 1 entrance structure installed during P–381 year 1 would also be constructed. The extension would consist of 14 28-inch wide, Z-shaped sheet piles. The extension and the cofferdam (96 28-inch wide, Z-shaped sheet piles) would be removed in 2024 using a vibratory hammer.

A temporary work trestle would be constructed to support the excavation of large shafts within the individual dry docking positions. The trestle would be installed in Dry Dock 1 North first and then relocated to Dry Dock 1 West. The trestle system would be supported by 4 84-inch steel pipe piles and would be relocated five times within each dry dock. As a result, the piles would be installed and removed 20 times in Dry Dock 1 North and 20 times in Dry Dock 1 West. The piles would be installed with a cluster drill consisting of multiple DTH hammers and removed with a rotary drill. Before the cluster drill would be deployed, a 102-inch casing would be set into bedrock and a 5-ft (1.5-m) deep rock socket would be excavated with a rotary drill (see Figure 1–4 in the Navy's application). The socket would be filled with concrete and a second, 84-inch casing would be installed inside the larger casing and set in the concrete. No drilling would be required to install the second casing. The outer casing would then be removed with a rotary drill. The 84-inch diameter cluster drill would operate independently inside the second casing to excavate the shaft. Once the shaft is drilled the inner casing would be removed by torch cutting.

A temporary tie-in consisting of 15 28-inch wide, Z-shaped sheet piles would be installed between the center wall foundation and the west closure wall at Dry Dock 1 West. Twenty-three 28-inch wide, Z-shaped sheet piles would also be installed on the easterly end of Dry Dock 1 west to provide a similar temporary tie-in to the center wall foundation near the entrance to Dry Dock 1 east. The sheet piles would be installed using an initial vibratory set followed by driving with impact hammers. These tie-ins would be removed using a vibratory hammer along with the Dry Dock 1 North tie-in to the west closure wall (16 28-inch wide, Z-shaped sheet piles) that was installed under the P–381 year 1 IHA (87 FR 19886).

To support excavation activities along Berth 1, 28 28-inch wide, Z-shaped sheet piles would be installed at the southeast corner of the berth using a combination of vibratory and impact hammers. These piles would be removed using a vibratory hammer.

Mechanical Bedrock Removal—Mechanical removal of bedrock would be completed by the end of 2023 using various methods appropriate for the removal location and as needed to avoid damage to adjacent structures. Bedrock removal would occur along the Berth 11 face and abutment and along Berth 1.

Bedrock would be removed by breaking it up with a hydraulic hammer (*i.e.,* hoe ram or breaker). To protect adjacent structures during mechanical bedrock removal, 924 4–6-inch diameter relief holes would be drilled using a DTH mono-hammer. A total of approximately 918 cubic meters (1,200 cy) of bedrock are anticipated to be removed.

Demolition of Super Flood Basin Wall Components—Demolition of existing wall components would include the removal of shutter panels, granite quay walls, sheet piles, and concrete making up the super flood basin. Demolition of existing wall structures would be conducted using a rock hammer. Specifically, the remaining sections of the existing concrete shutter panels making up the face of Berth 11 (112 panels), portions of the granite block quay wall (2,141 cm, 2,800 cy) at Berth 1, and the remaining existing sheet pile wall at Berth 1 (168 25-inch wide, Z-shaped sheet piles) would be removed.

The installation of a structural support waler (steel beam) at Berth 1 would also be completed. To complete the installation of the waler, about 98 m (320 linear ft) of concrete wall would be demolished using a hydraulic rock hammer.

Center Wall Tie-downs—Additional work in the center wall area would involve the installation of support tie downs for future tremie concrete work. The tie downs require the placement of a total of 194 rock anchors requiring 9-inch diameter holes. The rock anchors would be installed using a DTH mono-hammer.

Dry Dock and Gantry Crane Support—The location of the future center wall requires reinforcement to allow placement of the large pre-cast monolith structures forming the separation between the two new dry docking positions. Specifically, the floor of the existing basin must be able to provide an adequate foundation for the pre-cast monoliths that will make up the dry dock interiors and center wall. The basin floor will be reinforced by excavating 18 78-inch diameter shafts throughout the footprint of the center wall that will be filled with concrete to create the structural support piles for the center wall. The shafts will be excavated using a cluster drill consisting of multiple DTH mono-hammers. Before the cluster drill is deployed, a 102-inch diameter casing would be set into bedrock and a 5 foot deep rock socket would be excavated using a 102-inch diameter rotary drill (see Figure 1–4 of the Navy's application). The rock socket would be filled with concrete and a second, 78-inch diameter casing would be installed inside the 102-inch casing and set in the concrete. No drilling is required to install the second casing. The 102-inch diameter outer casing would then be removed with a rotary drill.

The future Dry Dock 1 North and Dry Dock 1 West require significant structural reinforcement to provide an adequate foundation for the installation of the large pre-cast monolith structures forming the dry dock interior. Reinforcement of the individual dry dock foundations and walls would begin first at Dry Dock 1 North and, once completed, continue at Dry Dock 1 West. Twenty 78-inch diameter shafts would be excavated along the Berth 11 face and head wall to support the walls of Dry Dock 1 North. Along the floor of Dry Dock 1 North, 23 108-inch diameter shafts would be excavated for the installation of the foundation support piles and 18 78-inch diameter shafts would be excavated for the installation of leveling piles (*i.e.,* diving board shafts).

The dry dock foundation and wall support pile and leveling pile shafts would be filled with concrete to create the support piles for the dry dock walls and floors. The shafts would be excavated using a cluster drill consisting of multiple DTH hammers in the same manner as previously described for the temporary work trestle piles. Once the wall and foundation support piles and leveling piles for Dry Dock 1 North have been installed, foundation and wall support piles and leveling piles would be installed for Dry Dock 1 West. Twenty-two 78-inch diameter shafts would be excavated along the Berth 1 face to support the walls of Dry Dock 1 West. Twenty-three 108-inch diameter shafts would be excavated along the floor of Dry Dock 1 West for the installation of foundation support piles and 18 78-inch shafts would be excavated for the installation of leveling piles (*i.e.,* diving board shafts). The casing sizes and rotary drill sizes proposed for each shaft are specified in Table 1.

The large concrete monolithic sections used to create the dry docks and the center wall separation would be placed using a gantry crane. The gantry crane system would be structurally supported by the installation of 16 72-inch diameter shafts installed along the western extent of the Berth 1 face. The shafts would be installed using a DTH cluster drill as described for the temporary work trestle piles. The casing sizes and rotary drill sizes proposed for the gantry crane support shafts are specified in Table 1.

P–310 Emergency Repairs

Testing of the super flood basin on January 5, 2022 resulted in excess exfiltration through Berths 1 and 2, prompting the need for emergency repairs along Berth 1 as well as between the super flood basin entrance structure and the west closure wall. Emergency repairs consisted of the installation of sheet piles and the tremie pouring of concrete to fill in gaps along the structure walls and floor. Installation of emergency repairs at Berth 1 and the installation and removal of emergency repairs at the west closure wall and entrance structure occurred before the period described in the Navy's LOA application. Only the removal of Berth 1 emergency repair components would occur during the requested LOA period.

The removal of the 216 28-inch wide, Z-shaped sheet piles along the Berth 1 face would be completed through direct pulling via barge-mounted crane or by vibratory hammer. Specific methods will be determined by the contractor based on resistance to extraction from the seabed. Direct pulling via crane is not anticipated to generate harmful levels of underwater sound. If required, the use of the vibratory hammer to extract the installed sheet piles would be limited to an initial effort to break the sheets loose, allowing them to be directly pulled out. As a conservative measure, vibratory extraction of these sheet piles is assumed for all analyses.

The removal of 765 cubic meters (1,000 cy) of tremie concrete is anticipated to require use of a hydraulic rock hammer to break up material into smaller pieces. Smaller pieces would then be retrieved via excavator bucket for offsite disposal. The Navy estimates daily active use of the rock hammer for the removal of concrete from emergency repairs to be 4 hours per day.

Means and Methods for Noise Producing Activities

Only 28-inch wide, Z-shaped sheet piles would be installed or removed with pile-driving equipment during P–381 construction. The installation of 28-inch wide, Z-shaped steel sheet piles would be installed initially using vibratory means and then finished with impact hammers, if necessary. Impact hammers would also be used to push obstructions out of the way and where sediment conditions do not permit the efficient use of vibratory hammers. Pile removal activities would use cranes and vibratory hammers exclusively.

The removal of bedrock and concrete and the demolition of concrete shutter panels at Berth 11 and granite blocks and sheet piles at Berth 1 during P–381 construction would be by mechanical means. These features would be demolished using a hydraulic rock hammer (*i.e.,* hoe ram). The type/size of rock hammers used would be determined by the contractor selected to perform the work.

Two methods of rock excavation would be used during P–381 construction; DTH excavation and rotary drilling. During P–381 construction, rotary drilling would be used to set the casings and pre-drill rock sockets for DTH cluster drills. DTH excavation using mono-hammers would be used to create shafts for rock anchors and tie downs and for the excavation of relief holes during mechanical bedrock removal. For the largest shafts (greater than 42-inches in diameter), DTH excavation would use a cluster drill. A cluster drill uses multiple mono-hammers within a single bit to efficiently break up bedrock and create large diameter holes (see Figure 1–5 in the Navy's application).

Concurrent Activities

In order to maintain project schedules, it is likely that multiple pieces of equipment would operate at the same time within the basin. No ancillary activities are anticipated during the construction period that would require unimpeded access to the super flood basin. Therefore, it is anticipated that there would be space available within the project area for additional construction equipment. A maximum of 13 pieces of equipment could potentially operate in the project area at a single time. While this is an unlikely scenario, it could occur for a very brief period. Construction equipment would be staged along the perimeter of the super flood basin (Berth 11, Berth 1 and head wall) as well on multiple barges within the super flood basin. Table 2 provides a summary of possible equipment combinations that could be used simultaneously over the course of the proposed construction period.

TABLE 2—SUMMARY OF MULTIPLE EQUIPMENT SCENARIOS

Year	Quantity	Equipment
2023	5	Rock Hammer (2), Vibratory Hammer (2), Impact Hammer (1).
	5	Rock Hammer (2), Vibratory Hammer (1), Impact Hammer (1), DTH Mono-hammer (1).
	5	Rock Hammer (1), Vibratory Hammer (1), Impact Hammer (1), DTH Mono-hammer (1), Rotary Drill (1).
	5	Rock Hammer (1), Vibratory Hammer (1), DTH Mono-hammer (1), Cluster Drill (2).
	5	Cluster Drill (2), Vibratory Hammer (1), Mono-hammer DTH (1), Rotary Drill (1).
	5	Rock Hammer (1), Impact Hammer (1), DTH Mono-hammer (1), Cluster Drill (2).
	6	Rock Hammer (2), DTH Mono-hammer (2), Cluster Drill (1), Rotary Drill (1).
	6	Rock Hammer (2), Vibratory Hammer (1), DTH Mono-hammer (1), Rotary Drill (2).
	8	Rock Hammer (2), Vibratory Hammer (2), DTH Mono-hammer (2), Cluster Drill (2).
	10	Rock Hammer (3), Vibratory Hammer (2), Impact hammer (1), DTH Mono-hammer (2), Cluster Drill (2).
	13	Rock Hammer (5), Cluster Drill (2), Vibratory Hammer (2), Impact Hammer (1), Mono-hammer DTH (3).
2024	8	Rock Hammer (2), Vibratory Hammer (2), DTH Mono-hammer (2), Cluster Drill (2).
	5	Cluster Drill (2), DTH mono-hammer (1), Vibratory hammer (1), Impact Hammer (1).
	3	Cluster Drill (2), DTH mono-hammer (1).
	3	Cluster Drill (1), Rotary Drill (1), DTH mono-hammer (1).
	3	Rotary Drill (2), DTH mono-hammer (1).
2025	3	Cluster Drill (2), DTH mono-hammer (1).
	3	Cluster Drill (1), Rotary Drill (1), DTH mono-hammer (1).
	3	Rotary Drill (2), DTH mono-hammer (1).
	2	Rotary Drill (2).
	2	Cluster Drill (2).

Source: 381 Constructors, 2022.

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

Description of Marine Mammals in the Area of Specified Activities

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

Table 3 lists all species or stocks for which take is expected and proposed to be authorized for this activity, and summarizes information related to the population or stock, including regulatory status under the MMPA and Endangered Species Act (ESA) and potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS' SARs). While no serious injury or mortality is expected to occur, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species or stocks and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS' stock abundance estimates for most species represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All stocks managed under the MMPA in this region are assessed in NMFS' U.S. Atlantic and Gulf of Mexico SARs. All values presented in Table 3 are the most recent available at the time of publication (including from the 2021 SARs) and are available online at: *www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*).

TABLE 3—SPECIES LIKELY IMPACTED BY THE SPECIFIED ACTIVITIES

Common name	Scientific name	MMPA stock	ESA/MMPA status; strategic (Y/N)[1]	Stock abundance Nbest, (CV, N_{min}, most recent abundance survey)[2]	PBR	Annual M/SI[3]
Order Cetartiodactyla—Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Phocoenidae (porpoises):						
Harbor Porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy	-; N	95,543 (0.31; 74,034; 2016)	851	164
Order Carnivora—Superfamily Pinnipedia						
Family Phocidae (earless seals):						
Harbor seal	*Phoca vitulina*	Western North Atlantic	-; N	61,336 (0.08, 57,637; 2018)	1,729	339
Gray seal	*Halichoerus grypus*	Western North Atlantic	-; N	27,300[4] (0.22; 22,785; 2016)	1,389	4,453
Harp seal	*Pagophilus groenlandicus*	Western North Atlantic	-; N	7,600,000 (unk,7,100.000, 2019).	426,000	178,573
Hooded seal	*Cystophora cristata*	Western North Atlantic	-; N	593,500	Unknown	1,680

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

[2] NMFS marine mammal stock assessment reports online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*. CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable (N.A.).

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

[4] This abundance value and the associated PBR value reflect the US population only. Estimated abundance for the entire Western North Atlantic stock, including animals in Canada, is 451,600. The annual M/SI estimate is for the entire stock.

As indicated above, all five species (with five managed stocks) in Table 3 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur.

Harbor Porpoise

Harbor porpoises occur from the coastline to deep waters (>1,800 m, 5906 ft); Westgate *et al.,* 1998), although the majority of the population is found over the continental shelf (Hayes *et al.,* 2022). Based on genetic analysis, it is assumed that harbor porpoises in U.S. and Canadian waters are divided into four populations, as follows: (1) Gulf of St. Lawrence; (2) Newfoundland; (3) Greenland; and (4) Gulf of Maine/Bay of Fundy (Hayes *et al.,* 2022). For management purposes in U.S. waters, harbor porpoises have been divided into ten stocks along both the East and West Coasts. In the project area, only the Gulf of Maine/Bay of Fundy stock of harbor porpoise may be present. This stock is found in U.S. and Canadian Atlantic waters and is concentrated in the northern Gulf of Maine and southern Bay of Fundy region, generally in waters less than 150 m (492 ft) deep (Hayes *et al.,* 2022).

The Navy has been collecting data on marine mammals in the Piscataqua River since 2017 through construction monitoring and non-construction related monthly surveys (2017–2018). Three harbor porpoises were observed travelling quickly through the river channel during marine mammal monitoring conducted between April and December 2017 in support of the Berth 11 Waterfront Improvements Project (Cianbro, 2018). Two harbor porpoises were observed during construction monitoring that occurred between January 2018 and January 2019 (Cianbro, 2018; Navy, 2019). One harbor porpoise was observed in March 2017 during non-construction related surveys conducted on 12 days (one per month) in 2017, and two harbor porpoises (one in August and one in November) were observed in monthly surveys conducted in 2018 (Naval Facilities Engineering Systems Command (NAVFAC) Mid-Atlantic 2018, 2019b). There was one sighting of a harbor porpoise during P–310 year 1 monitoring events (May through December 2020) (NAVFAC, 2021). No harbor porpoise were sighted in 2021 (NAVFAC, 2022).

Harbor Seal

Harbor seals are found in all nearshore waters of the North Atlantic and North Pacific Oceans and adjoining seas above about 30° N (Burns, 2009). They can be found year-round in coastal waters of eastern Canada and Maine and occur seasonally (September through late May) along the coasts of southern New England to Virginia (Ampela *et al.,* 2018; Hayes *et al.,* 2022; Jones and Rees, 2020). Overall, there are five recognized subspecies of harbor seal, two of which occur in the Atlantic Ocean. The western Atlantic harbor seal is the subspecies likely to occur in the proposed project area. There is some uncertainty about the overall population stock structure of harbor seals in the western North Atlantic Ocean. However, it is theorized that harbor seals along the eastern U.S. and Canada are all from a single population (Temte *et al.,* 1991). Haulout and pupping sites are located off Manomet, MA and the Isles of Shoals, ME (Hayes *et al.,* 2022).

Harbor seals are the most abundant pinniped in the Piscataqua River. The majority of harbor seals occur along the Maine coast with a large portion of them hauling out at the Isles of Shoals (see Figure 4–1 of the Navy's application), which is located approximately 14.5 km (9 mi) from the project area. There are no major rookeries near the Navy's proposed project area. The closest haul-out site is at Hicks Rocks, located approximately 2.4 km (1.5 mi) from the proposed project area, but it is on the opposite side of Seavey Island and not within the project area. Pupping season for harbor seals is May to June. No harbor seal pups were observed during recent monitoring events conducted in the area (Cianbro, 2018) as pupping sites are north of the Maine-New Hampshire border (Hayes *et al.,* 2022). During construction monitoring between the months of April and December 2017, there were 199 observations of harbor seals (Cianbro, 2018) in the project area. A total of 249 harbor seals were observed during construction monitoring between the months of January 2018 and January 2019 for the same project (Navy, 2019). The primary behaviors observed during monitoring were milling that occurred almost 60 percent of the time followed by swimming and traveling by the proposed project area at 29 percent and 12 percent, respectively (Cianbro, 2018). A total of 17 and 83 harbor seals were observed during the one-day monthly surveys conducted in 2017 and 2018, respectively (NAVFAC Mid-Atlantic, 2018; 2019b). Construction monitoring conducted between May and December of 2020 and January through December 2021 as part of P–310 recorded 721 harbor seals and 451 harbor seals, respectively (NAVFAC, 2021; 2022).

Gray Seal

There are three major populations of gray seals found in the world; eastern Canada (western North Atlantic stock), northwestern Europe and the Baltic Sea. Gray seals in the project area belong to the western North Atlantic stock. The range for this stock is from New Jersey to Labrador. Current population trends show that gray seal abundance is likely increasing in the U.S. Atlantic Exclusive Economic Zone (EEZ) (Hayes *et al.,* 2022). Although the rate of increase is unknown, surveys conducted since their arrival in the 1980s indicate a steady increase in abundance in both Maine and Massachusetts (Hayes *et al.,* 2022). It is believed that recolonization by Canadian gray seals is the source of the U.S. population (Hayes *et al.,* 2022).

In U.S. waters, gray seals have been observed using an historic pupping site on Muskeget Island in Massachusetts since 1988 and on Seal and Green Islands in Maine since approximately the mid-1990s. All of these sites are more than 180 km (112 mi) from the Shipyard. In general, this species can be found year-round in the coastal waters of the Gulf of Maine (Hayes *et al.,* 2022).

During construction monitoring for the waterfront improvements project, there were 24 observations of gray seals within the proposed project area between the months of April and December 2017 (Cianbro, 2018) and a total of 12 observed between January 2018 and January 2019 (Navy, 2019). Ten of the 12 observations occurred during the winter months (Navy, 2019). The primary behavior observed during surveys was milling at just over 60 percent of the time followed by swimming within and traveling through the proposed project area. Gray seals were observed foraging approximately 5 percent of the time (Cianbro, 2018). The one-day monthly marine mammal surveys during 2017 and 2018 recorded six and three sightings, respectively, of gray seal (NAVFAC Mid-Atlantic, 2018, 2019b). A total of 47 gray seals were observed during P–310 year 1 monitoring events from May through December 2020 (NAVFAC, 2021). In 2021, 21 gray seals were sighted during monitoring (NAVFAC, 2022). No gray seal pups were observed during the surveys (Cianbro, 2018; Navy, 2019) as pupping sites for gray seals (like harbor seals) are known to occur north of Maine-New Hampshire border.

Hooded Seal

Hooded seals are generally found in deeper waters or on drifting pack ice. The world population of hooded seals has been divided into three stocks, which coincide with specific breeding areas, as follows: (1) Northwest Atlantic, (2) Greenland Sea, and (3) White Sea (Hayes *et al.,* 2022). The hooded seal is a highly migratory species, and its range can extend from the Canadian arctic to Puerto Rico. In U.S. waters, the species has an increasing presence in the coastal waters between Maine and Florida (Hayes *et al.,* 2022). In the U.S., they are considered members of the western North Atlantic stock and generally occur in New England waters from January through May and further south in the summer and fall seasons (Hayes *et al.,* 2022).

Hooded seals are known to occur in the Piscataqua River; however, they are not as abundant as the more commonly observed harbor seal. Anecdotal sighting information indicates that two hooded seals were observed from the Shipyard in August 2009, but no other observations have been recorded (Trefry November 20, 2015). Hooded seals were not observed during marine mammal monitoring or survey events that took place in 2017, 2018, 2020, or 2021 (Cianbro, 2018; NAVFAC Mid-Atlantic 2018, 2019b; Navy 2019; NAVFAC 2021, 2022).

Harp Seal

The harp seal is a highly migratory species, its range extending throughout the Arctic and North Atlantic Oceans. The world's harp seal population is separated into three stocks, based on associations with specific locations of pagophilic breeding activities: (1) off eastern Canada, (2) on the West Ice off eastern Greenland, and (3) in the White Sea off the coast of Russia. The largest stock, which includes two herds that breed either off the coast of Newfoundland/Labrador or near the Magdelan Islands in the Gulf of St. Lawrence, is equivalent to the western North Atlantic stock. Harp seals that occur in the United States are considered members of the western North Atlantic stock and generally occur in New England waters from January through May (Hayes *et al.,* 2022).

Harp seals are known to occur in the Piscataqua River; however, they are not as abundant as the more commonly observed harbor seal and were last documented in the river in May of 2020. Two harp seals were sighted on two separate occasions (on May 12 and May 14, 2020) during construction monitoring for P–310 (Stantec, 2020). No pile-driving was occurring at the time of the sighting. Previous to that, the last harp seal sighting was in 2016 (NAVFAC Mid-Atlantic, 2016; NMFS, 2016). Harp seals were not observed during marine mammal monitoring or survey events that took place in 2017 and 2018 (Cianbro, 2018; NAVFAC Mid-Atlantic, 2018, 2019b; Navy, 2019). No harp seals were sighted in 2021 (NAVFAC, 2021, 2022).

