

DEPARTMENT OF COMMERCE**National Oceanic and Atmospheric Administration****50 CFR Part 217**

[Docket No. 210318–0058]

RIN 0648–BK21

Taking Marine Mammals Incidental to the Hampton Roads Bridge Tunnel Expansion Project in Norfolk, Virginia

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

ACTION: Final rule; notification of issuance of Letters of Authorization.

SUMMARY: NMFS, upon request of the Hampton Roads Connector Partners (HRCP), hereby issues regulations to govern the unintentional taking of marine mammals incidental to construction activities associated with the Hampton Roads Bridge Tunnel Expansion Project (HRBT) in Norfolk, Virginia, over the course of five years (2021–2026). These regulations, which allow for the issuance of Letters of Authorization (LOA) for the incidental take of marine mammals during the described activities and specified timeframes, prescribe the permissible methods of taking and other means of effecting the least practicable adverse impact on marine mammal species or stocks and their habitat, as well as requirements pertaining to the monitoring and reporting of such taking.

DATES: Effective from April 2, 2021 through April 1, 2026.

ADDRESSES: A copy of HRCP's application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: <https://www.fisheries.noaa.gov/action/incidental-take-authorization-hampton-roads-bridge-tunnel-expansion-project-hampton-0>. In case of problems accessing these documents, please call the contact listed below.

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

SUPPLEMENTARY INFORMATION:**Purpose and Need for Regulatory Action**

We received an application from the HRCP requesting five-year regulations and authorization to take multiple species of marine mammals. This rule establishes a framework under the authority of the MMPA (16 U.S.C. 1361 *et seq.*) to allow for the authorization of

take of marine mammals incidental to the HRCP's construction activities associated with the HRBT. The HRBT is a major road transportation infrastructure project along the existing I–64 highway in Virginia, consisting of roadway improvements, trestle bridges, and bored tunnels crossing the James River between Norfolk and Hampton. The purpose of the project is to address severe traffic congestion at the existing HRBT crossing by increasing traffic capacity and upgrading lanes.

Legal Authority for the Action

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

Summary of Major Provisions Within the Final Rule

Following is a summary of the major provisions of these regulations regarding HRCP's construction activities. These measures include:

- Shutdown of construction activities under certain circumstances to minimize injury of marine mammals;
- Required monitoring of the construction areas to detect the presence of marine mammals before beginning construction activities;
- Soft start for impact pile driving to allow marine mammals the opportunity to leave the area prior to initiating impact pile driving at full power; and
- Use of bubble curtains during impact driving of steel piles in appropriate circumstances.

Background

The MMPA prohibits the “take” of marine mammals, with certain

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

Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s) and will not have an unmitigable adverse impact on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Further, NMFS must prescribe the permissible methods of taking and other “means of effecting the least practicable adverse impact” on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of 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.

Summary of Request

On November 19, 2019, NMFS received an application from HRCP requesting authorization for take of marine mammals incidental to construction activities related to a major road transport infrastructure project along the existing I-64 highway in Virginia, consisting of roadway improvements, trestle bridges, and bored tunnels crossing Hampton Roads between Norfolk and Hampton, Virginia. HRCP submitted a revised application on June 27, 2020 which included changes to construction methods. We determined the application was adequate and complete on September 29, 2020. On October 7, 2020 (85 FR 63256), we published a notice of receipt (NOR) of HRCP's application in the **Federal Register**, requesting comments and information related to the request for thirty days. The proposed rule was subsequently published in the **Federal Register** on January 8, 2021 (86 FR 1588) and requested comments and information from the public. Please see Comments and Responses, below.

HRCP previously applied for an incidental harassment authorization (IHA) to cover initial in-water pile driving work. That IHA was issued on July 10, 2020 (85 FR 48153; August 10, 2020), and is effective until July 9, 2021. Information related to this previous IHA may be found online at: <https://www.fisheries.noaa.gov/action/incidental-take-authorization-hampton-roads-bridge-tunnel-expansion-project-hampton-norfolk>. To date, HRCP has adhered to all mitigation, monitoring, and reporting requirements and has not exceed authorized numbers of take.

HRCP proposed to conduct in-water construction activities, including pile installation and removal, and requested authorization to take five species of marine mammals by Level A and Level B harassment. Neither HRCP nor NMFS expects serious injury or mortality to result from this activity, and none is authorized. The regulations are effective for five years (2021–2026).