Unusual Mortality Events (UMEs)

Between July 2018 and March 2020 elevated numbers of harbor seal and gray seal mortalities occurred across Maine, New Hampshire and Massachusetts. This event was declared an Unusual Mortality Event (UME). Seals showing clinical signs were observed stranding as far south as Virginia, although not in elevated numbers. Therefore the UME investigation encompassed all seal strandings from Maine to Virginia. Lastly, ice seals (harp and hooded seals) also started stranding with clinical signs, again not in elevated numbers, and those two seal species were added to this UME investigation. Information on this UME is available online at: *https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-life-distress/2018-2020-pinniped-unusual-mortality-event-along.*

Since July 2022, a second UME of harbor seals and gray seals in this region has been declared after elevated numbers of sick and dead individuals were documented along the southern and central coast of Maine from Biddeford to Boothbay (including Cumberland, Lincoln, Knox, Sagadahoc and York Counties). Information on this UME is available online at: *https://www.fisheries.noaa.gov/2022-pinniped-unusual-mortality-event-along-maine-coast.*

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. 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, 2019) recommended that marine mammals be divided into hearing groups based on directly measured (behavioral or auditory evoked potential techniques) or estimated hearing ranges (behavioral response data, anatomical modeling, etc.). Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans). Subsequently, NMFS (2018a) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 4.

TABLE 4—MARINE MAMMAL HEARING GROUPS

[NMFS, 2018]

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

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

The pinniped functional hearing group was modified from Southall *et al.* (2007) on the basis of data indicating that phocid species have consistently demonstrated an extended frequency range of hearing compared to otariids, especially in the higher frequency range (Hemilä *et al.,* 2006; Kastelein *et al.,* 2009; Reichmuth and Holt, 2013).

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018a) for a review of available information.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

This section provides a discussion of the ways in which components of the specified activity may impact marine mammals and their habitat. The Estimated Take section later in this document includes a quantitative analysis of the number of individuals that are expected to be taken by this activity. The Negligible Impact Analysis and Determination section considers the content of this section, the Estimated Take 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 whether those impacts are reasonably expected to, or reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Acoustic effects on marine mammals during the specified activity can occur from impact and vibratory pile installation and removal, rotary drilling, DTH, and rock hammering. The effects of underwater noise from the Navy's proposed activities have the potential to result in Level A and Level B harassment of marine mammals in the action area.

Description of Sound Sources

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

Sound travels in waves, the basic components of which are frequency, wavelength, velocity, and amplitude. Frequency is the number of pressure waves that pass by a reference point per unit of time and is measured in hertz (Hz) or cycles per second. Wavelength is the distance between two peaks or corresponding points of a sound wave (length of one cycle). Higher frequency sounds have shorter wavelengths than lower frequency sounds, and typically attenuate (decrease) more rapidly, except in certain cases in shallower water. Amplitude is the height of the sound pressure wave or the ''loudness'' of a sound and is typically described using the relative unit of the 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 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). The received level is the sound level at the listener's position. Note that all underwater sound levels in this document are referenced to a pressure of 1 μPa and all airborne sound levels in this document are referenced to a pressure of 20 μPa.

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

Sound exposure level (SEL; represented as dB referenced to 1 micropascal squared per second (re 1 μPa2–s)) represents the total energy in a stated frequency band over a stated time interval or event, and considers both intensity and duration of exposure. The per-pulse SEL is calculated over the time window containing the entire pulse (*i.e.,* 100 percent of the acoustic energy). SEL is a cumulative metric; it can be accumulated over a single pulse, or calculated over periods containing multiple pulses. Cumulative SEL (SELcum) represents the total energy accumulated by a receiver over a defined time window or during an event. Peak sound pressure (also referred to as zero-to-peak sound pressure or 0–pk) is the maximum instantaneous sound pressure measurable in the water at a specified distance from the source, and is represented in the same units as the RMS sound pressure.

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

Even in the absence of sound from the specified activity, the underwater environment is typically loud due to ambient sound, which is defined as the all-encompassing sound in a given place and is usually a composite of sound from many sources both near and far (American National Standards Institute standards (ANSI), 1995). The sound level of a region is defined by the total acoustical energy being generated by known and unknown sources. These sources may include physical (*e.g.,* wind and waves, earthquakes, ice, atmospheric sound), biological (*e.g.,* sounds produced by marine mammals, fish, and invertebrates), and anthropogenic (*e.g.,* vessels, dredging, construction) sound. A number of sources contribute to ambient sound, including wind and waves, which are a main source of naturally occurring ambient sound for frequencies between 200 Hz and 50 kilohertz (kHz) (Mitson, 1995). In general, ambient sound levels tend to increase with increasing wind speed and wave height. Precipitation can become an important component of total sound at frequencies above 500 Hz, and possibly down to 100 Hz during quiet times. Marine mammals can contribute significantly to ambient sound levels, as can some fish and snapping shrimp. The frequency band for biological contributions is from approximately 12 Hz to over 100 kHz. Sources of ambient sound related to human activity include transportation (surface vessels), dredging and construction, oil and gas drilling and production, geophysical surveys, sonar, and explosions. Vessel noise typically dominates the total ambient sound for frequencies between 20 and 300 Hz. In general, the frequencies of anthropogenic sounds are below 1 kHz and, if higher frequency sound levels are created, they attenuate rapidly.

The Shipyard is a dynamic industrial facility situated on an island with a narrow separation of waterways between the installation and the communities of Kittery and Portsmouth. The predominant noise sources from Shipyard industrial operations consist of dry dock cranes; passing vessels; and industrial equipment (*e.g.,* forklifts, loaders, rigs, vacuums, fans, dust collectors, blower belts, heating, air conditioning, and ventilation units, water pumps, and exhaust tubes and lids). Other components such as construction, vessel ground support equipment for maintenance purposes, vessel traffic across the Piscataqua River, and vehicle traffic on the Shipyard's bridges and on local roads in Kittery and Portsmouth produce noise, but such noise generally represents a transitory contribution to the average noise level environment (Blue Ridge Research and Consulting, 2015; ESS Group, 2015).

Ambient sound levels recorded at the Shipyard are considered typical of a large outdoor industrial facility and vary widely in space and time (ESS Group, 2015). Thirteen underwater acoustic recordings were logged in 2017 with sensors placed in depths of 4.5 m (15 ft) within the security fencing area of the Shipyard Berth 11. Recordings ranged from 140 dB to 161.3 dB peak SPL and from 128.2 dB to 133.8 dB RMS SPL. Conditions at which the recordings were made were with little wind and near peak tidal flow. A mean SPL of 131 dB RMS was evenly distributed within the security fencing area and is consistent with observations made at other locations near the Shipyard and documented background sound levels in estuarine or tidal locations (Hydrosonic LLC, 2017). Due to the close proximity to the Shipyard that measurements were recorded, ambient underwater noise levels further into the navigation channel are likely to be lower.

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

In-water construction activities associated with the project would include impact and vibratory pile installation and removal, rotary drilling, DTH, and rock hammering. The sounds produced by these activities fall into one of two general sound types: impulsive and non-impulsive (defined below). 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.

Impulsive sound sources (*e.g.,* explosions, gunshots, sonic booms, impact pile driving) produce signals that are brief (typically considered to be less than one second), broadband, atonal transients (ANSI, 1986; Harris, 1998; National Institute for Occupational Safety and Health (NIOSH), 1998; International Organization for Standardization (ISO) 2003; ANSI 2005) and occur either as isolated events or repeated in some succession. Impulsive 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-impulsive 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-impulsive sounds can be transient signals of short duration but without the essential properties of impulses (*e.g.,* rapid rise time). Examples of non-impulsive sounds include those produced by vessels, aircraft, machinery operations such as drilling or dredging, vibratory pile driving, and active sonar systems. The duration of such sounds, as received at a distance, can be greatly extended in a highly reverberant environment.

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

Hydraulic rock hammers (*i.e.,* hoe rams) will be used for removal and demolition purposes. These tools are impact devices designed to break rock or concrete. A rock hammer operates by using a chisel-like hammer to rapidly strike an exposed surface to break it up into smaller pieces that will be removed by a clamshell dredge or bucket excavator, as appropriate. Few data exist regarding the underwater sounds produced by rock hammers. Data reported by Escude (2012), however, suggest that the sounds produced by hoe rams are comparable to impact hammers. Therefore, for the purposes of this analysis, it is assumed that hydraulic rock hammers act as an impulsive source characterized by rapid rise times and high peak levels.

DTH systems, involving both mono-hammers and cluster-hammers, and rotary drills will also be used during the proposed construction. In rotary drilling, the drill bit rotates on the rock while the drill rig applies pressure. The bit rotates and grinds continuously to fracture the rock and create a hole. Rotary drilling is considered a non-impulsive noise source, similar to vibratory pile driving. A DTH hammer is essentially a drill bit that drills through the bedrock using a rotating function like a normal drill, in concert with a hammering mechanism operated by a pneumatic (or sometimes hydraulic) component integrated into to the DTH hammer to increase speed of progress through the substrate (*i.e.,* it is similar to a ''hammer drill'' hand tool). Rock socketing involves using DTH equipment to create a hole in the bedrock inside which the pile is placed to give it lateral and longitudinal strength. The sounds produced by the DTH methods contain both a continuous non-impulsive component from the drilling action and an impulsive component from the hammering effect. Therefore, we treat DTH systems as both impulsive and continuous, non-impulsive sound source types simultaneously.

The likely or possible impacts of the Navy's proposed activities on marine mammals could involve both non-acoustic and acoustic stressors. Potential non-acoustic stressors could result from the physical presence of the equipment and personnel; however, given there are no known pinniped haul-out sites in the vicinity of the Shipyard, visual and other non-acoustic stressors would be limited, and any impacts to marine mammals are expected to primarily be acoustic in nature.

Acoustic Impacts

The introduction of anthropogenic noise into the aquatic environment from pile driving or drilling is the primary means by which marine mammals may be harassed from the Navy's specified activity. In general, animals exposed to natural or anthropogenic sound may experience physical and psychological effects, ranging in magnitude from none to severe (Southall *et al.,* 2007, 2019). In general, exposure to pile driving or drilling noise has the potential to result in auditory threshold shifts and behavioral reactions (*e.g.,* avoidance, temporary cessation of foraging and vocalizing, changes in dive behavior). Exposure to anthropogenic noise can also lead to non-observable physiological responses such an increase in stress hormones. Additional noise in a marine mammal's habitat can mask acoustic cues used by marine mammals to carry out daily functions such as communication and predator and prey detection. The effects of pile driving or drilling noise on marine mammals are dependent on several factors, including, but not limited to, sound type (*e.g.,* impulsive vs. non-impulsive), the species, age and sex class (*e.g.,* adult male vs. mom with calf), duration of exposure, the distance between the pile and the animal, received levels, behavior at time of exposure, and previous history with exposure (Wartzok *et al.,* 2004; Southall *et al.,* 2007). Here we discuss physical auditory effects (threshold shifts) followed by behavioral effects and potential impacts on habitat.

NMFS defines a noise-induced threshold shift (TS) as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018a). The amount of threshold shift is customarily expressed in dB. A TS can be permanent or temporary. As described in NMFS (2018a), there are numerous factors to consider when examining the consequence of TS, including, but not limited to, the signal temporal pattern (*e.g.,* impulsive or non-impulsive), likelihood an individual would be exposed for a long enough duration or to a high enough level to induce a TS, the magnitude of the TS, time to recovery (seconds to minutes or hours to days), the frequency range of the exposure (*i.e.,* spectral content), the hearing and vocalization frequency range of the exposed species relative to the signal's frequency spectrum (*i.e.,* how animal uses sound within the frequency band of the signal; *e.g.,* Kastelein *et al.,* 2014), and the overlap between the animal and the source (*e.g.,* spatial, temporal, and spectral). When analyzing the auditory effects of noise exposure, it is often helpful to broadly categorize sound as either impulsive or non-impulsive. When considering auditory effects, vibratory pile driving and rotary drilling are considered non-impulsive sources while impact pile driving and rock hammering are treated as an impulsive source. DTH is considered to have both non-impulsive and impulsive components.

Permanent Threshold Shift (PTS)—NMFS defines PTS as a permanent, irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018). Available data from humans and other terrestrial mammals indicate that a 40 dB threshold shift approximates PTS onset (see Ward *et al.,* 1958, 1959; Ward, 1960; Kryter *et al.,* 1966; Miller, 1974; Ahroon *et al.,* 1996; Henderson *et al.,* 2008). PTS levels for marine mammals are estimates, as with the exception of a single study unintentionally inducing PTS in a harbor seal (Kastak *et al.,* 2008), there are no empirical data measuring PTS in marine mammals largely due to the fact that, for various ethical reasons, experiments involving anthropogenic noise exposure at levels inducing PTS are not typically pursued or authorized (NMFS, 2018).

Temporary Threshold Shift (TTS)—A temporary, reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level (NMFS, 2018). Based on data from cetacean TTS measurements (see Southall *et al.* 2007), a TTS of 6 dB is considered the minimum threshold shift clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Schlundt *et al.,* 2000; Finneran *et al.,* 2000, 2002). As described in Finneran (2015), marine mammal studies have shown the amount of TTS increases with SELcum in an accelerating fashion: at low exposures with lower SELcum, the amount of TTS is typically small and the growth curves have shallow slopes. At exposures with higher SELcum, the growth curves become steeper and approach linear relationships with the noise SEL.

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 (similar to those discussed in auditory masking, below). 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 takes place during a time when the animal is traveling through the open ocean, 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. We note that reduced hearing sensitivity as a simple function of aging has been observed in marine mammals, as well as humans and other taxa (Southall *et al.,* 2007), so we can infer that strategies exist for coping with this condition to some degree, though likely not without cost.

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

TTS is the mildest form of hearing impairment that can occur during exposure to sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises, and a sound must be at a higher level in order to be heard. In terrestrial and marine mammals, TTS can last from minutes or hours to days (in cases of strong TTS). In many cases, hearing sensitivity recovers rapidly after exposure to the sound ends. Currently, TTS data only exist for four species of cetaceans (bottlenose dolphin), beluga whale (*Delphinapterus leucas*), harbor porpoise, and Yangtze finless porpoise (*Neophocoena asiaeorientalis*)) and five species of pinnipeds exposed to a limited number of sound sources (*i.e.,* mostly tones and octave-band noise) in laboratory settings (Finneran, 2015). TTS was not observed in trained spotted (*Phoca largha*) and ringed (*Pusa hispida*) seals exposed to impulsive noise at levels matching previous predictions of TTS onset (Reichmuth *et al.,* 2016). In general, harbor seals and harbor porpoises have a lower TTS onset than other measured pinniped or cetacean species (Finneran, 2015). Additionally, the existing marine mammal TTS data come from a limited number of individuals within these species. No data are available on noise-induced hearing loss for mysticetes. For summaries of data on TTS in marine mammals or for further discussion of TTS onset thresholds, please see Southall *et al.* (2007), Finneran and Jenkins (2012), Finneran (2015), and Table 5 in NMFS (2018).

Behavioral Harassment—Exposure to noise from pile driving and drilling also has the potential to behaviorally disturb marine mammals. 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. Disturbance may result in changing durations of surfacing and dives, changing direction and/or speed; reducing/increasing vocal activities; changing/cessation of certain behavioral activities (such as socializing or feeding); eliciting a visible startle response or aggressive behavior (such as tail/fin slapping or jaw clapping); avoidance of areas where sound sources are located. Pinnipeds may increase their haul out time, possibly to avoid in-water disturbance (Thorson and Reyff, 2006). 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). In general, pinnipeds seem more tolerant of, or at least habituate more quickly to, potentially disturbing underwater sound than do cetaceans, and generally seem to be less responsive to exposure to industrial sound than most cetaceans. Please see Appendices B and C of Southall *et al.* (2007) and Gomez *et al.* (2016) for reviews 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 above, 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; National Research Council (NRC), 2003; Wartzok *et al.,* 2003). Controlled experiments with captive marine mammals have showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway *et al.,* 1997; Finneran *et al.,* 2003). Observed responses of wild marine mammals to loud pulsed sound sources (typically seismic airguns or acoustic harassment devices) have been varied but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds, 2002; see also Richardson *et al.,* 1995; Nowacek *et al.,* 2007).

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

Changes in dive behavior can vary widely and may consist of increased or decreased dive times and surface intervals as well as changes in the rates of ascent and descent during a dive (*e.g.,* Frankel and Clark, 2000; Costa *et al.,* 2003; Ng and Leung, 2003; Nowacek *et al.,* 2004; Goldbogen *et al.,* 2013a,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 (*Eubalaena glacialis*) 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.,* Blackwell *et al.,* 2004; Bejder *et al.,* 2006; Teilmann *et al.,* 2006).

A flight response is a dramatic change in normal movement to a directed and rapid movement away from the perceived location of a sound source. The flight response differs from other avoidance responses in the intensity of the response (*e.g.,* directed movement, rate of travel). Relatively little information on flight responses of marine mammals to anthropogenic signals exist, although observations of flight responses to the presence of predators have occurred (Connor and

Heithaus, 1996, Bowers *et al.,* 2018). 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 5-day period did not cause any sleep deprivation or stress effects.

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

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

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

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

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

Auditory Masking—Since many marine mammals rely on sound to find prey, moderate social interactions, and facilitate mating (Tyack, 2008), noise from anthropogenic sound sources can interfere with these functions, but only if the noise spectrum overlaps with the hearing sensitivity of the marine mammal (Southall *et al.,* 2007; Clark *et al.,* 2009; Hatch *et al.,* 2012). Chronic exposure to excessive, though not high-intensity, noise could cause masking at particular frequencies for marine mammals that utilize sound for vital biological functions (Clark *et al.,* 2009). Acoustic masking is when other noises such as from human sources interfere 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). Therefore, under certain circumstances, marine mammals whose acoustical sensors or environment are being severely masked could also be impaired from maximizing their performance fitness in survival and reproduction. 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).

Marine mammals in the Piscataqua River are exposed to anthropogenic noise which may lead to some habituation, but is also a source of masking. Vocalization changes may result from a need to compete with an increase in background noise and include increasing the source level, modifying the frequency, increasing the call repetition rate of vocalizations, or ceasing to vocalize in the presence of increased noise (Hotchkin and Parks, 2013).

Masking is more likely to occur in the presence of broadband, relatively continuous noise sources. Energy distribution of pile driving covers a broad frequency spectrum, and sound from pile driving would be within the audible range of pinnipeds and cetaceans present in the proposed action area. While some construction during the Navy's activities may mask some acoustic signals that are relevant to the daily behavior of marine mammals, the short-term duration and limited areas affected make it very unlikely that survival would be affected.

Airborne Acoustic Effects—Pinnipeds that occur near the project site could be exposed to airborne sounds associated with construction activities that have the potential to cause behavioral harassment, depending on their distance from these activities. Airborne noise would primarily be an issue for pinnipeds that are swimming or hauled out near the project site within the range of noise levels elevated above airborne acoustic criteria. Although pinnipeds are known to haul-out regularly on man-made objects, we believe that incidents of take resulting solely from airborne sound are unlikely due to the sheltered proximity between the proposed project area and the haulout sites (*e.g.,* Hicks Rocks located on the opposite side of the island where activities are occurring). Cetaceans are not expected to be exposed to airborne sounds that would result in harassment as defined under the MMPA.

We recognize that pinnipeds in the water could be exposed to airborne sound that may result in behavioral harassment when looking with their heads above water. Most likely, airborne sound would cause behavioral responses similar to those discussed above in relation to underwater sound. For instance, anthropogenic sound could cause hauled-out pinnipeds to exhibit changes in their normal behavior, such as reduction in vocalizations, or cause them to temporarily abandon the area and move further from the source. However, these animals would previously have been 'taken' because of exposure to underwater sound above the behavioral harassment thresholds, which are in all cases larger than those associated with airborne sound. Thus, the behavioral harassment of these animals is already accounted for in these estimates of potential take. Therefore, we do not believe that authorization of incidental take resulting from airborne sound for pinnipeds is warranted, and airborne sound is not discussed further here.

Potential Effects on Marine Mammal Habitat

Water quality—Temporary and localized reduction in water quality will occur as a result of in-water construction activities. Most of this effect will occur during the installation and removal of piles and bedrock removal when bottom sediments are disturbed. The installation and removal of piles and bedrock removal and dredging will disturb bottom sediments and may cause a temporary increase in suspended sediment in the project area. Using available information collected from a project in the Hudson River, pile-driving activities are anticipated to produce total suspended sediment (TSS) concentrations of approximately 5.0 to 10.0 milligrams per liter (mg/L) above background levels within approximately 91 m (300 ft) of the pile being driven (Federal Highway Administration, 2012). During pile extraction, sediment attached to the pile moves vertically through the water column until gravitational forces cause it to slough off under its own weight. The small resulting sediment plume is expected to settle out of the water column within a few hours. Studies of the effects of turbid water on fish (marine mammal prey) suggest that concentrations of suspended sediment can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton, 1993). The TSS levels expected for pile-driving or removal (5.0 to 10.0 mg/L) are below those shown to have adverse effects on fish (580.0 mg/L for the most sensitive species, with 1,000.0 mg/L more typical) and benthic communities (390.0 mg/L; Environmental Protection Agency, 1986).

Impacts to water quality from DTH mono-hammers are expected to be similar to those described for pile driving. Impacts to water quality would be localized and temporary and would have negligible impacts on marine mammal habitat. The cluster drill system and rotary drilling of shafts would have negligible impacts on water quality from sediment resuspension because the system would operate within a casing set into the bedrock. The cluster drill would collect excavated material inside of the apparatus where it would be lifted to the surface and placed onto a barge for subsequent disposal.

TSS concentrations associated with mechanical clamshell bucket dredging operations have been shown to range from 105 mg/L in the middle of the water column to 445 mg/L near the bottom (210 mg/L, depth-averaged) (Army Corps of Engineers, 2001). Furthermore, a study by Burton (1993) measured TSS concentrations at distances of 152, 305, 610, and 1006 m (500, 1,000, 2,000, and 3,300 ft) from dredge sites in the Delaware River and were able to detect concentrations between 15 mg/L and 191 mg/L up to 610 m (2,000 ft) from the dredge site. In support of the New York/New Jersey Harbor Deepening Project, the U.S. Army Corps of Engineers conducted extensive monitoring of mechanical dredge plumes (Army Corps of Engineers, 2015). Independent of bucket type or size, plumes dissipated to background levels within 183 m (600 ft) of the source in the upper water column and 732 m (2,400 ft) in the lower water column. Based on these studies, elevated suspended sediment concentrations at several hundreds of mg/L above background may be present in the immediate vicinity of the bucket, but would settle rapidly within a 732 m (2,400 ft) radius of the dredge location. The TSS levels expected for mechanical dredging (up to 445.0 mg/L) are below those shown to have adverse effect on fish (typically up to 1,000.0 mg/L; see summary of scientific literature in Burton 1993, Wilber and Clarke 2001).

Effects to turbidity and sedimentation are expected to be short-term, minor, and localized. Since the currents are so strong in the area, following the completion of sediment-disturbing activities, suspended sediments in the water column should dissipate and quickly return to background levels in all construction scenarios. Turbidity within the water column has the potential to reduce the level of oxygen in the water and irritate the gills of prey fish species in the proposed project area. However, turbidity plumes associated with the project would be temporary and localized, and fish in the proposed project area would be able to move away from and avoid the areas where plumes may occur. Therefore, it is expected that the impacts on prey fish species from turbidity, and therefore on marine mammals, would be minimal and temporary. In general, the area likely impacted by the proposed construction activities is relatively small compared to the available marine mammal habitat in Great Bay Estuary.

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

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

Fish react to sounds that are especially strong and/or intermittent low-frequency sounds. Short duration, sharp sounds can cause overt or subtle changes in fish behavior and local distribution. The reaction of fish to noise depends on the physiological state of the fish, past exposures, motivation (*e.g.,* feeding, spawning, migration), and other environmental factors. Hastings and Popper (2005) identified several studies that suggest fish may relocate to avoid certain areas of sound energy. Additional studies have documented effects of pile driving on fish; several are based on studies in support of large, multiyear bridge construction projects (*e.g.,* Scholik and Yan, 2001, 2002; Popper and Hastings, 2009). Several studies have demonstrated that impulse sounds might affect the distribution and behavior of some fishes, potentially impacting foraging opportunities or increasing energetic costs (*e.g.,* Fewtrell and McCauley, 2012; Pearson *et al.,* 1992; Skalski *et al.,* 1992; Santulli *et al.,* 1999; Paxton *et al.,* 2017). However, some studies have shown no or slight reaction to impulse sounds (*e.g.,* Pena *et al.,* 2013; Wardle *et al.,* 2001; Jorgenson and Gyselman, 2009; Cott *et al.,* 2012). More commonly, though, the impacts of noise on fish are temporary.

SPLs of sufficient strength have been known to cause injury to fish and fish mortality (summarized in Popper *et al.,* 2014). However, in most fish species, hair cells in the ear continuously regenerate and loss of auditory function likely is restored when damaged cells are replaced with new cells. Halvorsen *et al.* (2012a) showed that a TTS of 4–6 dB was recoverable within 24 hours for one species. Impacts would be most severe when the individual fish is close to the source and when the duration of exposure is long. Injury caused by barotrauma can range from slight to severe and can cause death, and is most likely for fish with swim bladders. Barotrauma injuries have been documented during controlled exposure to impact pile driving (Halvorsen *et al.,* 2012b; Casper *et al.,* 2013).

The greatest potential impact to fish during construction would occur during impact pile driving, rock hammering, and DTH excavation (DTH mono-hammer and cluster drill). However, the duration of impact pile driving would be limited to the final stage of installation (''proofing'') after the pile has been driven as close as practicable to the design depth with a vibratory driver. In-water construction activities would only occur during daylight hours allowing fish to forage and transit the project area in the evening. Additionally, the Back Channel of the Piscataqua River would be unaffected by construction activities and would provide a pathway for unrestricted fish movement. Vibratory pile driving and rock hammering would possibly elicit behavioral reactions from fish such as temporary avoidance of the area but is unlikely to cause injuries to fish or have persistent effects on local fish populations. In addition, it should be noted that the area in question is low-quality habitat since it is already highly developed and experiences a high level of anthropogenic noise from normal Shipyard operations and other vessel traffic. In general, impacts on marine mammal prey species are expected to be minor and temporary.

In-Water Construction Effects on Potential Foraging Habitat

The proposed activities would not result in permanent impacts to habitats used directly by marine mammals. The total seafloor area affected by pile installation and removal is a very small area compared to the vast foraging area available to marine mammals outside this project area. Construction would have minimal permanent and temporary impacts on benthic invertebrate species, a marine mammal prey source. Benthic invertebrates that are commonly prey for marine mammals, such as squid species, were not detected during a 2014 benthic survey of the proposed project area (CR Environmental, Inc., 2014). The majority of direct benthic habitat loss previously occurred with the permanent loss of approximately 3.5 acres of benthic habitat from construction of the super flood basin (P–310). The water surface of Great Bay Estuary extends approximately 4.45 square mi (124,000,000 square ft) at low tide (Mills, No date). Therefore, that loss of approximately 152,000 square ft represented approximately one-tenth of 1 percent of the benthic habitat in the estuary at low tide. Additional areas that would be permanently removed by the multifunctional expansion of Dry Dock 1 (P- 381) are either previously impacted by P–310 construction activities or beneath and adjacent to the existing berths along the Shipyard's industrial waterfront and are regularly disturbed as part of the construction dredging to maintain safe navigational depths. Further, vessel activity at the berths creates minor disturbances of benthic habitats (*e.g.,* vessel propeller wakes) during waterfront operations. Therefore, impacts of the project are not likely to have adverse effects on marine mammal foraging habitat in the proposed project area.

The area impacted by the project is relatively small compared to the available habitat just outside the project area, and there are no areas of particular importance that would be impacted by this project. Any behavioral avoidance by fish of the disturbed area would still leave significantly large areas of fish and marine mammal foraging habitat in the nearby vicinity. As described in the preceding, the potential for the Navy's 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.

Estimated Take

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

As described previously, no serious injury or mortality is anticipated or proposed to be authorized for this activity. Harassment is the only type of take expected to result from these activities. Except with respect to certain activities not pertinent here, section 3(18) of the MMPA defines ''harassment'' as any act of pursuit, torment, or annoyance, which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes would primarily be by Level B harassment, as use of the acoustic sources (*i.e.,* impact and vibratory pile installation and removal, rotary drilling, DTH, and rock hammering) has the potential to result in disruption of behavioral patterns for individual marine mammals. There is also some potential for auditory injury (Level A harassment) to result, primarily for high frequency species and/or phocids because predicted auditory injury zones are larger than for mid-frequency species and/or otariids. The proposed mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable. Below we describe how the proposed take numbers are estimated.

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

Acoustic Thresholds

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

Level B Harassment—Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.,* frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.,* bathymetry, other noises in the area, predators in the area), and the receiving animals (hearing, motivation, experience, demography, life stage, depth) and can be difficult to predict (*e.g.,* Southall *et al.,* 2007, 2021, Ellison *et al.,* 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above root-mean-squared pressure received levels (RMS SPL) of 120 dB (referenced to 1 micropascal (re 1 μPa)) for continuous (*e.g.,* vibratory pile-driving, drilling) and above RMS SPL 160 dB re 1 μPa for non-explosive impulsive (*e.g.,* seismic airguns) or intermittent (*e.g.,* scientific sonar) sources. Generally speaking, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

The Navy's proposed activity includes the use of continuous (vibratory pile driving/removal, rotary drilling) and intermittent (impact pile driving, rock hammering) sources, and therefore the RMS SPL thresholds of 120 and 160 dB re 1 μPa, respectively, are applicable. DTH systems have both continuous and intermittent components as discussed in the *Description of Sound Sources* section above. When evaluating Level B harassment, NMFS recommends treating DTH as a continuous source and applying the RMS SPL thresholds of 120 dB re 1 μPa (see NMFS recommended guidance on DTH systems at *https://media.fisheries.noaa.gov/2022-11/PUBLIC%20DTH%20Basic%20Guidance_November%202022.pdf;* NMFS, 2022).

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

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

TABLE 5—THRESHOLDS IDENTIFYING THE ONSET OF PERMANENT THRESHOLD SHIFT

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

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

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

Ensonified Area

Here, we describe operational and environmental parameters of the activity that are used in estimating the area ensonified above the acoustic thresholds, including source levels and transmission loss coefficient.

The sound field in the project area is the existing background noise plus additional construction noise from the proposed project. Marine mammals are expected to be affected via sound generated by the primary components of the project (*i.e.,* impact pile driving, vibratory pile driving, vibratory pile removal, rotary drilling, rock hammering, and DTH).

Sound Source Levels of Proposed Activities—The intensity of pile driving sounds is greatly influenced by factors such as the type of piles, hammers, and the physical environment (*e.g.,* sediment type) in which the activity takes place. The Navy evaluated sound source level (SL) measurements available for certain pile types and sizes from similar environments from other Navy pile driving projects, including from past projects conducted at the Shipyard, and used them as proxy SLs to determine reasonable SLs likely to result from the pile driving and drilling activities in their application. Projects reviewed were those most similar to the specified activity in terms of drilling and rock hammering activities, type and size of piles installed, method of pile installation, and substrate conditions. Some of the proxy source levels proposed by the Navy are expected to be more conservative as compared to what may be realized by the actual pile driving to take place, as the values are from larger pile sizes. In some instances, for reasons described below, NMFS relied on alternative proxy SLs in our evaluation of the impacts of the Navy's proposed activities on marine mammals (Table 6). Note that the source levels in this Table represent the SPL referenced at a distance of 10 m from the source.

TABLE 6—SUMMARY OF UNATTENUATED IN-WATER PILE DRIVING SOURCE LEVELS

Pile type	Installation method	Pile diameter	Peak SPL (dB re 1 μPa)	RMS SPL (dB re 1 μPa)	SEL_{ss} (dB re 1 μPa² sec)
Casing/Socket	Rotary Drill	126-inch	NA	154 (169 at 1 m)	NA
		102-inch	NA	154 (169 at 1 m)	NA
		84-inch	NA	154 (169 at 1 m)	NA
Shaft	DTH Cluster Drill	108-inch	NA	201.6 [5] (Level A) 174 [6] (Level B)	NA
		84-inch	NA	196.7 [5] (Level A) 174 [6] (Level B)	NA
		78-inch	NA	195.2 [5] (Level A) 174 [6] (Level B)	181
		72-inch	NA	193.7 [5] (Level A) 174 [6] (Level B)	NA
Rock anchor	DTH mono-hammer	9-inch	172	167	146
Relief hole	DTH mono-hammer	4 to 6-inch	170	156 [6]	144
Z-shaped Sheet	Impact	28-inch [1]	211	196	181
	Vibratory	28-inch [2]	NA	167	167
	Vibratory	25-inch [3]	NA	167	167
Bedrock and concrete demolition	Rock Hammer [4]	NA	197	186 [4]	[4] 171

[1] An appropriate proxy value for impact driving 28-inch wide, Z-shaped sheet piles is not available, so a value for 30-inch steel pipe piles was used as a proxy value (NAVFAC SW, 2020 [p. A–4]).

[2] An appropriate proxy value for vibratory pile driving 28-inch wide, Z-shaped sheet piles is not available, so a value for 30-inch steel pipe piles was used as a proxy value (Navy, 2015 [p. 14]).

[3] An appropriate proxy value for vibratory pile driving 25-inch sheet piles is not available, so the value for 28-inch wide, Z-shaped sheet piles was used as a proxy.

[4] Escude, 2012.

[5] RMS SPL values were derived from regression and extrapolation calculations of existing data by NMFS.

[6] SPLs vary from those proposed in the Navy's application as the NMFS DTH recommended guidance updated the source level proxy it recommends for some DTH systems after the Navy's application was deemed adequate and complete (NMFS, 2022).

Notes: All SPLs are unattenuated and represent the SPL referenced at a distance of 10 m from the source; NA = Not applicable; single strike SEL are the proxy source levels for impact pile driving used to calculate distances to PTS; dB re 1 μPa = decibels (dB) referenced to a pressure of 1 microPascal, measures underwater SPL.; dB re 1 μPa²-sec = dB referenced to a pressure of 1 microPascal squared per second, measures underwater SEL.

With regards to the proxy values summarized in Table 6, very little information is available regarding source levels for in-water rotary drilling activities. As a conservative measure and to be consistent with previously issued IHAs for similar projects in the region, a proxy of 154 dB RMS is proposed for all rotary drilling activities (Dazey, 2012).

NMFS recommends treating DTH systems as both impulsive and continuous, non-impulsive sound source types simultaneously. Thus, impulsive thresholds are used to evaluate Level A harassment, and the continuous threshold is used to evaluate Level B harassment. The Navy consulted with NMFS to obtain the appropriate proxy values for DTH mono- and cluster-hammers. With regards to DTH mono-hammers, NMFS recommended proxy levels for Level A harassment based on available data regarding DTH systems of similar sized piles and holes (Table 6) (Denes *et al.,* 2019; Guan and Miner, 2020; Reyff and Heyvaert, 2019; Reyff, 2020; Heyvaert and Reyff, 2021). No hydroacoustic data exist for cluster DTH systems; therefore, NMFS recommends proxy values based off of regression and extrapolation calculations of existing data for mono-hammers until hydroacoustic data on DTH cluster drills be obtained (NMFS, 2022). Because of the high number of hammers and strikes for this system, DTH cluster drills were treated as a continuous sound source for the time component of Level A harassment (*i.e.,* for the entire duration DTH cluster drills are operational, they were considered to be producing strikes, rather than indicating the number of strikes per second, which was unknown), but still used the impulsive thresholds.

At the time of the Navy's application submission, NMFS recommended that the RMS SPL at 10 m should be 167 dB when evaluating Level B harassment (Heyvaert and Reyff, 2021 as cited in NMFS, 2021b) for all DTH pile/hole sizes. However, since that time, NMFS has received additional clarifying information regarding DTH data presented in Reyff and Heyvaert (2019) and Reyff (2020) that allows for different RMS SPL at 10 m to be recommended for piles/holes of varying diameters (NMFS, 2022). Therefore, NMFS proposes to use the following proxy RMS SPLs at 10 m to evaluate Level B harassment from this sound source in this analysis (Table 6): 156 dB RMS for the 4 to 6 inch mono hammers (Reyff and Heyvaert, 2019; Reyff, 2020), 167 dB RMS for the 9 inch mono-hammers (Heyvaert and Reyff, 2021), and 174 dB RMS for all DTH cluster drills greater or equal to 74 inches (Reyff and Heyvaert, 2019; Reyff, 2020). See Footnote 6 to Table 6.

Rock hammering is analyzed as an impulsive noise source. For purposes of this analysis, it is assumed that the hammer would have a maximum strike rate of 460 strikes per minute and would operate for a maximum duration of 15 minutes before needing to reposition or stop to check progress. Therefore, noise impacts for rock hammering activities are assessed using the number of blows per 15-minute interval (6,900 blows) and the number of 15-minute intervals anticipated over the course of the day based on the durations provided in Tables 1, 7, and 8. As with rotary drilling, very little information is available regarding source levels associated with nearshore rock hammering. In previous IHAs related to the Shipyard, NMFS relied on preliminary measurements from the Tappan Zee Bridge replacement project (Reyff, 2018a, 2018b) as well as data from a WSDOT concrete pier demolition project (Escude, 2012) to inform proxy SLs for rock hammering. However, a few discrepancies in the preliminary data of the Tappan Zee Bridge reports have been identified resulting from NMFS' further inspection into the report's data. Therefore, NMFS proposes to use the SLs reported only from the Escude (2012) concrete pier demolition project as proxy values for rock hammering activities associated with P–381 (Table 6).

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

$$TL = B * \log10 (R1/R2),$$

Where:

B = transmission loss coefficient (assumed to be 15)

R1 = the distance of the modeled SPL from the driven pile, and

R2 = the distance from the driven pile of the initial measurement.

This formula neglects loss due to scattering and absorption, which is assumed to be zero here. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, most notably the water bathymetry and presence or absence of reflective or absorptive conditions including in-water structures and sediments. The recommended TL coefficient for most nearshore environments is the practical spreading value of 15. This value results in an expected propagation environment that would lie between spherical and cylindrical spreading loss conditions, which is the most appropriate assumption for the Navy's proposed construction activities in the absence of specific modelling. All Level B harassment isopleths are reported in Tables 7 and 8 considering RMS SLs.

Level A Harassment Zones—The ensonified area associated with Level A harassment is more technically challenging to predict due to the need to account for a duration component. Therefore, NMFS developed an optional User Spreadsheet tool to accompany the Technical Guidance that can be used to relatively simply predict an isopleth distance for use in conjunction with marine mammal density or occurrence to help predict potential takes. We note that because of some of the assumptions included in the methods underlying this optional tool, we anticipate that the resulting isopleth estimates are typically going to be overestimates of some degree, which may result in an overestimate of potential take by Level A harassment. However, this optional tool offers the best way to estimate isopleth distances when more sophisticated modeling methods are not available or practical. For stationary sources (such as from impact and vibratory pile driving, drilling, DTH, and rock hammering), the optional User Spreadsheet tool predicts the distance at which, if a marine mammal remained at that distance for the duration of the activity, it would be expected to incur PTS. Inputs used in the User Spreadsheet can be found in Appendix A of the Navy's application, Appendix A of the Navy's addendum, and the resulting isopleths are reported in Tables 7 and 8.

TABLE 7—CALCULATED DISTANCE AND AREAS OF LEVEL A AND LEVEL B HARASSMENT FOR IMPULSIVE NOISE
[DTH, impact pile driving, hydraulic rock hammering]

Activity ID	Year [1]/ activity	Purpose	Duration, count, size, and or rate	Total production days	Level A harassment [2]		Level B harassment
					High frequency cetaceans (harbor porpoise)	Phocid pinnipeds	All species
1	2/Hydraulic Rock Hammer.	Shutter Panel Demolition (112 panels).	5 hours/day (20 intervals/day at 15 each).	56	5,034.5 m/0.417417 km².	2,261.9 m/0.417417 km².	541.17 m/0.277858 km².
3	2–3/Hydraulic Rock Hammer.	Removal of Granite Quay Wall (2,800 cy).	2.5 hours/day (10 intervals/day at 15 min each).	47	3,171.6 m/0.417417 km².	1,424.9 m/0.417417 km².	541.17 m/0.277858 km².
4	2–3/Hydraulic Rock Hammer.	Berth 1 Top of Wall Demolition for Waler Install (320 lf).	10 hours/day (40 intervals/day at 15 min each).	74	7,991.8 m/0.417417 km².	3,590.5 m/0.417417 km².	541.17 m/0.277858 km².
6	2/Hydraulic Rock Hammer.	Mechanical Rock Removal (700 cy) at Berth 11 Basin Floor.	12 hours/day (48 intervals/day at 15 min each).	60	9,024.7 m/0.417417 km².	4,054.5 m/0.417417 km².	541.17 m/0.277858 km².
10	2/Hydraulic Rock Hammer.	Mechanical Rock Removal (300 cy) at Berth 1 Basin Floor.	12 hours/day (48 intervals/day at 15 min each).	25	9,024.7 m/0.417417 km².	4,054.5 m/0.417417 km².	541.17 m/0.277858 km².
21	2/Hydraulic Rock Hammer.	Removal of Emergency Repair Concrete (500 cy) at Berth 1.	4 hours/day (16 intervals/day at 15 min each).	15	4,388.6 m/0.417417 km².	1,949.2 m/0.417417 km².	541.17 m/0.277858 km².
7	2/DTH Monohammer.	Relief Holes at Berth 11 Basin Floor.	924 4–6 inch holes, 27 holes/day.	35	178.9 m/0.047675 km²	80.4 m/0.014413 km²	2,512 m/0. 417417 km².
11	2/DTH Monohammer.	Dry Dock 1 North entrance Rock Anchors.	50 9-inch holes, 2 holes/day.	25	244.8 m/0.073751 km²	110 m/0.022912 km²	13,594 m/0.417417 km².
22	2–3/DTH Monohammer.	Center Wall Foundation Rock Anchors.	72 9-inch holes, 2 holes/day.	36	244.8 m/0.073751 km²	110 m/0.022912 km²	13,594 m/0.417417 km².
34	3–4 DTH Monohammer.	Dry Dock 1 North Rock Anchors.	36 9-inch holes, 2 holes/day.	18	244.8 m/0.073751 km²	110 m/0.022912 km²	13,594 m/0.417417 km².
35	4–5/DTH Monohammer.	Dry Dock 1 West Rock Anchors.	36 9-inch holes, 2 holes/day.	18	244.8 m/0.073751 km²	110 m/0.022912 km²	13,594 m/0. 417417 km².
R	2/Impact Pile Driving.	Dry Dock 1 North Entrance Temporary Cofferdam.	48 28-inch Z-shaped sheets, 8 sheets/day.	6	1,568.6 m/0.417417 km².	704.7 m/0.364953 km²	2,512 m/0.417417 km².
5	2/Impact Pile Driving.	Berth 1 Support of Excavation.	28 28-inch Z-shaped sheets, 4 piles/day.	8	988.2 m/0.403411 km²	444.0 m/0.201158 km²	2,512 m/0.417417 km².
8	2/Impact Pile Driving.	Temporary Cofferdam Extension.	14 28-inch Z-shaped sheets, 4 piles/day.	4	988.2 m/0.403411 km²	444.0 m/0.201158 km²	2,512 m/0.417417 km².
12	2/Impact Pile Driving.	Center Wall Tie-in to West Closure Wall.	15 28-inch Z-shaped sheets, 4 piles/day.	4	988.2 m/0.403411 km²	444.0 m/0.201158 km²	2,512 m/0.417417 km².
24	2–3/Impact Pile Driving.	Center Wall East Tie-in to Existing Wall.	23 28-inch Z-shaped sheets, 2 piles/day.	12	622.5 m/0.334747 km²	279.7 m/0.090757 km²	2,512 m/0.417417 km².
A4	2/DTH Cluster Drill.	Dry Dock 1 North Entrance Foundation Support Piles.	18 78-inch shafts, 10 hours/day, 6.5 days/shaft.	117	84,380.4 m/0.417417 km².	37,909.7 m/0.417417 km².	39,811 m/0.417417 km².
9d	2/DTH Cluster Drill.	Gantry Crane Support Piles.	16 72-inch shafts, 10 hours/day, 5 days/shaft.	80	67,025.7 m/0.417417 km².	30,112.8 m/0.417417 km².	39,811 m/0.417417 km².
13d	2–3/DTH Cluster Drill.	Dry Dock 1 North Temporary Work Trestle.	20 84-inch shafts, 10 hours/day, 3.5 days/shaft.	70	106,228.6 m/0.417417 km².	47,725.5 m/0.417417 km².	39,811 m/0.417417 km².
15d	2–3/DTH Cluster Drill.	Dry Dock 1 North Leveling Piles (Diving Board Shafts).	18 78-inch shafts, 10 hours/day, 7.5 days/shaft.	135	84,380.4 m/0.417417 km².	37,909.7 m/0.417417 km².	39,811 m/0.417417 km².
16d	2–3/DTH Cluster Drill.	Wall Shafts for Dry Dock 1 North.	20 78-inch shafts, 10 hours/day, 7.5 days/shaft.	150	84,380.4 m/0.417417 km².	37,909.7 m/0.417417 km².	39,811 m/0.417417 km².
17d	2–3/DTH Cluster Drill.	Foundation Shafts for Dry Dock 1 North.	23 108-inch shafts, 10 hours/day, 8.5 days/shaft.	196	225,376.2 m/0.417417 km².	101,255.2 m/0.417417 km².	39,811 m/0.417417 km².
29d	3–4/DTH Cluster Drill.	Dry Dock 1 West Temporary Work Trestle.	20 84-inch shafts, 10 hours/day, 3.5 days/shaft.	70	106,228.6 m/0.417417 km².	47,725.5 m/0.417417 km².	39,811 m/0.417417 km².
31d	3–4/DTH Cluster Drill.	Wall Shafts for Dry Dock 1 West.	22 78-inch shafts, 10 hours/day, 7.5 days/shaft.	165	84,380.4 m/0.417417 km².	37,909.7 m/0.417417 km².	39,811 m/0.417417 km².

TABLE 7—CALCULATED DISTANCE AND AREAS OF LEVEL A AND LEVEL B HARASSMENT FOR IMPULSIVE NOISE—Continued

[DTH, impact pile driving, hydraulic rock hammering]

Activity ID	Year[1]/activity	Purpose	Duration, count, size, and or rate	Total production days	Level A harassment[2]		Level B harassment
					High frequency cetaceans (harbor porpoise)	Phocid pinnipeds	All species
32d	3–4/DTH Cluster Drill.	Foundation Shafts for Dry Dock 1 West.	23 108-inch shafts, 10 hours/day, 8.5 days/pile.	196	225,376.2 m/0.417417 km².	101,255.2 m/0.417417 km².	39,811 m/0.417417 km².
33d	3–4/DTH Cluster Drill.	Dry Dock 1 West Leveling Piles (Diving Board Shafts).	18 78-inch shafts, 10 hours/day, 7.5 days/pile.	135	84,380.4 m/0.417417 km².	37,909.7 m/0.417417 km².	39,811 m/0.417417 km².