Description of Activity

Overview

HRCP is planning to conduct construction activities associated with the HRBT project. This is a major road transport infrastructure project along the existing I-64 highway in Virginia, consisting of roadway improvements, trestle bridges, and bored tunnels crossing Hampton Roads between Norfolk and Hampton. The project will address severe traffic congestion at the existing HRBT crossing by increasing capacity and will include widening I-64 to create an eight-lane facility with a consistent six-lanes between the I-64/I-664 and I-64/I-564 Interchange, which could expand to eight-lanes during peak travel periods with the use of drivable shoulder lanes within the project limits. The project will include the construction of two new two-lane tunnels, expansion of the existing portal islands, and full replacement of the existing North and South bridge-trestles.

The HRBT project will require extensive pile installation and pile removal activities. Pile installation methods will include impact and vibratory driving, jetting, and down-the-hole (DTH) pile installation. Pile removal techniques for temporary piles will include vibratory pile removal or cutting three feet below the mudline. Impact pile installation is projected to take place at 3 to 4 locations simultaneously and there is the potential for as many as 7 pile installation locations operating concurrently with different hammer types. Pile installation and removal can

occur at variable rates, from a few minutes one day to several hours the next. HRCP anticipates that between 1 to 10 piles could be installed per day, depending on project scheduling.

The project may incidentally expose marine mammals occurring in the vicinity to elevated levels of underwater sound, thereby resulting in incidental take, by Level A and Level B harassment.

Dates and Duration

The regulations are valid for a period of five years (2021–2026). The specified activities may occur at any time during the five-year period of validity of the regulations. HRCP expects pile driving and removal to occur six days per week. The overall number of anticipated days of pile installation and removal is 312 each year for five years, based on a 6-day work week for an estimated total of 1,560 days.

HRCP plans to conduct work during daylight hours. However, pile installation and removal may extend into evening or nighttime hours as needed to accommodate pile installation requirements (e.g., once pile driving begins, a pile will be driven to design tip elevation). In order to maintain pile integrity and follow safety precautions, pile installation or removal will continue after dark only for piles already in the process of being installed or removed. Installation or removal will not commence on new piles after dark.

Specific Geographic Region

The project area is located in the waterway of Hampton Roads adjacent to the existing bridge and island structures of the HRBT. Hampton Roads is located at the confluence of the James River, the Elizabeth River, the Nansemond River, Willoughby Bay, and the Chesapeake Bay. (see Figures 1–1 and 2–1 in HRCP's application). For additional detail regarding the specified geographic region, please see our Proposed Rule (86 FR 1588; January 8, 2021) and Section 2 of HRCP's application. A map of the HRBT Project Area is provided in Figure 1 below and Figures 1–1 and 2–1 in HRCP's application.

Detailed Description of Specific Activity

The planned project will widen I-64 for approximately 9.9 miles along I-64 from Settlers Landing Road in Hampton, Virginia, to the I-64/I-564 interchange in Norfolk, Virginia. The project will create an eight-lane facility with six consistent use lanes and will include full replacement of the North and South Trestle-Bridges, two new parallel tunnels constructed using a tunnel

boring machine (TBM), expansion of the existing portal islands, and widening of the Willoughby Bay Trestle-Bridges, Bay Avenue Bridges, and Oastes Creek Bridges. Also, upland portions of I-64 will be widened to accommodate the additional lanes, the Mallory Street Bridge will be replaced, and the I-64 overpass bridges will be improved.

Pile installation and removal would occur at North Trestle, North Island, South Island, South Trestle, Willoughby Spit, and Willoughby Bay (refer to Figure 1–1 in the application). Table 1 below identifies the various project design segments where in-water marine construction activities are planned that have the potential to affect marine mammals. HRCP plans to install up to 6,798 piles including 24- to 60-inch steel pipe piles, 24- to 54-inch concrete piles, 16-inch timber piles, and sheet piles. This would be done by a variety of methods including use of vibratory hammer, impact hammer, DTH hammer, and/or jetting. HRCP would remove up to 4,728 piles including 24- to 42-inch steel pipe piles, sheet piles, and 16-inch timber piles using a vibratory hammer, direct pull or by cutting them below the mudline. HRCP plans on using multiple hammers concurrently to install and remove piles. Tables 2 through Table 6 show the number and types of piles planned for installation and removal each year by component and segment while Table 7 shows the total number of template piles over five years by location. A detailed description of HRCP's planned activities was provided in our notice of proposed rulemaking (86 FR 1588; January 8, 2021) and is not repeated here. No changes have been made to the specified activities described therein.