[1] Note, for the purposes of this analysis, the proposed construction years are identified as years 2 through 5; takes for marine mammals during Year 1 of the Navy's construction activities were authorized in a previously issued IHA (87 FR 19886; April 6, 2022).

[2] To determine underwater harassment zone size, ensonified areas from the source were clipped along the shoreline using Geographical Information Systems (GIS).

TABLE 8—CALCULATED DISTANCE AND AREAS OF LEVEL A AND LEVEL B HARASSMENT FOR NON-IMPULSIVE NOISE

[Rotary drilling and vibratory pile driving/extracting]

Activity ID	Year[1]/activity	Purpose	Duration, count, size, and or rate	Total production days	Level A harassment[2]		Level B harassment
					High frequency cetaceans (harbor porpoise)	Phocid pinnipeds	All species
R	2/Vibratory Pile Driving.	Dry Dock 1 North Entrance Temporary Cofferdam.	48 28-inch Z-shaped sheets, 8 sheets/day.	6	19.4 m/0.001041 km²	8.0 m/0.0002 km²	13,594 m/0.417417 km².
2	2–3/Vibratory Extraction.	Remove Berth 1 Sheet Piles.	168 25-inch Z-shaped sheets, 4 piles/day.	42	12.2 m/0.000454 km²	5.0 m/0.000078 km²	13,594 m/0.417417 km².
5	2/Vibratory Pile Driving.	Install Berth 1 Support of Excavation.	28 28-inch Z-shaped sheets, 4 piles/day.	8	12.2 m/0.000454 km²	5.0 m/0.000078 km²	13,594 m/0.417417 km².
8	2/Vibratory Pile Driving.	Install Temporary Cofferdam Extension.	14 28-inch Z-shaped sheets, 4 piles/day.	4	12.2 m/0.000454 km²	5.0 m/0.000078 km²	13,594 m/0.417417 km².
12	2/Vibratory Pile Driving.	Center Wall Tie-In to Existing West Closure Wall.	15 28-inch Z-shaped sheets, 4 piles/day.	4	12.2 m/0.000454 km²	5.0 m/0.000078 km²	13,594 m/0.417417 km².
18	2/Vibratory Extraction.	Berth 11 End Wall Temporary Guide Wall.	60 28-inch Z-shaped sheets, 8 piles/day.	10	19.4 m/0.001041 km²	8.0 m/0.0002 km²	13,594 m/0.417417 km².
19	2/Vibratory Extraction.	Remove Berth 1 Support of Excavation.	28 28-inch Z-shaped sheets, 8 piles/day.	5	19.4 m/0.001041 km²	8.0 m/0.0002 km²	13,594 m/0.417417 km².
20	2/Vibratory Extraction.	Remove Berth 1 Emergency Repairs.	108 28-inch Z-shaped sheets, 6 piles/day.	18	16.0 m/0.000733 km²	6.6 m/0.000136 km²	13,594 m/0.417417 km².
23	2–3/Vibratory Extraction.	Dry Dock 1 North-Remove Center Wall Tie-in to West Closure Wall.	16 28-inch Z-shaped sheets, 8 piles/day.	3	19.4 m/0.001041 km²	8.0 m/0.0002 km²	13,594 m/0.417417 km².
24	2–3/Vibratory Pile Driving.	Center Wall East Tie-in to Existing Wall.	23 28-inch Z-shaped sheets, 2 piles/day.	12	7.7 m/0.000185 km²	3.2 m/0.000032 km²	13,594 m/0.417417 km².
25	2–3/Vibratory Extraction.	Dry Dock 1 West Remove Center Wall Tie-in to West Closure Wall.	15 28-inch Z-shaped sheets, 8 piles/day.	3	19.4 m/0.001041 km²	8.0 m/0.0002 km²	13,594 m/0.417417 km².
26	2–3/Vibratory Extraction.	Remove Center Wall Tie-in to Existing Wall.	23 28-inch, Z-shaped sheets, 8 piles/day.	12	19.4 m/0.001041 km²	8.0 m/0.0002 km²	13,594 m/0.417417 km².
27	2–3/Vibratory Extraction.	Remove Temporary Cofferdam.	96 28-inch Z-shaped sheets, 8 piles/day.	12	19.4 m/0.001041 km²	8.0 m/0.0002 km²	13,594 m/0.417417 km².
28	2–3/Vibratory Extraction.	Remove Temporary Cofferdam Extension.	14 28-inch Z-shaped sheets, 8 piles/day.	2	19.4 m/0.001041 km²	8.0 m/0.0002 km²	13,594 m/0.417417 km².
A1	2/Rotary Drill.	Dry Dock 1 North Entrance Foundation Support Piles—Install Outer Casing.	18 102-inch borings, 1 hour/day, 1 casing/day.	18	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².
A2	2/Rotary Drill.	Dry Dock 1 North Entrance Foundation Support Piles—Pre-Drill Socket.	18 102-inch borings, 9 hours/day, 1 socket/day.	18	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.41747 km².

TABLE 8—CALCULATED DISTANCE AND AREAS OF LEVEL A AND LEVEL B HARASSMENT FOR NON-IMPULSIVE NOISE—Continued

[Rotary drilling and vibratory pile driving/extracting]

Activity ID	Year[1]/activity	Purpose	Duration, count, size, and or rate	Total production days	Level A harassment[2]		Level B harassment
					High frequency cetaceans (harbor porpoise)	Phocid pinnipeds	All species
A3	2/Rotary Drill.	Dry Dock 1 North Entrance Foundation Support Piles—Remove Outer Casing.	18 102-inch borings, 15 minutes/casing, 1 casing/day.	18	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
9a	2/Rotary Drill.	Gantry Crane Support—Install Outer Casing.	16 102-inch borings, 1 hour/day, 1 casing/day.	16	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².
9b	2/Rotary Drill.	Gantry Crane Support—Pre-Drill Socket.	16 102-inch borings, 9 hours/day, 1 socket/day.	16	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
9c	2/Rotary Drill.	Gantry Crane Support—Remove Outer Casing.	16 102-inch borings, 15 minutes/casing, 1 casing/day.	16	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
13a	2–3/Rotary Drill.	Dry Dock 1 North Temporary Work Trestle—Install Outer Casing.	20 102-inch borings, 1 hour/day, 1 casing/day.	20	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².
13b	2–3/Rotary Drill.	Dry Dock 1 North Temporary Work Trestle—Pre-Drill Socket.	20 102-inch borings, 9 hours/day, 1 socket/day.	20	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
13c	2–3/Rotary Drill.	Dry Dock 1 North Temporary Work Trestle—Remove Outer Casing.	20 102-inch borings, 15 minutes/casing, 1 casing//day.	20	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
14	2–3/Rotary Drill.	Remove Dry Dock 1 North Temporary Work Trestle Piles.	20 84-inch borings, 15 minutes/casing, 1 casing/day.	20	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
15a	2–3/Rotary Drill.	Dry Dock 1 North Leveling Piles—Install Outer Casing.	18 84-inch borings, 1 hour/day, 1 casing/day.	18	2.1 m/0.000014 km²	1.3 m/0.000005km²	1,848 m/0.417417 km².
15b	2–3/Rotary Drill.	Dry Dock 1 North Leveling Piles—Pre-Drill Socket.	18 84-inch borings, 9 hours/day, 1 socket/day.	18	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
15c	2–3/Rotary Drill.	Dry Dock 1 North Leveling Piles—Remove Outer Casing.	18 84-inch borings, 15 minutes/casing, 1 casing/day.	18	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
16a	2–3/Rotary Drill.	Dry Dock 1 North Wall Shafts—Install Outer Casing.	20 102-inch borings, 1 hour/day, 1 casing/day.	20	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².
16b	2–3/Rotary Drill.	Dry Dock 1 North Wall Shafts—Pre-Drill Socket.	20 102-inch borings, 9 hours/day, 1 socket/day.	20	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
16c	2–3/Rotary Drill.	Dry Dock 1 North Wall Shafts—Remove Outer Casing.	20 102-inch borings, 15 minutes/casing, 1 casing/day.	20	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
17a	2–3/Rotary Drill.	Dry Dock 1 North Foundation Shafts—Install Outer Casing.	23 126-inch borings, 1 hour/day, 1 casing/day.	23	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².
17b	2–3/Rotary Drill.	Dry Dock 1 North Foundation Shafts Pre-Drill Sockets.	23 126-inch borings, 9 hours/day, 1 socket/day.	23	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
17c	2–3/Rotary Drill.	Dry Dock 1 North Foundation Shafts—Remove Outer Casing.	23 126-inch borings, 15 minutes/casing, 1 casing/day.	23	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
29a	3–4/Rotary Drill.	Dry Dock 1 West Temporary Work Trestle—Install Outer Casing.	20 102-inch borings, 1 hour/day, 1 casing/day.	20	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².
29b	3–4/Rotary Drill.	Dry Dock 1 West Temporary Work Trestle—Pre-Drill Socket.	20 102-inch borings, 9 hours/day, 1 socket/day.	20	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
29c	3–4/Rotary Drill.	Dry Dock 1 West Temporary Work Trestle—Remove Outer Casing.	20 102-inch borings, 15 minutes/casing, 1 casing/day.	20	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
30	3–4/Rotary Drill.	Dry Dock 1 West Remove Temporary Work Trestle Piles.	20 84-inch borings, 15 minutes/pile, 1 pile/day.	20	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
31a	3–4/Rotary Drill.	Dry Dock 1 West Wall Shafts—Install Outer Casing.	22 102-inch borings, 1 hour/day, 1 casing/day.	22	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².

TABLE 8—CALCULATED DISTANCE AND AREAS OF LEVEL A AND LEVEL B HARASSMENT FOR NON-IMPULSIVE NOISE—Continued

[Rotary drilling and vibratory pile driving/extracting]

Activity ID	Year [1]/ activity	Purpose	Duration, count, size, and or rate	Total production days	Level A harassment [2]		Level B harassment
					High frequency cetaceans (harbor porpoise)	Phocid pinnipeds	All species
31b	3–4/Rotary Drill.	Dry Dock 1 West Wall Shafts—Pre-Drill Socket.	22 102-inch borings, 9 hours/day, 1 socket/day.	22	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
31c	3–4/Rotary Drill.	Dry Dock 1 West Wall Shafts—Remove Outer Casing.	22 102-inch borings, 15 minutes/casing, 1 casing/day.	22	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
32a	3–4/Rotary Drill.	Dry Dock 1 West Foundation Shafts—Install Outer Casing.	23 126-inch borings, 1 hour/day, 1 casing/day.	23	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².
32b	3–4/Rotary Drill.	Dry Dock 1 West Foundation Shafts Pre-Drill Sockets.	23 126-inch borings, 9 hours/day, 1 socket/day.	23	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
32c	3–4/Rotary Drill.	Dry Dock 1 West Foundation Shafts—Remove Outer Casing.	23 126-inch borings, 15 minutes/casing, 1 casing/day.	23	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².
33a	3–4/Rotary Drill.	Dry Dock 1 North Leveling Piles—Install Outer Casing.	18 84-inch borings, 1 hour/day, 1 casing/day.	18	2.1 m/0.000014 km²	1.3 m/0.000005 km²	1,848 m/0.417417 km².
33b	3–4/Rotary Drill.	Dry Dock 1 West, Leveling Piles—Pre-Drill Socket.	18 84-inch borings, 9 hours/day, 1 socket/day.	18	8.9 m/0.000248 km²	5.4 m/0.000091 km²	1,848 m/0.417417 km².
33c	3–4/Rotary Drill.	Dry Dock 1 North Leveling Piles—Remove Outer Casing.	18 84-inch borings, 15 minutes/casing, 1 casing/day.	18	0.8 m/0.000002 km²	0.5 m/0.000001 km²	1,848 m/0.417417 km².

[1] Note, for the purposes of this analysis, the proposed construction years are identified as years 2 through 5; takes for marine mammals during Year 1 of the Navy's construction activities were authorized in a previously issued IHA (87 FR 19886; April 6, 2022).

[2] To determine underwater harassment zone size, ensonified areas from the source were clipped along the shoreline using Geographical Information Systems (GIS).

The calculated maximum distances corresponding to the underwater marine mammal harassment zones from impulsive (impact pile driving, rock hammering, DTH) and non-impulsive (vibratory pile driving, rotary drilling) noise and the area of the harassment zone within the region of influence (ROI) are summarized in Tables 7 and 8, respectively. Sound source locations were chosen to model the greatest possible affected areas; typically, these locations would be at the riverward end of the super flood basin. The calculated distances do not take the land masses into consideration, but the ensonified areas do. Neither consider the reduction that would be achieved by the required use of a bubble curtain and therefore all take estimates are considered conservative. Refer to Figures 6–1 through 6–20 of the Navy's application for visual representations of the calculated maximum distances corresponding to the underwater marine mammal harassment zones from impulsive (impact pile driving, rock hammering, DTH) and non-impulsive (vibratory pile driving, rotary drilling) noise and the corresponding area of the harassment zone within the ROI.

Calculated distances to Level A harassment and Level B harassment thresholds are large, especially for DTH and rock hammering activities. However, in most cases the full distance of sound propagation would not be reached due to the presence of land masses and anthropogenic structures that would prevent the noise from reaching nearly the full extent of the harassment isopleths. Refer to Figure 1–3 in the Navy's application for the ROI, which illustrates that the land masses preclude the sound from traveling more than approximately 870 m (3,000 ft) from the source, at most. Areas encompassed within the threshold (harassment zones) were calculated by using a Geographical Information System (GIS) to clip the maximum calculated distances to the extent of the ROI (see Figure 2).

Concurrent Activities—Simultaneous use of pile drivers, hammers, and drills could result in increased SPLs and harassment zone sizes given the proximity of the component sites and the rules of decibel addition (see Table 9 below). Due to the relatively small size of the ROI, the use of a single DTH cluster drill or rock hammer would ensonify the entire ROI to the Level A (PTS Onset) harassment thresholds (refer to Table 7). Therefore, when this equipment is operated in conjunction with other noise-generating equipment, there would be no change in the size of the harassment zone. The entire ROI would remain ensonified to the Level A harassment thresholds for the duration of the activity and there would be no Level B harassment zone. However, when DTH cluster drills or rock hammers are not in use, increased SPLs and harassment zone sizes within the ROI could result. Due to the substantial amount of rock hammering and DTH excavation required for the construction of the multifunctional expansion of Dry Dock 1, the only scenarios identified in which cluster drills and/or rock hammers would not be in operation would be at the end of the project (construction years 3 and 4) when two rotary drills or two rotary drills and a DTH mono-hammer (9-inch) could be used simultaneously (refer to Table 2).

When two noise sources have overlapping sound fields, there is potential for higher sound levels than for non-overlapping sources because the isopleth of one sound source encompasses the sound source of another isopleth. In such instances, the sources are considered additive and combined using the rules of decibel addition, presented in Table 9 below (NMFS, 2021d; WSDOT, 2020).

TABLE 9—ADJUSTMENTS FOR SOUND EXPOSURE LEVEL CRITERION

Source types	Difference in sound level (at specified meters)	Adjustments to specifications for Level A harassment RMS/SEL_{ss} * calculations
Non-impulsive, continuous/Non-impulsive, continuous, OR.	0 or 1 dB	Add 3 dB to the highest sound level (at specified meters) AND adjust number of piles per day to account for overlap (space and time).
	2 or 3 dB	Add 2 dB to the highest sound level (at specified meters) AND adjust number of piles per day to account for overlap (space and time).
Impulsive source (multiple strikes per second)/Impulsive source (multiple strikes per second).	4 to 9 dB	Add 1 dB to the highest sound level (at specified meters) AND adjust number of piles per day to account for overlap (space and time).
	10 dB or more	Add 0 dB to the highest sound level (at specified meters) AND adjust number of piles per day to account for overlap (space and time).

* RMS level for vibratory pile driving/rotary hammer and single strike SEL (SEL_{ss}) level for DTH/rock hammer.

For simultaneous usage of three or more continuous sound sources, the three overlapping sources with the highest SLs are identified. Of the three highest SLs, the lower two are combined using the above rules, then the combination of the lower two is combined with the highest of the three. For example, with overlapping isopleths from 24-, 36-, and 42-inch diameter steel pipe piles with sound source levels of 161, 167, and 168 dB RMS respectively, the 24- and 36-inch would be added together; given that 167–161 = 6 dB, then 1 dB is added to the highest of the two sound source levels (167 dB), for a combined noise level of 168 dB. Next, the newly calculated 168 dB is added to the 42-inch steel pile with sound source levels of 168 dB. Since 168–168 = 0 dB, 3 dB is added to the highest value, or 171 dB in total for the combination of 24-, 36-, and 42-inch steel pipe piles (NMFS, 2021d). By using this method, revised proxy SPLs were determined for the use of two 102-inch diameter rotary drills and the use of two 108-inch rotary drills and one 9-inch DTH mono-hammer. The revised proxy values are presented in Table 10 and the resulting harassment zones are summarized in Table 11 (visually depicted in Figures 6–21 and 6–22 in the Navy's application).

TABLE 10—REVISED PROXY VALUES FOR SIMULTANEOUS USE OF NON-IMPULSIVE SOURCES

Source A		Source B		Revised proxy RMS SPL (dB re 1 μPa)
Equipment	RMS SPL (dB re 1 μPa)	Equipment	RMS SPL (dB re 1 μPa)	
Rotary Drill	154	Rotary Drill	154	157
Two Rotary Drills	157	DTH Mono-Hammer	167	167

TABLE 11—LEVEL A AND LEVEL B HARASSMENT ZONES RESULTING FROM CONCURRENT ACTIVITIES

Multiple source scenario	Level A harassment		Level B harassment
	High frequency cetaceans (harbor porpoise)	Phocid pinnipeds	All species
2 Rotary Drills (9 hrs)	23.6 m/0.001514 km²	9.7 m/0.000294 km²	2,929 m/0.417417 km².
2 Rotary Drills (9 hrs) and 1 DTH Mono-Hammer (5 hrs).	74.2 m/0.012773 km²	30.5 m/0.002489 km²	13,594 m/0.417417 km².

Marine Mammal Occurrence and Take Estimation

In this section we provide information about the occurrence of marine mammals, including density or other relevant information, that will inform the take calculations. We also describe how the information provided above is synthesized to produce a quantitative estimate of the take that is reasonably likely to occur and proposed for authorization.

Potential exposures to impact and vibratory pile driving, rotary drilling, DTH, and rock hammering noise for each acoustic threshold were estimated using marine mammal density estimates (N) from the Navy Marine Species Density Database (NMSDD; Navy, 2017) or from monitoring reports from the Berth 11 Waterfront Improvements and P–310 construction projects. Specifically, where monitoring data specific to the project area were available, they were used, and the NMSDD data were used when there were no monitoring data available. The take estimate was determined using the following equation: take estimate = N * days of activity * area of harassment. A 10 m shutdown zone designed to prevent animal interactions with equipment was subtracted from the Level A harassment zone, and the area of the Level A harassment zone was subtracted from the Level B harassment zone to avoid double counting of takes during these take calculations. Days of construction were conservatively based on relatively slow daily production rates. The pile type, size, and installation method that produce the largest zone of influence were used to estimate exposure of marine mammals to noise impacts. In instances where an activity would ensonify the entire ROI to the Level A harassment threshold, all potential takes are assumed to be by Level A harassment.

Because some construction activities would occur over more than one construction year, the number of takes per year were determined by the percent duration of each construction activity occurring each year (calculated by months). For example, if an activity were to occur for 6 months, with 3 months occurring in year 2 and 3 months occurring in year 3, then 50 percent of the takes were assigned to year 2 and 50 percent to year 3. In instances where only 1 take was calculated but activities spanned more than one construction year, one take was requested for each construction year. Table 12 summarizes the calculated duration percentages for each activity that were used to divide take numbers by year.

TABLE 12—DIVISION OF TAKES BY CONSTRUCTION YEAR

Activity ID	Total amount and estimated dates	Activity component	Year 2 [1] % takes	Year 3 [1] % takes	Year 4 [1] % takes	Year 5 [1] % takes
(A1,2,3,4) Center Wall—Install Foundation Support Piles.	Drill 18 shafts, *Apr 23 to Aug 23*	Install 102-inch diameter outer casing.	100	0	0	0
		Pre-drill 102-inch outer casing	100	0	0	0
		Remove 102-inch outer casing	100	0	0	0
		Drill 79-inch diameter shaft	100	0	0	0
(R) Dry Dock 1 North Entrance—Install Temporary Cofferdam.	Install 48 sheet piles, *Apr 23 to May 23*.	28-inch wide Z-shaped sheets	100	0	0	0
(1) Berth 11—Remove Shutter Panels.	Remove 112 panels, *Apr 23 to Apr 23*.	Concrete shutter panels	100	0	0	0
(2) Berth 1—Remove Sheet Piles	Remove 168 sheet piles, *Apr 23 to Jun 24*.	25-inch-wide Z-shaped	80	20	0	0
(3) Berth 1—Remove Granite Block Quay Wall.	2,800 cy, *Apr 23 to Jun 24*	Removal of granite blocks	80	20	0	0
(4) Berth 1—Top of Wall Removal for Waler Installation.	320 lf, *Apr 23 to Jun 24*	Mechanical concrete removal	80	20	0	0
(5) Berth 1—Install southeast corner SOE.	Install 28 sheet piles, Apr 23 to Jul 23.	28-inch-wide Z-shaped	100	0	0	0
(6) Berth 11—Mechanical Rock Removal at Basin Floor.	700 cy, *Apr 23 to Aug 23*	Excavate Bedrock	100	0	0	0
(7) Berth 11 Face—Mechanical Rock Removal at Basin Floor.	Drill 924 relief holes, *Apr 23 to Aug 23*.	4–6 inch diameter holes	100	0	0	0
(8) Temporary Cofferdam Extension.	Install 14 sheet piles, *Apr 23 to Jun 23*.	28-inch-wide Z-shaped	100	0	0	0
(9a, b, c, d) Gantry crane Support Piles at Berth 1 West.	Drill 16 shafts, *Apr 23 to Aug 23*	Set 102-inch diameter casing	100	0	0	0
		Pre-drill 102-inch rock socket	100	0	0	0
		Remove 102-inch casing	100	0	0	0
		72-inch diameter shafts	100	0	0	0
(10) Berth 1—Mechanical Rock Removal at Basin Floor.	500 cy, *Apr 23 to Sep 23*	Excavate Bedrock	100	0	0	0
(11) Dry Dock 1 North Entrance—Drill Tremie Tie Downs.	Drill 50 rock anchors, *Apr 23 to Oct 23*.	9-inch diameter holes	100	0	0	0
(12) Center Wall—Install Tie-In to Existing West Closure Wall.	Install 15 sheet piles, *Apr 23 to Dec 23*.	28-inch wide Z-shaped	100	0	0	0
(13a, b, c, d) Dry Dock 1 North—Temporary Piles.	Drill 20 shafts, *May 23 to Nov 24*	Set 102-inch diameter casing	60	40	0	0
		Pre-drill 102-inch rock socket	60	40	0	0
		Remove 102-inch casing	60	40	0	0
		84-inch diameter shafts	60	40	0	0
(14) Dry Dock 1 North—Remove Temporary Work Trestle Piles.	Remove 20 piles, *May 23 to Nov 24*.	84-inch diameter drill piles	60	40	0	0
(15a, b, c, d) Dry Dock 1 North—Install Leveling Piles (Diving Board Shafts).	Drill 18 shafts, *May 23–Nov 24*	Set 84-inch casing	60	40	0	0
		Pre-drill 84-inch rock socket	60	40	0	0
		Remove 84-inch casing	60	40	0	0
		78-inch diameter shaft	60	40	0	0
(16a, b, c, d) Wall Shafts for Dry Dock 1 North.	Drill 20 shafts, *Jun 23 to Nov 24*	Set 102-inch diameter casing	60	40	0	0
		Pre-drill 102-inch rock socket	60	40	0	0
		Remove 102-inch casing	60	40	0	0
		Drill 78-inch diameter shaft	60	40	0	0
(17a, b, c, d) Foundation Shafts for Dry Dock 1 North.	Drill 23 shafts, *Jun 23 to Nov 24*	Set 126-inch diameter Casing	60	40	0	0
		Pre-drill 126-inch rock socket	60	40	0	0
		Remove 126-inch casing	60	40	0	0
		Drill 108-inch diameter shafts	60	40	0	0
(18) Berth 11 End Wall—Remove Temporary Guide Wall.	Remove 60 sheet piles, *Jul 23 to Aug 23*.	28-inch wide Z-shaped	100	0	0	0
(19) Remove Berth 1 southeast corner SOE.	Remove 28 sheet piles, *Jul 23 to Sep 23*.	28-inch-wide Z-shaped	100	0	0	0
(20) Removal of Berth 1 Emergency Repair Sheet Piles.	Remove 216 sheet piles, *Aug 23 to Mar 24*.	28-inch-wide Z-shaped	100	0	0	0
(21) Removal of Berth 1 Emergency Repair Tremie Concrete.	765 cubic meters (1,000 cy), *Aug 23 to Mar 24*.	Mechanical concrete removal	100	0	0	0
(22) Center wall foundation—Drill in monolith Tie Downs.	Install 72 rock anchors, *Aug 23 to May 24*.	9-inch diameter holes	80	20	0	0
(23) Center Wall—Remove tie-in to existing west closure wall (Dry Dock 1 North).	Remove 16 sheet piles, *Aug 23 to Aug 24*.	28-inch-wide Z-shaped	60	40	0	0
(24) Center wall East—sheet pile tie-in to Existing Wall.	Install 23 sheet piles, *Aug 23 to Oct 24*.	28-inch wide Z-shaped	50	50	0	0
(25) Remove tie-in to West Closure Wall (Dry Dock 1 West).	Remove 15 sheet pile, *Dec 23 to Dec 24*.	28-inch wide Z-shaped	30	70	0	0

TABLE 12—DIVISION OF TAKES BY CONSTRUCTION YEAR—Continued

Activity ID	Total amount and estimated dates	Activity component	Year 2[1] % takes	Year 3[1] % takes	Year 4[1] % takes	Year 5[1] % takes
(26) Remove Center wall East—sheet pile tie-in to Existing Wall (Dry Dock 1 West).	Remove 23 sheet piles, *Dec 23 to Dec 24*.	28-inch wide Z-shaped	30	70	0	0
(27) Dry Dock 1 north entrance—Remove Temporary Cofferdam.	Remove 96 sheet piles, *Jan 24 to Sep 24*.	28-inch wide Z-shaped	33	66	0	0
(28) Remove Temporary Cofferdam Extension.	Remove 14 sheet piles, *Jan 24 to Sep 24*.	28-inch wide Z-shaped	33	66	0	0
(29a, b, c, d) Dry Dock 1 West—Install Temporary Piles.	Drill 20 shafts, *Apr 24 to Feb 26*	Set 102-inch diameter casing	0	50	50	0
		Pre-drill 102-inch rock socket	0	50	50	0
		Remove 102-inch casing	0	50	50	0
		84-inch diameter shafts	0	50	50	0
(30) Dry Dock 1 West—Remove Temporary Work Trestle Piles.	Remove 20 piles, *Apr 24 to Feb 26*.	84-inch diameter piles	0	50	50	0
(31a, b, c, d) Wall Shafts for Dry Dock 1 West.	Drill 22 shafts, *Jun 24 to Feb 26*	Set 102-inch diameter casing	0	50	50	0
		Pre-drill 102-inch rock socket	0	50	50	0
		Remove 102-inch casing	0	50	50	0
		78-inch diameter shaft	0	50	50	0
(32a, b, c, d) Foundation Shafts for Dry Dock 1 West.	Drill 23 shafts, *Jun 24 to Feb 26*	Set 126-inch casing	0	50	50	0
		Pre-drill 126-inch rock socket	0	50	50	0
		Remove 126-inch casing	0	50	50	0
		Drill 108-inch diameter shaft	0	50	50	0
(33a, b, c, d) Dry Dock 1 West—Install Leveling Piles (Diving Board Shafts).	Drill 18 shafts, *Jun 24 to Feb 26*	Set 84-inch casing	0	50	50	0
		Pre-drill 84-inch rock socket	0	50	50	0
		Remove 84-inch casing	0	50	50	0
		Drill 78-inch diameter shaft	0	50	50	0
(34) Dry Dock 1 North—Tie Downs.	Install 36 rock anchors, *Jul 24 to Jul 25*.	9-inch diameter holes	0	70	30	0
(35) Dry Dock 1 West—Install Tie Downs.	Install 36 rock anchors, *Dec 25 to Dec 26*.	9-inch diameter hole	0	0	30	70

* Note, for the purposes of this analysis, the proposed construction years are identified as years 2 through 5; takes for marine mammals during Year 1 of the Navy's construction activities were authorized in a previously issued IHA (87 FR 19886; April 6, 2022).

We describe how the information provided above is brought together to produce a quantitative take estimate in the species sections below. A summary of take proposed for authorization is available in Table 16.

Harbor Porpoise

Harbor porpoises are expected to be present in the proposed project area from April to December. Based on density data from the NMSDD, their presence is highest in spring, decreases in summer, and slightly increases in fall. During construction monitoring in the project area, there were three harbor porpoise observations between April and December of 2017; two harbor porpoise observations in early August of 2018; and one harbor porpoise observation in 2020 (Cianbro, 2018; Navy, 2019; NAVFAC, 2021). There were no harbor porpoise observations in the project area in 2021 (NAVFAC, 2022). Given that monitoring data specific to the project area are available, the more general NMSDD data were not used to determine species density in the project area. Instead, the Navy used observation data from the 2017 and 2018 construction monitoring for the Berth 11 Waterfront Improvements Project and determined that the density of harbor porpoise for the largest harassment zone was equal to 0.04/km^2. Estimated take was calculated with this density estimate multiplied by the harassment zone multiplied by the days for each activity (see Table 13).

TABLE 13—ESTIMATED TAKE OF HARBOR PORPOISE BY PROJECT ACTIVITY

Activity ID	Year/activity	Purpose	Density	Total production days	Level A harassment zone (km²)	Proposed take by Level A harassment					Level B harassment zone (km²)	Proposed take by Level B harassment				
						Total	Year 2	Year 3	Year 4	Year 5		Total	Year 2	Year 3	Year 4	Year 5
A	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	0.04	18	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	0.04	18	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	0.04	18	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	2 DTH Cluster Drill.	Center Wall—Install Foundation Support Piles.	0.04	117	0.417417	2	2	0	0	0	0.417417	0	0	0	0	0
R	2 Vibratory Pile Driving.	Dry Dock 1 North Entrance—Install Temporary Cofferdam.	0.04	6	0.0014041	0	0	0	0	0	0.417417	0	0	0	0	0
	2 Impact Pile Driving.	Dry Dock 1 North Entrance—Install Temporary Cofferdam.	0.04	6	0.417417	0	0	0	0	0	0.417417	0	0	0	0	0
1	2 Hydraulic Rock Hammer.	Shutter Panel Demolition (112 panels).	0.04	56	0.417417	1	1	0	0	0	0.277858	0	0	0	0	0
2	2–3 Vibratory Extraction.	Remove Berth 1 Sheet Piles	0.04	42	0.000454	0	0	0	0	0	0.417417	[1]2	1	1	0	0
3	2–3 Hydraulic Rock Hammer.	Removal of Granite Quay Wall (2,800 cy).	0.04	47	0.417417	[1]2	1	1	0	0	0.277858	0	0	0	0	0
4	2–3 Hydraulic Rock Hammer.	Berth 1 Top of Wall Demolition for Waler Install (320 lf).	0.04	74	0.417417	[1]2	1	1	0	0	0.277858	0	0	0	0	0
5	2 Vibratory Pile Driving.	Install Berth 1 Support of Excavation.	0.04	8	0.000454	0	0	0	0	0	0.417417	0	0	0	0	0
	2 Impact Pile Driving.	Berth 1 Support of Excavation	0.04	8	0.403411	0	0	0	0	0	0.417417	0	0	0	0	0
6	2 Hydraulic Rock Hammer.	Mechanical Rock Removal (700 cy) at Berth 11 Basin Floor.	0.04	60	0.417417	1	1	0	0	0	0.277858	0	0	0	0	0
7	2 DTH Mono-hammer.	Relief Holes at Berth 11 Basin Floor.	0.04	35	0.047675	0	0	0	0	0	0.417417	1	1	0	0	0
8	2 Vibratory Pile Driving.	Install Temporary Cofferdam Extension.	0.04	4	0.000454	0	0	0	0	0	0.417417	0	0	0	0	0
	2 Impact Pile Driving.	Temporary Cofferdam Extension	0.04	4	0.403411	0	0	0	0	0	0.417417	0	0	0	0	0
9	2 Rotary Drill	Gantry Crane Support—Install Outer Casing.	0.04	16	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	2 Rotary Drill	Gantry Crane Support—Pre-Drill Socket.	0.04	16	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	2 Rotary Drill	Gantry Crane Support—Remove Outer Casing.	0.04	16	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	2 DTH Cluster Drill.	Gantry Crane Support Piles	0.04	80	0.417417	1	1	0	0	0	0.417417	0	0	0	0	0
10	2 Hydraulic Rock Hammer.	Mechanical Rock Removal (300 cy) at Berth 1 Basin Floor.	0.04	25	0.417417	0	0	0	0	0	0.277858	0	0	0	0	0
11	2 DTH Mono-hammer.	Dry Dock 1 North Entrance Rock Anchors.	0.04	25	0.073751	0	0	0	0	0	0.417417	0	0	0	0	0
12	2 Vibratory Pile Driving.	Center Wall Tie-In to Existing West Closure Wall.	0.04	4	0.000454	0	0	0	0	0	0.417417	0	0	0	0	0
	2 Impact Pile Driving.	Center Wall Tie-in to West Closure Wall.	0.04	4	0.403411	0	0	0	0	0	0.417417	0	0	0	0	0
13	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Install Outer Casing.	0.04	20	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Pre-Drill Socket.	0.04	20	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Remove Outer Casing.	0.04	20	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 DTH Cluster Drill.	Dry Dock 1 North Temporary Work Trestle.	0.04	70	0.417417	[1]2	1	1	0	0	0.417417	0	0	0	0	0

14	2–3 Rotary Drill	Remove Dry Dock 1 North Temporary Work Trestle Piles.	0.04	20	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
15	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Install Outer Casing.	0.04	18	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Pre-Drill Socket.	0.04	18	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Remove Outer Casing.	0.04	18	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 DTH Cluster Drill.	Dry Dock 1 North Leveling Piles (Diving Board Shafts).	0.04	135	0.417417	2	1	1	0	0	0.417417	0	0	0	0	0
16	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts—Install Outer Casing.	0.04	20	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts – Pre-Drill Socket.	0.04	20	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts—Remove Outer Casing.	0.04	20	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 DTH Cluster Drill.	Wall Shafts for Dry Dock 1 North	0.04	150	0.417417	3	2	1	0	0	0.417417	0	0	0	0	0
17	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts—Install Outer Casing.	0.04	23	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts Pre-Drill Sockets.	0.04	23	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts—Remove Outer Casing.	0.04	23	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 DTH Cluster Drill.	Foundation Shafts for Dry Dock 1 North.	0.04	196	0.417417	3	2	1	0	0	0.417417	0	0	0	0	0
18	2 Vibratory Extraction.	Berth 11 End Wall Temporary Guide Wall.	0.04	10	0.001041	0	0	0	0	0	0.417417	0	0	0	0	0
19	2 Vibratory Extraction.	Remove Berth 1 Support of Excavation.	0.04	5	0.001041	0	0	0	0	0	0.417417	0	0	0	0	0
20	2 Vibratory Extraction.	Remove Berth 1 Emergency Repairs.	0.04	18	0.000733	0	0	0	0	0	0.417417	1	1	0	0	0
21	2 Hydraulic Rock Hammer.	Removal of Emergency Repair Concrete (500 cy) at Berth 1.	0.04	15	0.417417	0	0	0	0	0	0.277858	0	0	0	0	0
22	2–3 DTH Monohammer.	Center Wall Foundation Rock Anchors.	0.04	36	0.073751	0	0	0	0	0	0.417417	0	0	0	0	0
23	2–3 Vibratory Extraction.	Dry Dock 1 North-Remove Center Wall Tie-in to West Closure Wall.	0.04	3	0.001041	0	0	0	0	0	0.417417	0	0	0	0	0
24	2–3 Vibratory Pile Driving.	Center Wall East Tie-in to Existing Wall.	0.04	12	0.000185	0	0	0	0	0	0.417417	0	0	0	0	0
	2–3 Impact Pile Driving.	Center Wall East Tie-in to Existing Wall.	0.04	12	0.334747	0	0	0	0	0	0.417417	0	0	0	0	0
25	2–3 Vibratory Extraction.	Dry Dock 1 West Remove Center Wall Tie-in to West Closure Wall.	0.04	3	0.001041	0	0	0	0	0	0.417417	0	0	0	0	0
26	2–3 Vibratory Extraction.	Remove Center Wall Tie-in to Existing Wall.	0.04	12	0.001041	0	0	0	0	0	0.417417	0	0	0	0	0
27	2–3 Vibratory Extraction.	Remove Temporary Cofferdam ...	0.04	12	0.001041	0	0	0	0	0	0.417417	0	0	0	0	0
28	2–3 Vibratory Extraction.	Remove Temporary Cofferdam Extension.	0.04	2	0.001041	0	0	0	0	0	0.417417	0	0	0	0	0
29	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Install Outer Casing.	0.04	20	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Pre-Drill Socket.	0.04	20	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Remove Outer Casing.	0.04	20	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 DTH Cluster Drill.	Dry Dock 1 West Temporary Work Trestle.	0.04	70	0.417417	[1]2	0	1	1	0	0.417417	0	0	0	0	0
30	3–4 Rotary Drill	Dry Dock 1 West Remove Temporary Work Trestle Piles.	0.04	20	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
31	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Install Outer Casing.	0.04	22	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0

TABLE 13—ESTIMATED TAKE OF HARBOR PORPOISE BY PROJECT ACTIVITY—Continued

Activity ID	Year/activity	Purpose	Density	Total production days	Level A harassment zone (km²)	Proposed take by Level A harassment					Level B harassment zone (km²)	Proposed take by Level B harassment				
						Total	Year 2	Year 3	Year 4	Year 5		Total	Year 2	Year 3	Year 4	Year 5
	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Pre-Drill Socket.	0.04	22	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Remove Outer Casing.	0.04	22	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 DTH Cluster Drill.	Wall Shafts for Dry Dock 1 West	0.04	165	0.417417	3	0	1	2	0	0.417417	0	0	0	0	0
32	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts—Install Outer Casing.	0.04	23	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts Pre-Drill Sockets.	0.04	23	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts—Remove Outer Casing.	0.04	23	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 DTH Cluster Drill.	Foundation Shafts for Dry Dock 1 West.	0.04	196	0.417417	3	0	1	2	0	0.417417	0	0	0	0	0
33	3–4 Rotary Drill	Dry Dock 1 North Leveling Piles—Install Outer Casing.	0.04	18	0.000014	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Leveling Piles—Pre-Drill Socket.	0.04	18	0.000248	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 North Leveling Piles—Remove Outer Casing.	0.04	18	0.000002	0	0	0	0	0	0.417417	0	0	0	0	0
	3–4 DTH Cluster Drill.	Dry Dock 1 West Leveling Piles (Diving Board Shafts).	0.04	135	0.417417	2	0	1	1	0	0.417417	0	0	0	0	0
34	3–4 DTH Mono-hammer.	Dry Dock 1 North Rock Anchors	0.04	18	0.073751	0	0	0	0	0	0.417417	0	0	0	0	0
35	4–5 DTH Mono-hammer.	Dry Dock 1 West Rock Anchors	0.04	18	0.073751	0	0	0	0	0	0.417417	0	0	0	0	0
Total	....	....	....	....	....	29	13	10	6	0	....	4	3	[2]2	0	0

*Note, for the purposes of this analysis, the proposed construction years are identified as years 2 through 5; takes for marine mammals during Year 1 of the Navy's construction activities were authorized in a previously issued IHA (87 FR 19886; April 6, 2022).

[1] In instances where only 1 take was calculated but activities spanned more than one construction year, one take was requested by the Navy for each construction year.

[2] One take by Level B harassment was added to construction year 3 to account for average group size of harbor porpoises (see *https://www.fisheries.noaa.gov/species/harbor-porpoise#:~:text=The%20harbor%20porpoise%20is%20a,estuaries%2C%20harbors%2C%20and%20fjords*).

** No additional takes are expected to result from the simultaneous use of two rotary drills and a DTH mono-hammer in construction years 3 and 4 and the simultaneous use of two rotary drills in construction year 4.

Although no construction activity is currently planned for the final year of the LOA period (construction year 6), potential schedule slips may occur as a result of equipment failure, inclement weather, or other unforeseen events. However, potential takes that could occur during year 6 as a result of delays to activities scheduled for years 2–5 are accounted for through the analyses for those years, and no additional take is proposed for authorization.

Harbor Seal

Harbor seals may be present year-round in the project vicinity, with consistent densities throughout the year. Harbor seals are the most common pinniped in the Piscataqua River near the Shipyard. Sightings of this species were recorded during monthly surveys conducted in 2017 and 2018 (NAVFAC Mid-Atlantic, 2018, 2019b) as well as during Berth 11 and P–310 construction monitoring in 2017, 2018, 2020 and 2021 (Cianbro, 2018; Navy, 2019; NAVFAC, 2021, 2022), and therefore density estimates from these efforts were considered in the analysis. Based on observations recorded during the Berth 11 Waterfront Improvements (199 observations of harbor seals during year 1 and 249 observations of harbor seals during year 2 [448 total] over 322 days) and P–310 project construction monitoring (721 observations of harbor seals during year 1 and 451 observations of harbor seals during year 2 [1,172 total] over 349 days), harbor seal density was estimated to be 3.0/km^2 in the project area (Cianbro, 2018; Navy, 2019; NAVFAC, 2021, 2022).

Takes by Level A harassment were calculated for harbor seals where the density of animals (3 harbor seals/km^2) was multiplied by the harassment zone and the number of days per construction activity. This method was deemed to be inappropriate by the Navy for calculating takes by Level B harassment for harbor seals as it produced take numbers that were lower than the number of harbor seals that has been previously observed in the Navy's monitoring reports. Therefore, the Navy is proposing (and NMFS concurs) to increase the take by Level B harassment to more accurately reflect harbor seal observations in the monitoring reports, by using the value of three harbor seals observed a day multiplied by the total number of construction days (*i.e.,* 349 days), resulting in 1,047 takes per year by Level B harassment. This method is consistent with the methodology used to estimate takes by Level B harassment in IHA issued by NMFS for the first year of P–381 construction activities (87 FR 19866; April 6, 2022).

Additional takes by Level B harassment may occur during the simultaneous use of two rotary drills and a DTH mono-hammer in construction years 3 and 4 and the simultaneous use of two rotary drills in construction year 4. The simultaneous use of two rotary drills would result in 28 additional takes by Level B harassment of harbor seals. The simultaneous use of two rotary drills and a DTH mono-hammer would result in 22 additional takes by Level B harassment of harbor seals. Note, the use of cluster drills and rock hammers in construction years 2 and 3 result in the entire ROI being ensonified to Level A harassment thresholds; therefore, there would be no change to the size of the harassment zones from concurrent construction activities during these years and thus no need to authorize additional takes. To account for concurrent activities in construction years 3 and 4, the Navy is requesting to add additional takes by Level B harassment to their proposed take numbers (22 harbor seal in construction year 3 and 50 harbor seal in construction year 4). Therefore the Navy requests 1,047 takes by Level B harassment for harbor seals in construction year 2, 1,069 takes by Level B harassment for harbor seals in construction year 3, 1,097 takes by Level B harassment for harbor seals in construction year 4, and 1,047 takes by Level B takes for harbor seals in construction year 5 (note the division of takes over the construction years is summarized in Table 12).

Take by Level A harassment of harbor seals is shown in Table 14 below. Note that where the Level A harassment zone is as large as the Level B harassment zone and fills the entire potentially ensonified area, the enumerated takes in the Level A harassment column may be in the form of Level A harassment and/or Level B harassment, but would be authorized as takes by Level A harassment. The proposed takes by Level B harassment were not included in Table 14 as they were calculated by a different method (*i.e.,* by using the value of three harbor seals observed per day multiplied by the total number of construction days; *i.e.,* 349 days).

TABLE 14—ESTIMATED TAKE BY LEVEL A HARASSMENT OF HARBOR SEAL BY PROJECT ACTIVITY

Activity ID	Year/activity	Purpose	Density	Total production days	Level A harassment zone (km^2)	Proposed take by Level A harassment				
						Total	Year 2	Year 3	Year 4	Year 5
A	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	3	18	0.000005	0	0	0	0	0
	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	3	18	0.000091	0	0	0	0	0
	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	3	18	0.000001	0	0	0	0	0
	2 DTH Cluster Drill	Center Wall—Install Foundation Support Piles.	3	117	0.417417	147	147	0	0	0
R	2 Vibratory Pile Driving.	Dry Dock 1 North Entrance—Install Temporary Cofferdam.	3	6	0.0002	0	0	0	0	0
	2 Impact Pile Driving.	Dry Dock 1 North Entrance—Install Temporary Cofferdam.	3	6	0.364953	7	7	0	0	0
1	2 Hydraulic Rock Hammer.	Shutter Panel Demolition (112 panels).	3	56	0.417417	70	70	0	0	0
2	2–3 Vibratory Extraction.	Remove Berth 1 Sheet Piles	3	42	0.000078	0	0	0	0	0
3	2–3 Hydraulic Rock Hammer.	Removal of Granite Quay Wall (2,800 cy).	3	47	0.417417	59	47	12	0	0
4	2–3 Hydraulic Rock Hammer.	Berth 1 Top of Wall Demolition for Waler Install (320 lf).	3	74	0.417417	93	74	19	0	0
5	2 Vibratory Pile Driving.	Install Berth 1 Support of Excavation	3	8	0.000078	0	0	0	0	0
	2 Impact Pile Driving.	Berth 1 Support of Excavation	3	8	0.201158	5	5	0	0	0

TABLE 14—ESTIMATED TAKE BY LEVEL A HARASSMENT OF HARBOR SEAL BY PROJECT ACTIVITY—Continued

Activity ID	Year/activity	Purpose	Density	Total production days	Level A harassment zone (km²)	Proposed take by level A harassment				
						Total	Year 2	Year 3	Year 4	Year 5
6	2 Hydraulic Rock Hammer.	Mechanical Rock Removal (700 cy) at Berth 11 Basin Floor.	3	60	0.417417	75	75	0	0	0
7	2 DTH Mono-hammer.	Relief Holes at Berth 11 Basin Floor	3	35	0.014413	1	1	0	0	0
8	2 Vibratory Pile Driving.	Install Temporary Cofferdam Extension.	3	4	0.000078	0	0	0	0	0
	2 Impact Pile Driving.	Temporary Cofferdam Extension	3	4	0.201158	2	2	0	0	0
9	2 Rotary Drill	Gantry Crane Support—Install Outer Casing.	3	16	0.000005	0	0	0	0	0
	2 Rotary Drill	Gantry Crane Support—Pre-Drill Socket.	3	16	0.000091	0	0	0	0	0
	2 Rotary Drill	Gantry Crane Support—Remove Outer Casing.	3	16	0.000091	0	0	0	0	0
	2 DTH Cluster Drill	Gantry Crane Support Piles	3	80	0.417417	100	100	0	0	0
10	2 Hydraulic Rock Hammer.	Mechanical Rock Removal (300 cy) at Berth 1 Basin Floor.	3	25	0.417417	31	31	0	0	0
11	2 DTH Mono-hammer.	Dry Dock 1 North Entrance Rock Anchors.	3	25	0.022912	2	2	0	0	0
12	2 Vibratory Pile Driving.	Center Wall Tie-in to Existing West Closure Wall.	3	4	0.000078	0	0	0	0	0
	2 Impact Pile Driving.	Center Wall Tie-in to West Closure Wall.	3	4	0.201158	2	2	0	0	0
13	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Install Outer Casing.	3	20	0.000005	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Pre-Drill Socket.	3	20	0.000091	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Remove Outer Casing.	3	20	0.000001	0	0	0	0	0
	2–3 DTH Cluster Drill.	Dry Dock 1 North Temporary Work Trestle.	3	70	0.417417	88	53	35	0	0
14	2–3 Rotary Drill	Remove Dry Dock 1 North Temporary Work Trestle Piles.	3	20	0.000002	0	0	0	0	0
15	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Install Outer Casing.	3	18	0.000005	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Pre-Drill Socket.	3	18	0.000091	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Remove Outer Casing.	3	18	0.000001	0	0	0	0	0
	2–3 DTH Cluster Drill.	Dry Dock 1 North Leveling Piles (Diving Board Shafts).	3	135	0.417417	169	101	68	0	0
16	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts—Install Outer Casing.	3	20	0.000005	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts—Pre-Drill Socket.	3	20	0.000091	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts—Remove Outer Casing.	3	20	0.000001	0	0	0	0	0
	2–3 DTH Cluster Drill.	Wall Shafts for Dry Dock 1 North	3	150	0.417417	188	113	75	0	0
17	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts—Install Outer Casing.	3	23	0.000005	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts—Pre-Drill Sockets.	3	23	0.000091	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts—Remove Outer Casing.	3	23	0.000001	0	0	0	0	0
	2–3 DTH Cluster Drill.	Foundation Shafts for Dry Dock 1 North.	3	196	0.417417	245	147	98	0	0
18	2 Vibratory Extraction.	Berth 11 End Wall Temporary Guide Wall.	3	10	0.0002	0	0	0	0	0
19	2 Vibratory Extraction.	Remove Berth 1 Support of Excavation.	3	5	0.0002	0	0	0	0	0
20	2 Vibratory Extraction.	Remove Berth 1 Emergency Repairs	3	18	0.000136	0	0	0	0	0
21	2 Hydraulic Rock Hammer.	Removal of Emergency Repair Concrete (500 cy) at Berth 1.	3	15	0.417417	19	19	0	0	0
22	2–3 DTH Monohammer.	Center Wall Foundation Rock Anchors.	3	36	0.022912	2	1	1	0	0
23	2–3 Vibratory Extraction.	Dry Dock 1 North-Remove Center Wall Tie-in to West Closure Wall.	3	3	0.0002	0	0	0	0	0
24	2–3 Vibratory Pile Driving.	Center Wall East Tie-in to Existing Wall.	3	12	0.000032	0	0	0	0	0
	2–3 Impact Pile Driving.	Center Wall East Tie-in to Existing Wall.	3	12	0.090757	3	2	1	0	0
25	2–3 Vibratory Extraction.	Dry Dock 1 West Remove Center Wall Tie-in to West Closure Wall.	3	3	0.0002	0	0	0	0	0
26	2–3 Vibratory Extraction.	Remove Center Wall Tie-in to Existing Wall.	3	12	0.0002	0	0	0	0	0
27	2–3 Vibratory Extraction.	Remove Temporary Cofferdam	3	12	0.0002	0	0	0	0	0

TABLE 14—ESTIMATED TAKE BY LEVEL A HARASSMENT OF HARBOR SEAL BY PROJECT ACTIVITY—Continued

Activity ID	Year/activity	Purpose	Density	Total production days	Level A harassment zone (km²)	Proposed take by level A harassment				
						Total	Year 2	Year 3	Year 4	Year 5
28	2–3 Vibratory Extraction.	Remove Temporary Cofferdam Extension.	3	2	0.0002	0	0	0	0	0
29	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Install Outer Casing.	3	20	0.000005	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Pre-Drill Socket.	3	20	0.000091	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Remove Outer Casing.	3	20	0.000001	0	0	0	0	0
	3–4 DTH Cluster Drill.	Dry Dock 1 West Temporary Work Trestle.	3	70	0.417417	88	0	44	44	0
30	3–4 Rotary Drill	Dry Dock 1 West Remove Temporary Work Trestle Piles.	3	20	0.000002	0	0	0	0	0
31	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Install Outer Casing.	3	22	0.000005	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Pre-Drill Socket.	3	22	0.000091	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Remove Outer Casing.	3	22	0.000001	0	0	0	0	0
	3–4 DTH Cluster Drill.	Wall Shafts for Dry Dock 1 West	3	165	0.417417	206	0	103	103	0
32	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts—Install Outer Casing.	3	23	0.000005	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts—Pre-Drill Sockets.	3	23	0.000091	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts—Remove Outer Casing.	3	23	0.000001	0	0	0	0	0
	3–4 DTH Cluster Drill.	Foundation Shafts for Dry Dock 1 West.	3	196	0.417417	245	0	122	123	0
33	3–4 Rotary Drill	Dry Dock 1 North Leveling Piles—Install Outer Casing.	3	18	0.000005	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Leveling Piles—Pre-Drill Socket.	3	18	0.000091	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 North Leveling Piles—Remove Outer Casing.	3	18	0.000001	0	0	0	0	0
	3–4 DTH Cluster Drill.	Dry Dock 1 West Leveling Piles (Diving Board Shafts).	3	135	0.417417	169	0	84	85	0
34	3–4 DTH Monohammer.	Dry Dock 1 North Rock Anchors	3	18	0.022912	1	0	1	0	0
35	4–5 DTH Monohammer.	Dry Dock 1 West Rock Anchors	3	18	0.022912	1	0	0	0	1
Total						2,018	999	663	355	1

* Note, for the purposes of this analysis, the proposed construction years are identified as years 2 through 5; takes for marine mammals during Year 1 of the Navy's construction activities were authorized in a previously issued IHA (87 FR 19886; April 6, 2022).

Although no construction activity is currently planned for the final year of the LOA period (construction year 6), potential schedule slips may occur as a result of equipment failure, inclement weather, or other unforeseen events. However, potential takes that could occur during year 6 as a result of delays to activities scheduled for years 2–5 are accounted for through the analyses for those years, and no additional take is proposed for authorization.

Gray Seal

Gray seals may be present year-round in the project vicinity, with consistent densities throughout the year. Gray seals are less common in the Piscataqua River than the harbor seal. A total of nine sightings of gray seals were recorded during P–310 construction monitoring (NAVFAC, 2021, 2022). Density estimates of gray seals were based on the Berth 11 Waterfront Improvements (24 observations of gray seals during year 1 and 12 observations of gray seals during year 2 [36 total] over 322 days) and P–310 project construction monitoring (47 observations of gray seals during year 1 and 21 observations of gray seals during year 2 [68 total] over 349 days) and was estimated to be 0.2/km² (Cianbro, 2018; Navy, 2019; NAVFAC, 2021, 2022). These data were preferred in this analysis over the more general density data from the NMSDD.

Takes by Level A harassment were calculated for gray seals where the density of animals (0.2 gray seals/km²) was multiplied by the harassment zone and the number of days per construction activity. This method was deemed to be inappropriate by the Navy for calculating takes by Level B harassment for gray seals as it produced take that were fewer than the number of gray seals that has been previously observed in the Navy's monitoring reports. Therefore, the Navy is proposing (and NMFS concurs), to increase the take by Level B harassment to more accurately reflect gray seal observations in the monitoring reports, by using the value of 0.2 gray seals a day multiplied by the total number of construction days (*i.e.,* 349 days) resulting in 70 takes by Level B harassment proposed for authorization per year. This method is consistent with the methodology used to estimate takes by Level B harassment in IHA issued by NMFS for the first year of P–381 construction activities (87 FR 19866; April 6, 2022).

Additional takes by Level B harassment may occur during the simultaneous use of two rotary drills and a DTH mono-hammer in construction years 3 and 4 and the simultaneous use of two rotary drills in construction year 4. The simultaneous use of two rotary drills would result in 2 additional Level B takes of gray seals. The simultaneous use of two rotary drills and a DTH mono-hammer would result in 1 additional Level B take of gray seals. Note, the use of cluster drills and rock hammers in construction years 2 and 3 result in the entire ROI being ensonified to Level A harassment thresholds; therefore, there would be no change to the size of the harassment zones from concurrent construction activities during these years and thus no need to request additional takes. To account for concurrent activities in construction years 3 and 4, the Navy is requesting additional takes by Level B harassment to their proposed take numbers (1 gray seal in construction year 3 and 3 gray seals in construction year 4). Therefore the Navy requests 70 takes by Level B takes for gray seals in construction year 2, 71 takes by Level B harassment for gray seals in construction year 3, 73 takes by Level B harassment for gray seals in construction year 4, and 70 takes by Level B harassment for gray seals in construction year 5 (note the division of takes over the construction years is summarized in Table 12).

Take by Level A harassment of gray seals is shown in Table 15 below. Note that where the Level A harassment zone is as large as the Level B harassment zone and fills the entire potentially ensonified area, the enumerated takes in the Level A harassment column may be in the form of Level A harassment and/or Level B harassment, but would be authorized as takes by Level A harassment. The proposed takes by Level B harassment were not included in Table 15 as they were calculated by a different method (*i.e.,* by using the value of 0.2 gray seals observed a day multiplied by the total number of construction days; *i.e.,* 349 days).

TABLE 15—CALCULATED PROPOSED TAKE BY LEVEL A HARASSMENT OF GRAY SEAL BY PROJECT ACTIVITY

Activity ID	Year/activity	Purpose	Density	Total production days	Level A harassment zone (km²)	Proposed take by Level A harassment				
						Total	Year 2	Year 3	Year 4	Year 5
A	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	0.2	18	0.000005	0	0	0	0	0
	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	0.2	18	0.000091	0	0	0	0	0
	2 Rotary Drill	Center Wall—Install Foundation Support Piles.	0.2	18	0.000001	0	0	0	0	0
	2 DTH Cluster Drill	Center Wall—Install Foundation Support Piles.	0.2	117	0.417417	10	10	0	0	0
R	2 Vibratory Pile Driving.	Dry Dock 1 North Entrance—Install Temporary Cofferdam.	0.2	6	0.0002	0	0	0	0	0
	2 Impact Pile Driving.	Dry Dock 1 North Entrance—Install Temporary Cofferdam.	0.2	6	0.364953	0	0	0	0	0
1	2 Hydraulic Rock Hammer.	Shutter Panel Demolition (112 panels).	0.2	56	0.417417	5	5	0	0	0
2	2–3 Vibratory Extraction.	Remove Berth 1 Sheet Piles	0.2	42	0.000078	0	0	0	0	0
3	2–3 Hydraulic Rock Hammer.	Removal of Granite Quay Wall (2,800 cy).	0.2	47	0.417417	4	3	1	0	0
4	2–3 Hydraulic Rock Hammer.	Berth 1 Top of Wall Demolition for Waler Install (320 lf).	0.2	74	0.417417	6	5	1	0	0
5	2 Vibratory Pile Driving.	Install Berth 1 Support of Excavation	0.2	8	0.000078	0	0	0	0	0
	2 Impact Pile Driving.	Berth 1 Support of Excavation	0.2	8	0.201158	0	0	0	0	0
6	2 Hydraulic Rock Hammer.	Mechanical Rock Removal (700 cy) at Berth 11 Basin Floor.	0.2	60	0.417417	5	5	0	0	0
7	2 DTH Mono-hammer.	Relief Holes at Berth 11 Basin Floor	0.2	35	0.014413	0	0	0	0	0
8	2 Vibratory Pile Driving.	Install Temporary Cofferdam Extension.	0.2	4	0.000078	0	0	0	0	0
	2 Impact Pile Driving.	Temporary Cofferdam Extension	0.2	4	0.201158	0	0	0	0	0
9	2 Rotary Drill	Gantry Crane Support—Install Outer Casing.	0.2	16	0.000005	0	0	0	0	0
	2 Rotary Drill	Gantry Crane Support—Pre-Drill Socket.	0.2	16	0.000091	0	0	0	0	0
	2 Rotary Drill	Gantry Crane Support—Remove Outer Casing.	0.2	16	0.000091	0	0	0	0	0
	2 DTH Cluster Drill	Gantry Crane Support Piles	0.2	80	0.417417	7	7	0	0	0
10	2 Hydraulic Rock Hammer.	Mechanical Rock Removal (300 cy) at Berth 1 Basin Floor.	0.2	25	0.417417	2	2	0	0	0
11	2 DTH Mono-hammer.	Dry Dock 1 North Entrance Rock Anchors.	0.2	25	0.022912	0	0	0	0	0
12	2 Vibratory Pile Driving.	Center Wall Tie-In to Existing West Closure Wall.	0.2	4	0.000078	0	0	0	0	0
	2 Impact Pile Driving.	Center Wall Tie-in to West Closure Wall.	0.2	4	0.201158	0	0	0	0	0
13	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Install Outer Casing.	0.2	20	0.000005	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Pre-Drill Socket.	0.2	20	0.000091	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Temporary Work Trestle—Remove Outer Casing.	0.2	20	0.000001	0	0	0	0	0
	2–3 DTH Cluster Drill.	Dry Dock 1 North Temporary Work Trestle.	0.2	70	0.417417	6	4	2	0	0
14	2–3 Rotary Drill	Remove Dry Dock 1 North Temporary Work Trestle Piles.	0.2	20	0.000002	0	0	0	0	0
15	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Install Outer Casing.	0.2	18	0.000005	0	0	0	0	0

TABLE 15—CALCULATED PROPOSED TAKE BY LEVEL A HARASSMENT OF GRAY SEAL BY PROJECT ACTIVITY—Continued

Activity ID	Year/activity	Purpose	Density	Total production days	Level A harassment zone (km²)	Proposed take by Level A harassment				
						Total	Year 2	Year 3	Year 4	Year 5
	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Pre-Drill Socket.	0.2	18	0.000091	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Leveling Piles—Remove Outer Casing.	0.2	18	0.000001	0	0	0	0	0
	2–3 DTH Cluster Drill.	Dry Dock 1 North Leveling Piles (Diving Board Shafts).	0.2	135	0.417417	11	7	4	0	0
16	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts—Install Outer Casing.	0.2	20	0.000005	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts—Pre-Drill Socket.	0.2	20	0.000091	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Wall Shafts—Remove Outer Casing.	0.2	20	0.000001	0	0	0	0	0
	2–3 DTH Cluster Drill.	Wall Shafts for Dry Dock 1 North	0.2	150	0.417417	13	8	5	0	0
17	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts—Install Outer Casing.	0.2	23	0.000005	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts—Pre-Drill Sockets.	0.2	23	0.000091	0	0	0	0	0
	2–3 Rotary Drill	Dry Dock 1 North Foundation Shafts—Remove Outer Casing.	0.2	23	0.000001	0	0	0	0	0
	2–3 DTH Cluster Drill.	Foundation Shafts for Dry Dock 1 North.	0.2	196	0.417417	16	10	6	0	0
18	2 Vibratory Extraction.	Berth 11 End Wall Temporary Guide Wall.	0.2	10	0.0002	0	0	0	0	0
19	2 Vibratory Extraction.	Remove Berth 1 Support of Excavation.	0.2	5	0.0002	0	0	0	0	0
20	2 Vibratory Extraction.	Remove Berth 1 Emergency Repairs	0.2	18	0.000136	0	0	0	0	0
21	2 Hydraulic Rock Hammer.	Removal of Emergency Repair Concrete (500 cy) at Berth 1.	0.2	15	0.417417	1	1	0	0	0
22	2–3 DTH Monohammer.	Center Wall Foundation Rock Anchors.	0.2	36	0.022912	0	0	0	0	0
23	2–3 Vibratory Extraction.	Dry Dock 1 North-Remove Center Wall Tie-in to West Closure Wall.	0.2	3	0.0002	0	0	0	0	0
24	2–3 Vibratory Pile Driving.	Center Wall East Tie-in to Existing Wall.	0.2	12	0.000032	0	0	0	0	0
	2–3 Impact Pile Driving.	Center Wall East Tie-in to Existing Wall.	0.2	12	0.090757	0	0	0	0	0
25	2–3 Vibratory Extraction.	Dry Dock 1 West Remove Center Wall Tie-in to West Closure Wall.	0.2	3	0.0002	0	0	0	0	0
26	2–3 Vibratory Extraction.	Remove Center Wall Tie-in to Existing Wall.	0.2	12	0.0002	0	0	0	0	0
27	2–3 Vibratory Extraction.	Remove Temporary Cofferdam	0.2	12	0.0002	0	0	0	0	0
28	2–3 Vibratory Extraction.	Remove Temporary Cofferdam Extension.	0.2	2	0.0002	0	0	0	0	0
29	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Install Outer Casing.	0.2	20	0.000005	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Pre-Drill Socket.	0.2	20	0.000091	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Temporary Work Trestle—Remove Outer Casing.	0.2	20	0.000001	0	0	0	0	0
	3–4 DTH Cluster Drill.	Dry Dock 1 West Temporary Work Trestle.	0.2	70	0.417417	6	0	3	3	0
30	3–4 Rotary Drill	Dry Dock 1 West Remove Temporary Work Trestle Piles.	0.2	20	0.000002	0	0	0	0	0
31	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Install Outer Casing.	0.2	22	0.000005	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Pre-Drill Socket.	0.2	22	0.000091	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Wall Shafts—Remove Outer Casing.	0.2	22	0.000001	0	0	0	0	0
	3–4 DTH Cluster Drill.	Wall Shafts for Dry Dock 1 West	0.2	165	0.417417	14	0	7	7	0
32	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts—Install Outer Casing.	0.2	23	0.000005	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts—Pre-Drill Sockets.	0.2	23	0.000091	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Foundation Shafts—Remove Outer Casing.	0.2	23	0.000001	0	0	0	0	0
	3–4 DTH Cluster Drill.	Foundation Shafts for Dry Dock 1 West.	0.2	196	0.417417	16	0	8	8	0
33	3–4 Rotary Drill	Dry Dock 1 North Leveling Piles—Install Outer Casing.	0.2	18	0.000005	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 West Leveling Piles—Pre-Drill Socket.	0.2	18	0.000091	0	0	0	0	0
	3–4 Rotary Drill	Dry Dock 1 North Leveling Piles—Remove Outer Casing.	0.2	18	0.000001	0	0	0	0	0

TABLE 15—CALCULATED PROPOSED TAKE BY LEVEL A HARASSMENT OF GRAY SEAL BY PROJECT ACTIVITY—Continued

Activity ID	Year/activity	Purpose	Density	Total production days	Level A harassment zone (km^2)	Proposed take by Level A harassment				
						Total	Year 2	Year 3	Year 4	Year 5
	3–4 DTH Cluster Drill.	Dry Dock 1 West Leveling Piles (Diving Board Shafts).	0.2	135	0.417417	11	0	6	5	0
34	3–4 DTH Monohammer.	Dry Dock 1 North Rock Anchors	0.2	18	0.022912	0	0	0	0	0
35	4–5 DTH Monohammer.	Dry Dock 1 West Rock Anchors	0.2	18	0.022912	0	0	0	0	0
Total						133	67	43	23	0

* Note, for the purposes of this analysis, the proposed construction years are identified as years 2 through 5; takes for marine mammals during Year 1 of the Navy's construction activities were authorized in a previously issued IHA (87 FR 19886; April 6, 2022).

Although no construction activity is currently planned for the final year of the LOA period (construction year 6), potential schedule slips may occur as a result of equipment failure, inclement weather, or other unforeseen events. However, potential takes that could occur during year 6 as a result of delays to activities scheduled for years 2–5 are accounted for through the analyses for those years, and no additional take is proposed for authorization.

Hooded Seal

Hooded seals may be present in the project vicinity from January through May, though their exact seasonal densities are unknown. In general, hooded seals are much rarer than the harbor seal and gray seal in the Piscataqua River. NMFS authorized one take by Level B harassment per month from January to May of a hooded seal for the Berth 11 Waterfront Improvements Construction project (NMFS, 2018b) and for P–310 (Super Flood Basin) (NMFS, 2016; NMFS, 2019; NMFS 2021c). To date, the monitoring for those projects and for the density surveys have not recorded a sighting of hooded seal in the project area (Cianbro, 2018; NAVFAC Mid-Atlantic, 2018, 2019b; Navy 2019; NAVFAC, 2021, 2022). In order to guard against the potential for unauthorized take, the Navy is again requesting one take by Level B harassment of hooded seal per month (between the months of January and May) for each construction year. This will result in five takes by Level B harassment per year. Given the size of the shutdown zones in relation to the Level A harassment isopleths (see the Proposed Mitigation section below), NMFS also proposes to authorize five takes by Level A harassment per year to safeguard against unauthorized take of hooded seals that may occur unnoticed in the Level A harassment zone for sufficient duration to incur PTS.

Harp Seal

In general, harp seals are much rarer than the harbor seal and gray seal in the Piscataqua River. Harp seals were not observed during marine mammal monitoring or survey events that took place in 2017, 2018, or 2021 (Cianbro, 2018; NAVFAC Mid-Atlantic, 2018, 2019b; Navy, 2019; NAVFAC, 2021, 2022); however, two harp seals (n =2) were observed in the River in 2020 (Stantec, 2020), and another harp seal was observed in 2016 (NAVFAC Mid-Atlantic, 2016; NMFS, 2016). As above for hooded seals, the Navy is proposing one take by Level B harassment of harp seal per month of construction (between the months of January and May) for each construction year as was authorized by NMFS for the Berth 11 Waterfront Improvements Project (NMFS, 2018b) and for P–310 (Super Flood Basin) construction activities (NMFS, 2019, 2021a). Harp seals may occur in the area from January through May. Anticipating one Level B harassment harp seal take per month for 5 months per year during in-water construction would guard against potential unauthorized take of this species. Given the size of the shutdown zones in relation to the Level A harassment isopleths (see the Proposed Mitigation section below), NMFS also proposes to authorize five takes by Level A harassment per year to safeguard against unauthorized take of harp seals that may occur unnoticed in the Level A harassment zone for sufficient duration to incur PTS.

Table 16 below summarizes the authorized take for all the species described above as a percentage of stock abundance.

TABLE 16—PROPOSED TAKE ESTIMATES AS A PERCENTAGE OF STOCK ABUNDANCE

Construction year	Species	Stock (N_{EST})	Annual proposed Level A harassment	Annual proposed Level B harassment	Total proposed take	Percent of stock
2—Apr 2023–Mar 2024.	Harbor porpoise	Gulf of Maine/Bay of Fundy (95,543)	13	3	16	0.02
	Harbor seal	Western North Atlantic (61,336)	999	1,047	2,046	3.33
	Gray seal	Western North Atlantic (451,600)	67	70	137	0.03
	Harp seal	Western North Atlantic (7.6 million)	5	5	10	<0.01
	Hooded seal	Western North Atlantic (593,500)	5	5	10	<0.01
3—Apr 2024–Mar 2025.	Harbor porpoise	Gulf of Maine/Bay of Fundy (95,543)	10	2	12	0.01
	Harbor seal	Western North Atlantic (61,336)	663	1,069	1,732	2.82
	Gray seal	Western North Atlantic (451,600)	43	71	114	0.03
	Harp seal	Western North Atlantic (7.6 million)	5	5	10	<0.01
	Hooded seal	Western North Atlantic (593,500)	5	5	10	<0.01
4—Apr 2025–Mar 2026.	Harbor porpoise	Gulf of Maine/Bay of Fundy (95,543)	6	0	6	0.01
	Harbor seal	Western North Atlantic (61,336)	355	1,097	1,452	2.37
	Gray seal	Western North Atlantic (451,600)	23	73	96	0.02

TABLE 16—PROPOSED TAKE ESTIMATES AS A PERCENTAGE OF STOCK ABUNDANCE—Continued

Construction year	Species	Stock (N_{EST})	Annual proposed Level A harassment	Annual proposed Level B harassment	Total proposed take	Percent of stock
	Harp seal	Western North Atlantic (7.6 million)	5	5	10	<0.01
	Hooded seal	Western North Atlantic (593,500)	5	5	10	<0.01
5—Apr 2026–Mar 2027.	Harbor porpoise	Gulf of Maine/Bay of Fundy (95,543)	0	0	0	0
	Harbor seal	Western North Atlantic (61,336)	1	1,047	1,048	1.71
	Gray seal	Western North Atlantic (451,600)	0	70	70	0.02
	Harp seal	Western North Atlantic (7.6 million)	5	5	10	<0.01
	Hooded seal	Western North Atlantic (593,500)	5	5	10	<0.01
6—Apr 2027–Mar 2028.	Harbor porpoise	Gulf of Maine/Bay of Fundy (95,543)	0	0	0	<0.01
	Harbor seal	Western North Atlantic (61,336)	0	0	0	<0.01
	Gray seal	Western North Atlantic (451,600)	0	0	0	<0.01
	Harp seal	Western North Atlantic (7.6 million)	0	0	0	<0.01
	Hooded seal	Western North Atlantic (593,500)	0	0	0	<0.01
Total Estimated Proposed Take [1].	Harbor porpoise	Gulf of Maine/Bay of Fundy (95,543)	29	5	34	NA
	Harbor seal	Western North Atlantic (61,336)	2,018	4,260	6,278	NA
	Gray seal	Western North Atlantic (451,600)	133	284	438	NA
	Harp seal	Western North Atlantic (7.6 million)	25	25	50	NA
	Hooded seal	Western North Atlantic (593,500)	25	25	50	NA

[1] The total estimated proposed take does not include take that may occur in year six as a result of schedule delays, as these potential takes are already accounted for in previous years.

Proposed Mitigation

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

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

(1) The manner in which, and the degree to which, the successful implementation of the measure(s) is expected to reduce impacts to marine mammals, marine mammal species or stocks, and their habitat. This considers the nature of the potential adverse impact being mitigated (likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (probability implemented as planned), and;

(2) The practicability of the measures for applicant implementation, which may consider such things as cost, impact on operations.

The following mitigation measures apply to the Navy's in-water construction activities.

General

In-water construction activities must be halted upon observation of either a species for which incidental take is not authorized or a species for which incidental take has been authorized but the authorized number of takes has been met, entering or within the harassment zone. If such circumstances recur, the Navy will consult with NMFS concerning the potential need for an additional take authorization.

Coordination

The Navy shall conduct briefings between construction supervisors and crews, the marine mammal monitoring team, and Navy staff prior to the start of in-water construction activities and when new personnel join the work, to ensure that responsibilities, communication procedures, marine mammal monitoring protocols, and operational procedures are clearly understood.

Soft Start

The Navy shall use soft start techniques when impact pile driving. The objective of a soft start is to provide a warning and/or give animals in close proximity to pile-driving a chance to leave the area prior to an impact driver operating at full capacity, thereby exposing fewer animals to loud underwater and airborne sounds. Soft start requires contractors to provide an initial set of strikes from the impact hammer at reduced energy, followed by a 30-second waiting period, then two subsequent reduced-energy strike sets. Note the number of strikes will vary at reduced energy because raising the hammer at less than full power and then releasing it results in the hammer "bouncing" as it strikes the pile, resulting in multiple "strikes." A soft start will 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 30 minutes or longer. Soft start is not applicable to other in-water construction activities.

Bubble Curtain

During construction of the multifunctional expansion of Dry Dock 1, portions of the west closure wall and/or the super flood basin caisson gate may not be in place. A bubble curtain would be installed across the entrance openings to mitigate underwater noise impacts outside of the basin for those activities where Level A harassment thresholds are achieved across the entire ROI (*i.e.,* cluster drill and hydraulic rock hammering (Table 7)). A bubble curtain similar to the one employed during P–310 blasting activities and proposed for use during P–381 year 1 construction is proposed to be used to minimize potential impacts outside of the basin. Hydroacoustic monitoring would be conducted inside of the bubble curtain to measure construction generated noise levels. Should the results of the recordings inside the bubble curtain show that the source levels do not result in the Level A harassment thresholds being achieved across the entire ROI by the activity occurring, upon review of the data by NMFS, the Navy may discontinue use of the bubble curtain for those activities that are not actually exceeding thresholds. The bubble curtain must adhere to the following restrictions:

- The bubble curtain must distribute air bubbles around 100 percent of the piling circumference for the full depth of the water column;
- The lowest bubble ring must be in contact with the substrate for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent substrate contact. No parts of the ring or other objects shall prevent full substrate contact; and
- Air flow to the bubblers must be balanced around the circumference of the pile;

Avoiding Direct Physical Interaction

During all in-water construction activities, in order to prevent injury from physical interaction with construction equipment, a shutdown zone of 10 m (33 ft) will be implemented. If a marine mammal comes within 10 m (33 ft) of such activity, operations shall cease and vessels will reduce speed to the minimum level required to maintain steerage and safe working conditions. If human safety is at risk, the in-water activity will be allowed to continue until it is safe to stop.

Shutdown Zones

The Navy shall establish shutdown zones for all in-water construction activities. The purpose of a shutdown zone is generally to define an area within which shutdown of the activity would occur upon sighting of a marine mammal (or in anticipation of an animal entering the defined area). Shutdown zones will vary based on the activity type and marine mammal hearing group (Table 17). The shutdown zone distances for rock hammering, impact pile-driving of sheet piles, and DTH excavation (200 m (656 ft) for harbor porpoise and 50 m (164 ft) for seals) are consistent with those implemented for the same activities for P–381 year 1 construction activities (NMFS, 2022a; 87 FR 19886). NMFS has preliminarily determined that these shutdown zones represent the largest area that can practicably be monitored.

TABLE 17—PILE DRIVING SHUTDOWN ZONE AND MONITORING ZONES DURING PROJECT ACTIVITIES

LOA year	Activity, size, and component	Shutdown zone (m)		Monitoring zone [1] (km^2)
		Harbor porpoise	Seals	
2	Rock Hammering [2]	200	50	ROI.[3]
2	Impact Pile Driving—8 sheet piles per day	200	50	ROI.[4]
2	Impact Pile Driving—4 sheet piles per day	200	50	ROI.[4]
2/3	Impact Pile Driving—2 sheet piles per day	200	50	ROI.[4]
2/3	Vibratory Pile Driving/Extraction—8 sheet piles per day	20	10	ROI.[4]
2	Vibratory Pile Driving/Extraction—6 sheet piles per day	20	10	ROI.[4]
2	Vibratory Pile Driving/Extraction—4 sheet piles per day	15	10	ROI.[4]
2/3	Vibratory Pile Driving/Extraction—2 sheet piles per day	10	10	ROI.[4]
2	DTH mono-hammer 4–6 inch relief holes	180	50	ROI.[4]
2/3/4/5	DTH mono-hammer 9-inch rock anchors for tie-downs	200	50	ROI.[4]
2/3/4	Rotary Drilling—1 hour to set casings	10	10	ROI.[4]
2/3/4	Rotary drilling—9 hours to drill socket	10	10	ROI.[4]
2/3/4	Rotary Drilling—15 minutes to remove casings and temporary work trestle piles	10	10	ROI.[4]
2/3/4	Cluster Drilling [2]	200	50	ROI.[3 4]

Notes:
[1] In instances where the harassment zone is larger than the region of influence (ROI), the entire ROI is indicated as the limit of monitoring (see Figure 1–3 in the Navy's application).
[2] Activities will employ a bubble curtain to reduce underwater noise impacts outside of the basin.
[3] The entire ROI would be ensonified to the Level A threshold.
[4] The entire ROI would be ensonified to the Level B threshold.

The Navy must delay or shutdown in-water construction activities should a marine mammal approach or enter the appropriate shutdown zone. The Navy may resume activities after one of the following conditions have been met: (1) the animal is observed exiting the shutdown zone; (2) the animal is thought to have exited the shutdown zone based on a determination of its course, speed, and movement relative to the pile driving location; or (3) the shutdown zone has been clear from any additional sightings for 15 minutes.

Protected Species Observers

The Navy shall employ at least three protected species observers (PSOs) to monitor marine mammal presence in the action area during all in-water construction activities. Additional PSOs may be added if warranted by site conditions (rough seas, rain) and the level of marine mammal activity. All PSOs will be approved by NMFS and the Navy prior to starting work as a PSO. PSOs must track marine mammals observed anywhere within their visual range relative to in-water construction activities, and estimate the amount of time a marine mammal spends within the Level A or Level B harassment zones while construction activities are underway.

Monitoring must take place from 30 minutes prior to initiation of pile driving or drilling activity (*i.e.,* pre-start clearance monitoring) through 30 minutes post-completion of pile driving or drilling activity. Pre-start clearance monitoring must be conducted for 30 minutes to ensure that the shutdown zones indicated in Table 17 are clear of marine mammals, and pile driving or drilling may commence when observers have declared the shutdown zone clear of marine mammals. Monitoring must occur throughout the time required to drive/drill a pile. If work ceases for more than 30 minutes, the pre-start clearance monitoring of the shutdown zones must commence. A determination that the shutdown zone is clear must be made during a period of good visibility (*i.e.,* the entire shutdown zone and surrounding waters must be visible to the naked eye).

The placement of PSOs during all pile driving and drilling activities (described in the Proposed Monitoring and Reporting section) must ensure that the entire shutdown zone and Level A harassment zone is visible during pile driving and drilling. Should environmental conditions deteriorate such that marine mammals within the entire shutdown zone or Level A harassment zone would not be visible (*e.g.,* fog, heavy rain), in-water construction activities must be delayed until the PSO is confident marine mammals within the shutdown zone or Level A harassment zone could be detected. However, if work on a pile has already begun, work is allowed to continue until that pile is installed.

If an in-water construction activity is delayed or halted due to the presence of a marine mammal, the activity may not commence or resume until either the animal has voluntarily exited and been visually confirmed beyond the shutdown zone indicated in Table 17 or 15 minutes have passed without re-detection of the animal. If in-water construction activities cease for more than 30 minutes, the pre-activity monitoring of the shutdown zone must commence.

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

Proposed Monitoring and Reporting

In order to issue an LOA 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 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 while conducting the activities. Effective reporting is critical both to compliance as well as ensuring that the most value is obtained from the required monitoring.

Under the MMPA implementing regulations, monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

• Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.,* presence, abundance, distribution, density);

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

• Individual marine mammal responses (behavioral or physiological) to acoustic stressors (acute, chronic, or cumulative), other stressors, or cumulative impacts from multiple stressors;

• How anticipated responses to stressors impact either: (1) long-term fitness and survival of individual marine mammals; or (2) populations, species, or stocks;

• Effects on marine mammal habitat (*e.g.,* marine mammal prey species, acoustic habitat, or other important physical components of marine mammal habitat); and,

• Mitigation and monitoring effectiveness.

The Navy shall submit a Marine Mammal Monitoring Plan to NMFS for approval in advance of the start of the construction covered by this proposed rule. The plan will incorporate all monitoring and mitigation measures and reporting requirements of the incidental take regulations.

Monitoring Zones

The Navy shall conduct monitoring to include the entire ROI, which includes the area within the Level B harassment zones (areas where SPLs are equal to or exceed the 160 dB RMS threshold for impact driving and hydraulic rock hammering, and the 120 dB RMS threshold during vibratory pile driving, rotary drilling, and DTH) (see Table 7 and 8). These monitoring 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 these 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.

Protected Species Observer (PSO) Monitoring Requirements and Locations

PSOs shall be responsible for monitoring the shutdown zones, the monitoring zones and the pre-clearance zones, as well as effectively documenting takes by Level A and B harassment. As described in more detail in the Reporting section below, they shall also (1) document the frequency at which marine mammals are present in the project area, (2) document behavior and group composition, (3) record all construction activities, and (4) document observed reactions (changes in behavior or movement) of marine mammals during each sighting. The PSOs shall monitor for marine mammals during all in-water construction activities associated with the project. The Navy shall monitor the project area to the extent possible based on the required number of PSOs, required monitoring locations, and environmental conditions. Visual monitoring shall be conducted by three PSOs. It is assumed that three PSOs shall be located on boats, docks, or piers sufficient to monitor the respective ROIs given the abundance of suitable vantage points (see Figure 11–1 of the Navy's application). The PSOs must record all observations of marine mammals, regardless of distance from the in-water construction activity.

In addition, PSOs shall work in shifts lasting no longer than 4 hrs with at least a 1-hr break between shifts and will not perform duties as a PSO for more than 12 hrs in a 24-hr period (to reduce PSO fatigue).

Monitoring of in-water construction activities shall be conducted by qualified, PSOs. The Navy shall adhere to the following conditions when selecting PSOs:

▪ PSOs must be independent (*i.e.,* not construction personnel) and have no other assigned tasks during monitoring periods;

▪ At least one PSO must have prior experience performing the duties of a PSO during construction activities pursuant to a NMFS-issued incidental take authorization;

▪ Other PSOs may substitute other relevant experience, education (degree in biological science or related field), or training;

■ Where a team of three PSOs are required, a lead observer or monitoring coordinator shall be designated. The lead observer must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization; and

■ PSOs must be approved by NMFS prior to beginning any activity subject to this proposed rule.

The Navy will ensure that the PSOs have the following additional 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;

■ Experience and ability to conduct field observations and collect data according to assigned protocols;

■ Experience or training in the field identification of marine mammals, including the identification of behaviors;

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

■ Writing skills sufficient to prepare a report of observations including but not limited to the number and species of marine mammals observed; dates and times when in-water construction activities were conducted; dates, times, and reason for implementation of mitigation (or why mitigation was not implemented when required); 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.

Hydroacoustic Monitoring

The Navy shall conduct a sound source verification (SSV) study effort to measure SPLs from in-water construction activities not previously monitored as part of P–310 or as part of P–381 year 1 construction. The Navy will collect and evaluate acoustic sound record levels for the rock excavation (rotary drilling or DTH excavation) activities conducted up to a maximum limit of 10 piles/holes. One hydrophone would be placed at locations 10 m (33 ft) from the noise source and a second hydrophone would be placed at a representative monitoring location at an intermediate distance between the cetacean and phocid shutdown zones. These locations would be adhered to as practicable given safety considerations and levels of activity in the basin. For the 10 rock excavation (rotary drilling or DTH excavation) events acoustically measured, 100 percent of the data will be analyzed.

At a minimum, the methodology includes:

■ For underwater recordings, a stationary hydrophone system with the ability to measure SPLs will be placed in accordance with NMFS' most recent guidance for the collection of source levels (NMFS, 2012).

■ Hydroacoustic monitoring will be conducted for each type of activity not previously monitored under P–310 or the P–381 year 1 IHA up to a maximum limit of 10 piles/holes (Table 18). Monitoring will occur from the same locations approved by NMFS for P–310 construction activities. The resulting data set will be analyzed to examine and confirm sound pressure levels and rates of TL for each separate in-water construction activity. With NMFS concurrence, these measurements may be used to recalculate the limits of shutdown and Level A and Level B harassment zones, as appropriate. Hydrophones will be placed in the same manner as for P–310 construction activities. Locations of hydroacoustic recordings will be collected via global positioning system. A depth sounder and/or weighted tape measure will be used to determine the depth of the water. The hydrophone will be attached to a-weighted nylon cord or chain to maintain a constant depth and distance from the pile/drill/hammer location. The nylon cord or chain will be attached to a float or tied to a static line.

TABLE 18—HYDROACOUSTIC MONITORING SUMMARY

Pile type/shaft size	Number installed/removed	Method of install/removal	Number monitored
126-inch shaft	138	Rotary Drill	10
84-inch shaft	148	Rotary Drill	10
108-inch shaft	46	DTH Cluster Drill	10
84-inch shaft	40	DTH Cluster Drill	10
72-inch shaft	16	DTH Cluster Drill	10

■ Each hydrophone will be calibrated at the start of each action and will be checked frequently to the applicable standards of the hydrophone manufacturer.

■ For each monitored location, a single hydrophone will be suspended midway in the water column in order to evaluate site-specific attenuation and propagation characteristics that may be present throughout the water column.

■ Environmental data will be collected, including but not limited to, the following: wind speed and direction, air temperature, humidity, surface water temperature, water depth, wave height, weather conditions, and other factors that could contribute to influencing the airborne and underwater sound levels (*e.g.,* aircraft, boats, etc.).

■ The chief inspector will supply the acoustics specialist with the substrate composition, hammer/drill model and size, hammer/drill energy settings, depth of drilling, and boring rates and any changes to those settings during the monitoring.

■ For acoustically monitored construction activities, data from the continuous monitoring locations will be post-processed to obtain the following sound measures:

○ Maximum peak sound pressure level recorded for all activities, expressed in dB re 1 μPa. This maximum value will originate from the phase of drilling/hammering during which drill/hammer energy was also at maximum (referred to as Level 4).

○ From all activities occurring during the Level 4 phase these additional measures will be made, as appropriate:

■ mean, median, minimum, and maximum RMS sound pressure level in (dB re 1 μPa);

■ mean duration of a pile strike (based on the 90 percent energy criterion);

■ number of hammer strikes;

■ mean, median, minimum, and maximum single strike SEL (dB re μPa^2 sec);

○ Median integration time used to calculate SPL RMS (for vibration monitoring, the time period selected is 1-second intervals. For impulsive monitoring, the time period is 90% of the energy pulse duration).

○ A frequency spectrum (power spectral density) (dB re µPa² per Hz) based on allstrikes with similar sound. Spectral resolution will be 1 Hz, and the spectrum will cover nominal range from 7 Hz to 20 kHz.

○ Finally, the cumulative SEL will be computed from all the strikes associated with each pile occurring during all phases, *i.e.,* soft start, Level 1, to Level 4. This measure is defined as the sum of all single strike SEL values. The sum is taken of the antilog, with $\log_{10}$ taken of result to express (dB re µPa² sec).

Maine Mammal Monitoring Reporting

The Navy shall submit annual draft reports to NMFS for each construction year within 90 calendar days of the completion of marine mammal monitoring as well as a draft 5-year comprehensive summary report at the end of the project. The report(s) will detail the monitoring protocol and summarize the data recorded during monitoring. Annual reports will also include results from acoustic monitoring (see below). Final annual report(s) (each portion of the project and comprehensive) must be prepared and submitted to NMFS within 30 days following resolution of any NMFS comments on the draft reports. If no comments are received from NMFS within 30 days of receipt of the draft report, the report shall be considered final. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments.

A draft five-year comprehensive summary report shall be submitted to NMFS 90 days after the expiration of the regulations. The draft report would synthesize the data recorded during hydroacoustic and marine mammal monitoring. NMFS would provide comments within 30 days after receiving this draft report, and the Navy would address the comments and submit revisions within 30 days of receipt. If no comment is received from NMFS within 30 days, the draft report would be considered as final.

All draft and final marine mammal monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *ITP.tyson.moore@noaa.gov.* The report must contain the following informational elements, at minimum, (and be included in the Marine Mammal Monitoring Plan), including:

▪ Dates and times (begin and end) of all marine mammal monitoring;

▪ Construction activities occurring during each daily observation period, including:

○ How many and what type of piles/shafts were driven and by what method (*e.g.,* impact, vibratory, rotary drilling, rock hammering, mono- or cluster-DTH); and

○ Total duration of driving time for each pile/hole (vibratory driving, rotary drilling) and number of strikes for each pile/hole (impact driving, hydraulic rock hammering); and

○ For DTH excavation, the duration of operation for both impulsive and non-pulse components, as well as the strike rate.

▪ PSO locations during marine mammal monitoring;

▪ Environmental conditions during monitoring periods (at beginning and end of PSO shift and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance;

▪ Upon observation of a marine mammal, the following information:

○ PSO who sighted the animal and PSO location and activity at time of sighting;

○ Time of sighting;

○ Identification of the animal (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;

○ Distance and bearing of each marine mammal observed relative to the in-water construction activity for each sighting (if the in-water construction was occurring at time of sighting);

○ Estimated number of animals (minimum/maximum/best);

○ Estimated number of animals by cohort (adults, juveniles, neonates, group composition, etc.;

○ Animal's closest point of approach and estimated time spent within each harassment zone; and

○ Description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses to the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);

▪ Number of marine mammals detected within the harassment zones, by species;

▪ Detailed information about implementation of any mitigation (*e.g.,* shutdowns and delays), a description of specific actions that ensued, and resulting changes in behavior of the animal, if any; and

▪ All PSO datasheets and/or raw sightings data.

The draft and final reports must also contain the informational elements described in the Hydroacoustic Monitoring Plan which, at minimum, must include:

▪ Hydrophone equipment and methods: recording device, sampling rate, distance (m) from the pile where recordings were made; depth of water and recording device(s);

▪ Type and size of pile being driven, substrate type, method of driving during recordings (*e.g.,* hammer model and energy), and total pile driving duration;

▪ Whether a sound attenuation device is used and, if so, a detailed description of the device used and the duration of its use per pile;

▪ For impact pile driving and/or DTH excavation (DTH mono-hammer and cluster drill) (per pile): Number of strikes and strike rate; depth of substrate to penetrate; pulse duration and mean, median, and maximum sound levels (dB re: 1 µPa): root mean square sound pressure level (SPLrms); cumulative sound exposure level (SELcum), peak sound pressure level (SPLpeak), and single-strike sound exposure level (SELs-s);

▪ For vibratory driving/removal and/or DTH excavation (DTH mono-hammer and cluster drill) (per pile): Duration of driving per pile; mean, median, and maximum sound levels (dB re: 1 µPa): root mean square sound pressure level (SPLrms), cumulative sound exposure level (SELcum) (and timeframe over which the sound is averaged);

▪ One-third octave band spectrum and power spectral density plot; and

▪ General Daily Site Conditions

○ Date and time of activities;

○ Water conditions (*e.g.,* sea state, tidal state); and

○ Weather conditions (*e.g.,* percent cover, visibility).

Reporting of Injured or Dead Marine Mammals

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the Navy shall report the incident to NMFS Office of Protected Resources (OPR) (*PR.ITP.MonitoringReports@noaa.gov*), NMFS (301–427–8401) and to the Greater Atlantic Region New England/Mid-Atlantic Stranding Coordinator (866–755–6622) as soon as feasible. The incident report must include the following information:

▪ Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

▪ Species identification (if known) or description of the animal(s) involved;

▪ Condition of the animal(s) (including carcass condition if the animal is dead);

▪ Observed behaviors of the animal(s), if alive;

▪ If available, photographs or video footage of the animal(s); and

▪ General circumstances under which the animal was discovered.

If the death or injury was clearly caused by the specified activity, the Navy must immediately cease the specified activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of this proposed rule. The Navy shall not resume their activities until notified by NMFS that they can continue.

Negligible Impact Analysis and Determination

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

To avoid repetition, this introductory discussion of our analysis applies to all the species listed in Table 3, given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks, or groups of species, in anticipated individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, they are described independently in the analysis below.

Construction activities associated with the project, as outlined previously, have the potential to disturb or displace marine mammals. Specifically, the specified activities may result in take, in the form of Level A and Level B harassment from underwater sounds generated by pile driving activities, rotary drilling, rock hammering, and DTH. Potential takes could occur if marine mammals are present in zones ensonified above the thresholds for Level A and Level B harassment, identified above, while activities are underway.

The Navy's proposed activities and associated impacts will occur within a limited, confined area of the stocks' range. Most of the work will occur behind the existing super flood basin walls that would act as a barrier to sound and would contain underwater noise to within a small portion of the Piscataqua River. The implementation of a soft start and a bubble curtain during some activities, along with other mitigation and monitoring measures already described, are expected to minimize the effects of the expected takes on the affected individuals. In addition, NMFS does not anticipate that serious injury or mortality will occur as a result of the Navy's planned activity given the nature of the activity, even in the absence of required mitigation.

Exposures to elevated sound levels produced during pile driving and drilling may cause behavioral disturbance of some individuals. Effects on individuals that are taken by Level B harassment, as enumerated in the Estimated Take section, 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). Marine mammals within the Level B harassment zones may not show any visual cues they are disturbed by activities or they could become alert, avoid the area, leave the area, or display other mild responses that are not observable such as changes in vocalization patterns or increased haul out time (Thorson and Reyff, 2006). Data from recent observations of harbor seals in the project area support the assumption that may behavioral responses to the proposed construction monitoring may be mild in nature (Navy, 2022). The Navy has observed 116 harbor seals in the project since January 20, 2022. This includes observations at the conclusion of P–310 construction (January to February 2022) and the start of P–381 construction (May 2022 through October 16, 2022). Forty-eight of these observations occurred during periods with active construction, and the most common behavior recorded (n=28; 58.3 percent) was no response. The other common behaviors noted for these observations were swimming or milling (n=18; 37.5 percent), with notably lower observations of retreat/flush behaviors (n=1, 2.1 percent) (Navy, 2022).

Additionally, some of the species present in the region will only be present temporarily based on seasonal patterns or during transit between other habitats. These temporarily present species will be exposed to even smaller periods of noise-generating activity, further decreasing the impacts. Most likely, individual animals will simply move away from the sound source and be temporarily displaced from the area, although even this reaction has been observed primarily only in association with impact pile driving. The activities analyzed here are similar to numerous other construction activities conducted along both Atlantic and Pacific coasts, which have taken place with no known long-term adverse consequences from behavioral harassment. These reactions and behavioral changes are expected to subside quickly when the exposures cease. The intensity of Level B harassment events will be minimized through use of mitigation measures described herein, including the soft starts and the use of the bubble curtain, which was not quantitatively factored into the take estimates. The Navy will use at least three PSOs stationed strategically to increase detectability of marine mammals during in-water construction activities and removal, enabling a high rate of success in implementation of shutdowns to avoid or minimize injury for most species. Further, given the absence of any major rookeries and only one isolated pinniped haul-out site at Hicks Rocks approximately 2.4 km (1.5 mi) from the proposed project area, we assume that potential takes by Level B harassment would have a negligible short-term effect on individuals and would not result in population-level impacts.

Due to the levels and durations of likely exposure, animals that experience PTS will likely only receive slight PTS, *i.e.,* minor degradation of hearing capabilities within regions of hearing that align most completely with the frequency range of the energy produced by Navy's proposed in-water construction activities (*i.e.,* the low-frequency region below 2 kHz), not severe hearing impairment or impairment in the reigns of greatest hearing sensitivity. If hearing impairment does occur, it is most likely that the affected animal will lose a few dBs in its hearing sensitivity, which in most cases is not likely to meaningfully affect its ability to forage and communicate with conspecifics. Data do not suggest that a single instance in which an animal accrues PTS (or TTS) and is subject to behavioral disturbance would result in impacts to reproduction or survival. If PTS were to occur, it would be at a lower level likely to accrue to a relatively small portion of the population by being a stationary activity in one particular location.

The project is also not expected to have significant adverse effects on any marine mammal habitat. The project activities will not modify existing marine mammal habitat since the project will occur within the same footprint as existing marine infrastructure. Impacts to the immediate substrate are anticipated, but these would be limited to minor, temporary suspension of sediments, which could impact water quality and visibility for a short amount of time but which would not be expected to have any effects on individual marine mammals. The nearshore and intertidal habitat where the project will occur is an area of consistent vessel traffic from Navy and non-Navy vessels, and some local individuals would likely be somewhat habituated to the level of activity in the area, further reducing the likelihood of more severe impacts. The closest pinniped haulout used by harbor and gray seals is Hicks Rocks, located approximately 2.4 km (1.5 mi) away on the opposite side of the island and not within the ensonified area. There are no other biologically important areas for marine mammals near the project area.

In addition, impacts to marine mammal prey species are expected to be minor and temporary. Overall, the area impacted by the project is very small compared to the available surrounding habitat, and does not include habitat of particular importance. The most likely impact to prey will be temporary behavioral avoidance of the immediate area. During construction activities, it is expected that some fish and marine mammals would temporarily leave the area of disturbance, thus impacting marine mammals' foraging opportunities in a limited portion of the foraging range. But, because of the relatively small area of the habitat that may be affected, the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

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

- No serious injury or mortality is anticipated or proposed for authorization;
- Level A harassment proposed for authorization is expected to be of a lower degree that would not impact the fitness of any animals;
- Anticipated incidents of Level B harassment consist of, at worst, temporary modifications in behavior;
- The required mitigation measures (*i.e.,* soft starts, bubble curtain, shutdown zones) are expected to be effective in reducing the effects of the specified activity;
- Minimal impacts to marine mammal habitat/prey are expected;
- There is one pinniped haulout in the vicinity of the project area (Hicks Rocks), but it is on the opposite side of Seavey Island and not within the ensonified area; and
- There are no known biologically important areas in the vicinity of the project.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine mammal take from the proposed activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

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

The maximum annual amount of take NMFS proposes to authorize for five marine mammal stocks is below one-third of the estimated stock abundance for all species (see Table 16). The number of animals proposed for authorization to be taken from these stocks would be considered small relative to the relevant stock's abundances even if each estimated take occurred to a new individual, which is an unlikely scenario.

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

Unmitigable Adverse Impact Analysis and Determination

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

Adaptive Management

The regulations governing the take of marine mammals incidental to Navy 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 completed projects 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.

Endangered Species Act

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA: 16 U.S.C. 1531 *et seq.*) requires that each Federal agency ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of LOAs, NMFS consults internally whenever we propose to authorize take for endangered or threatened species.

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

Request for Information

NMFS requests that interested persons 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 a final rule and make final determinations on whether to issue the requested authorization. This notice of proposed rulemaking and supporting 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. The Navy is the sole entity that would be subject to the requirements in these proposed regulations, and the 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.

Dated: January 5, 2023.

Samuel D. Rauch, III,

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

List of Subjects in 50 CFR Part 217

Administrative practice and procedure, Alaska, Endangered and threatened species, Exports, Fish, Fisheries, Fishing, Imports, Indians, Labeling, Marine mammals, Oil and gas exploration, Penalties, Reporting and recordkeeping requirements, Seafood, Transportation, Wildlife.

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

PART 217—REGULATIONS GOVERNING THE TAKE OF MARINE MAMMALS INCIDENTAL TO SPECIFIED ACTIVITIES

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

Authority: 16 U.S.C. 1361 *et seq.,* unless otherwise noted.

■ 2. Add Subpart N to part 217 to read as follows:

Subpart N—Taking and Importing Marine Mammals Incidental to U.S. Navy Construction at Portsmouth Naval Shipyard, Kittery, Maine

§ 217.130 Specified activity and geographical region.

(a) Regulations in this subpart apply only to taking of marine mammals by the U.S. Navy (Navy) and those persons it authorizes or funds to conduct activities that occurs incidental to construction activities related to the multifunctional expansion and modification of Dry Dock 1 in the areas outlined in paragraph (b) of this section.

(b) The taking of marine mammals by the Navy may be authorized in a Letter of Authorization (LOA) only if it occurs at Portsmouth Naval Shipyard, Kittery, Maine.

§ 217.131 Effective dates.

Regulations in this subpart are effective for a period of five years from the date of issuance.

§ 217.132 Permissible methods of taking.

Under an LOA issued pursuant to § 216.106 of this chapter and § 217.136, the Holder of the LOA (hereinafter "Navy") may incidentally, but not intentionally, take marine mammals within the area described in § 217.130(b) by harassment associated with construction activities related to the multifunctional expansion and modification of Dry Dock 1, provided the activity is in compliance with all terms, conditions, and requirements of the regulations in this subpart and the applicable LOA.

§ 217.133 Prohibitions.

(a) Except for the takings contemplated in § 217.1322 and authorized by a LOA issued under § 216.106 of this chapter and § 217.136, it is unlawful for any person to do any of the following in connection with the activities described in § 217.130:

(1) Violate, or fail to comply with, the terms, conditions, and requirements of this subpart or a LOA issued under § 216.106 of this chapter and § 217.136;

(2) Take any marine mammal not specified in such LOA;

(3) Take any marine mammal specified in such LOA in any manner other than as specified;

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

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

(b) [Reserved]

§ 217.134 Mitigation requirements.

(a) When conducting the activities identified in § 217.130(a), the mitigation measures contained in this subpart and any LOA issued under § 216.106 of this chapter and § 217.136 must be implemented. These mitigation measures include:

(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 at all times that activities subject to this LOA are being conducted.

(2) Should environmental conditions deteriorate such that marine mammals within the entire shutdown zone would not be visible (*e.g.,* fog, heavy rain, night), the Navy shall delay pile driving and drilling until observers are confident marine mammals within the shutdown zone could be detected.

(3) The Navy must ensure that construction supervisors and crews, the monitoring team, and relevant Navy staff are trained prior to the start of construction activity subject to this rule, so that responsibilities, communication procedures, monitoring protocols, and operational procedures are clearly understood. New personnel joining during the project will be trained prior to commencing work.

(4) The Navy, construction supervisors and crews, protected species observers (observers), and relevant Navy staff must avoid direct physical interaction with marine mammals during construction activity. If a marine mammal comes within 10 m of such activity, operations will cease and vessels will reduce speed to the minimum level required to maintain steerage and safe working conditions, as necessary, to avoid direct physical interaction.

(5) For all pile driving and drilling activities, the Navy must implement shutdown zones with radial distances as identified in a LOA issued under § 216.106 of this chapter and § 217.136. If a marine mammal comes within or approaches the shutdown zone, such operations must cease.

(6) The Navy must monitor the project area to the maximum extent possible based on the required number of protected species observers (PSOs), required monitoring locations, and environmental conditions as described in the NMFS-approved Marine Mammal Monitoring Plan.

(7) Monitoring must take place from 30 minutes prior to initiation of pile driving or drilling activity (*i.e.,* pre-start clearance monitoring) through 30 minutes post-completion of pile driving or drilling activity. Pre-activity monitoring must be conducted for 30 minutes to ensure that the shutdown zone is clear of marine mammals, and pile driving or drilling may commence when PSOs have declared the shutdown zone clear of marine mammals. Monitoring must occur throughout the time required to drive/drill a pile. If work ceases for more than 30 minutes, the pre-activity monitoring of the shutdown zones must commence. A determination that the shutdown zone is clear must be made during a period of good visibility (*i.e.,* the entire shutdown zone and surrounding waters must be visible to the naked eye).

(8) If a marine mammal enters a shutdown zone, all pile driving or drilling activities at that location must be halted. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animals must be allowed to remain in the shutdown zone (*i.e.,* must leave of their own volition) and their behavior must be monitored and documented. If a marine mammal is observed within the shutdown zone, pile driving or drilling activities may not commence or resume until at least one of the following conditions has been met:

(i) The animal has been observed exiting the shutdown zone;

(ii) The animal is thought to have exited the shutdown zone based on a determination of its course, speed, and movement relative to the pile driving location; or

(iii) The shutdown zone has been clear from any additional sightings for fifteen minutes.

(9) The Navy must conduct monitoring to include the entire region of influence, which includes the area within the Level A and Level B harassment zones with radial distances as identified in a LOA issued under § 216.106 of this chapter and § 217.136.

(10) The Navy must use soft start techniques when impact pile driving. Soft start requires contractors to provide an initial set of strikes from the hammer at reduced energy, followed by a 30-second waiting period. Then two subsequent reduced-energy strike sets would occur. A soft start will 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 30 minutes or longer.

(11) The Navy must install a bubble curtain across the entrance openings during cluster drill and hydraulic rock hammering activities. The bubble curtain must adhere to the following restrictions:

(i) The bubble curtain must distribute air bubbles around 100 percent of the piling circumference for the full depth of the water column;

(ii) The lowest bubble ring must be in contact with the substrate for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent substrate contact. No parts of the ring or other objects shall prevent full substrate contact; and

(iii) Air flow to the bubblers must be balanced around the circumference of the pile.

(iv) The bubble curtain may be discontinued for certain activities should the results of hydroacoustic recordings inside the bubble curtain show that the source levels from those activities do not result in the Level A harassment thresholds being achieved across the entire region of influence, upon review of the data by NMFS.

(12) Pile driving and drilling activity must be halted upon observation of either a species entering or within the harassment zone, for which incidental take is not authorized, or a species for which incidental take has been authorized but the authorized number of takes has been met.

(b) [Reserved]

§ 217.135 Requirements for monitoring and reporting.

(a) The Navy must submit a Marine Mammal Monitoring Plan to NMFS for approval in advance of construction. Marine mammal monitoring must be conducted in accordance with the conditions in this section and the Marine Mammal Monitoring Plan.

(b) Monitoring must be conducted by qualified PSOs in accordance with the following conditions:

(1) PSOs must be independent (*i.e.,* not construction personnel) and have no other assigned tasks during monitoring periods.

(2) At least one PSO must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.

(3) Other PSOs may substitute relevant experience, education (degree in biological science or related field), or training for prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.

(4) One PSO must be designated as lead PSO or monitoring coordinator. The lead PSO must have prior experience performing the duties of a PSO during construction activity pursuant to a NMFS-issued incidental take authorization.

(5) PSOs must be approved by NMFS prior to beginning any activity subject to this LOA.

(c) For all pile driving activities, a minimum of three PSOs must be stationed on boats, docks, or piers sufficient to monitor the harassment and shutdown zones, and as described in the Marine Mammal Monitoring Plan.

(d) PSOs must record all observations of marine mammals, regardless of distance from the pile/hole being driven/drilled, as well as additional data indicated in the reporting requirements.

(e) The shutdown/monitoring zones may be modified with NMFS' approval following NMFS' acceptance of an acoustic monitoring report.

(f) The Navy must submit a draft monitoring report to NMFS within 90 work days of the completion of required monitoring for each portion of the project as well as a comprehensive summary report at the end of the project. The report will detail the monitoring protocol and summarize the data recorded during monitoring. Final annual reports (each portion of the project and comprehensive) must be prepared and submitted within 30 days following resolution of any NMFS comments on the draft report. If no comments are received from NMFS within 30 days of receipt of the draft report, the report must be considered final. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments. The reports must at minimum contain the informational elements described as follows (as well as any additional information described in the Marine Mammal Monitoring Plan), including:

(1) Dates and times (begin and end) of all marine mammal monitoring.

(2) Construction activities occurring during each daily observation period, including how many and what type of piles were driven or drilled and by what method (*i.e.,* impact, vibratory, rotary drilling, rock hammering, mono- or cluster- down-the-hole (DTH)), the total duration of driving time for each pile/hole (vibratory driving, rotary drilling) and number of strikes for each pile/hole (impact driving, hydraulic rock hammering), and for DTH excavation, the duration of operation for both impulsive and non-pulse components as well as the strike rate.

(3) Environmental conditions during monitoring periods (at beginning and end of observer shift and whenever conditions change significantly), including Beaufort sea state and any other relevant weather conditions including cloud cover, fog, sun glare, and overall visibility to the horizon, and estimated observable distance (if less than the harassment zone distance);

(4) Upon observation of a marine mammal, the following information:

(i) PSO who sighted the animal and observer location, as well as the activity at the time of the sighting;

(ii) Time of sighting;

(iii) Identification of the animal (*e.g.,* genus/species, lowest possible taxonomic level, or unidentified), PSO confidence in identification, and the composition of the group if there is a mix of species;

(iv) Distances and bearings of each marine mammal observed in relation to the pile being driven or drilled for each sighting (if pile driving or drilling was occurring at time of sighting).

(v) Estimated number of animals (min/max/best);

(vi) Estimated number of animals by cohort (adults, juveniles, neonates, group composition etc.);

(vii) Animal's closest point of approach and estimated time spent within the harassment zone; and

(viii) Description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling), including an assessment of behavioral responses to the activity (*e.g.,* no response or changes in behavioral state such as ceasing feeding, changing direction, flushing, or breaching);

(ix) Number of marine mammals detected within the harassment zones, by species;

(x) Detailed information about any implementation of any mitigation (*e.g.,* shutdowns and delays), a description of specific actions that ensued, and resulting changes in the behavior of the animal, if any; and

(xi) All PSO datasheets and/or raw sightings data.

(g) The Navy must conduct hydroacoustic data collection (sound source verification and propagation loss) in accordance with a hydroacoustic monitoring plan that must be approved by NMFS in advance of construction. This includes measurements from 10 piles/holes during the rotary drilling of 126-inch and 84-inch shafts, and DTH cluster drilling of 108-inch, 84-inch, and 72-inch shafts. The Navy must report the hydroacoustic data collected as required by a LOA issued under § 216.106 of this chapter and § 217.136 and as described in the Acoustic Monitoring Plan, which at a minimum, must include:

(1) Hydrophone equipment and methods: recording device, sampling rate, distance (m) from the pile where recordings were made; depth of water and recording device(s);

(2) Type and size of pile being driven, substrate type, method of driving during recordings (*e.g.,* hammer model and energy), and total pile driving duration;

(3) Whether a sound attenuation device is used and, if so, a detailed description of the device used and the duration of its use per pile;

(4) For impact pile driving and/or DTH excavation (DTH mono-hammer and cluster drill) (per pile): Number of strikes and strike rate; depth of substrate to penetrate; pulse duration and mean, median, and maximum sound levels (dB re: 1 μPa): root mean square sound pressure level (SPL_{rms}); cumulative sound exposure level (SEL_{cum}), peak sound pressure level (SPL_{peak}), and single-strike sound exposure level (SEL_{s-s});

(5) For vibratory driving/removal and/or DTH excavation (DTH mono-hammer and cluster drill) (per pile): Duration of driving per pile; mean, median, and maximum sound levels (dB re: 1 μPa): root mean square sound pressure level (SPL_{rms}), cumulative sound exposure level (SEL_{cum}) (and timeframe over which the sound is averaged);

(6) One-third octave band spectrum and power spectral density plot; and

(7) General Daily Site Conditions, including the date and time of activities, the water conditions (*e.g.,* sea state, tidal state), and the weather conditions (*e.g.,* percent cover, visibility).

(h) All draft and final monitoring reports must be submitted to *PR.ITP.MonitoringReports@noaa.gov* and *ITP.tyson.moore@noaa.gov.*

(i) In the event that personnel involved in the construction activities discover an injured or dead marine mammal, the Navy must report the incident to NMFS Office of Protected Resources (OPR), and to the Greater Atlantic Region New England/Mid-Atlantic Stranding Coordinator, as soon as feasible. If the death or injury was clearly caused by the specified activity, the Navy must immediately cease the specified activities until NMFS OPR is able to review the circumstances of the incident and determine what, if any, additional measures are appropriate to ensure compliance with the terms of this rule and the LOA issued under § 216.106 of this chapter and § 217.136. The Navy will not resume their activities until notified by NMFS. The report must include the following information:

(1) Time, date, and location (latitude/longitude) of the first discovery (and updated location information if known and applicable);

(2) Species identification (if known) or description of the animal(s) involved;

(3) Condition of the animal(s) (including carcass condition if the animal is dead);

(4) Observed behaviors of the animal(s), if alive;

(5) If available, photographs or video footage of the animal(s); and

(6) General circumstances under which the animal was discovered.

§ 217.136 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to this subpart, the Navy must apply for and obtain an LOA.

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

(c) If an LOA expires prior to the expiration date of these regulations, the 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 an LOA, the Navy must apply for and obtain a modification of the LOA as described in § 217.137.

(e) The LOA will set forth the following information:

(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 will 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 an LOA will be published in the **Federal Register** within 30 days of a determination.

§ 217.137 Renewals and modifications of Letters of Authorization.

(a) An LOA issued under § 216.106 of this chapter and § 217.136 for the activity identified in § 217.130(a) may 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; and

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

(b) For LOA modification or renewal requests by the applicant that include changes to the activity or the mitigation, monitoring, or reporting that do not change the findings made for the regulations or 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 of this chapter and § 217.136 for the activity identified in § 217.130(a) may be modified by NMFS under the following circumstances:

(1) 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; and

(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; and

(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) 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 of this chapter and § 217.136, a LOA may be modified without prior public notice or opportunity for public comment. Notification would be published in the **Federal Register** within 30 days of the action.

§ 217.138–217.139 [Reserved]

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