TABLE 1—HRBT EXPANSION PROJECT DESIGN SEGMENTS

Project design segment number and name	Construction area
Segment 1a (Hampton)	1
Segment 1b (North Trestle-Bridges) ¹	2
Segment 2a (Tunnel) ¹	3
Segment 3a (South Trestle-Bridge) ¹	2
Segment 3b (Willoughby Spit) ¹	4
Segment 3c (Willoughby Bay Trestle-Bridges) ¹	2
Segment 3d (4th View Street Interchange)	4
Segment 4a (Norfolk-Navy) ..	4
Segment 5a (I-564 Interchange)	4

¹ Indicates segment includes in-water construction activities.

TABLE 2—NUMBERS AND TYPES OF PILES TO BE INSTALLED AND REMOVED DURING LOA YEAR ONE FOR EACH HRBT PROJECT COMPONENT AND SEGMENT

Project component	Pile size/type and material	Total number of piles to be installed	Total number of piles to be removed	Embedment length (feet)	Number of piles down-the-hole	Average down-the-hole duration per pile (minutes)	Number of piles vibrated/hammered	Average vibratory duration per pile (minutes)	Approximate number of impact strikes per pile	Number of piles per day per hammer	Estimated total number of hours of installation and removal	Number of days of installation and removal
North Trestle (Segment 1b)												
Permanent Piles	54-inch Concrete Cylinder Pipe.	188	0	140	.....	.....	188	.....	2,100	1	376	188
Casing	60-inch Steel Pipe ...	15	0	60	15	120	.....	.....	.....	3	30	5
North Shore Abutment.	AZ 700–19 Steel Sheet.	63	63	20	.....	.....	126	30	.....	10	63	13
North Island (Segment 2a)												
Hampton Creek Approach Channel Marker.	Existing, 36-inch Steel Pipe.	1	1	.....	.....	.....	1	50	.....	1	2	1
North Island Expansion.	AZ 700–26 Steel Sheet.	176	176	40	.....	.....	352	30	.....	10	176	35
Willoughby Bay (Segment 3c)												
Work Trestle	36-inch Steel Pipe ...	212	0	100	.....	.....	212	50	40	2	177	106
Moorings (Safe Haven).	42-inch Steel Pipe ...	40	0	60	.....	.....	40	30	.....	6	20	7
Permanent Piles	24-inch Concrete Square Pipe.	402	0	140	.....	.....	402	.....	2,100	1	804	402
Casing	42-inch Steel Pipe ...	240	240	60	.....	.....	480	30	.....	6	160	80
Willoughby Spit (Segment 3b)												
Dock on Spuds, Floating Dock.	36-inch Steel Pipe ...	8	0	100	.....	.....	8	50	40	3	7	3
Dock on Piles, Fixed Pier.	36-inch Steel Pipe ...	44	0	100	.....	.....	44	50	40	3	37	15
Finger Piers on Timber Piles.	16-inch CCA * Timber.	36	0	60	.....	.....	36	30	.....	4	18	9
South Trestle (Segment 3a)												
Work Trestle	36-inch Steel Pipe ...	156	0	100	22	120	134	50	40	2	130	78
Temporary MOT * Trestle.	36-inch Steel Pipe ...	113	0	100	11	120	102	50	40	2	85	51
Casing	42-inch Steel Pipe ...	30	0	60	.....	.....	30	30	.....	6	15	5
Permanent Piles	54-inch Concrete Cylinder Pipe.	252	0	140	.....	.....	252	.....	2,100	1	504	252
Casing	60-inch Steel Pipe ...	65	0	60	65	120	.....	.....	.....	3	130	22
South Island (Segment 2a)												
Settlement Reduction Piles.	24-inch Steel Pipe ...	24	0	85	.....	.....	24	60	40	6	24	4
Deep Foundation Piles.	30-inch Steel Pipe, Concrete Filled.	82	0	85	8	120	74	60	40	6	82	14
Moorings	42-inch Steel Pipe ...	25	0	60	.....	.....	25	30	.....	6	13	4
South Island Abutment.	AZ 700–19 Steel Sheet.	12	0	20	.....	.....	12	30	.....	10	6	2
Total .....	.....	2,184	480	.....	.....	.....	.....	.....	.....	.....	.....	1,296

* CCA = Chromated Copper Arsenate; MOT = Maintenance of Traffic; TBM = Tunnel Boring Machine.

TABLE 3—NUMBERS AND TYPES OF PILES TO BE INSTALLED AND REMOVED DURING LOA YEAR TWO FOR EACH HRBT PROJECT COMPONENT AND SEGMENT

Project component	Pile size/type and material	Total number of piles to be installed	Total number of piles to be removed	Embedment length (feet)	Number of piles down-the-hole	Average down-the-hole duration per pile (minutes)	Number of piles vibrated/hammered	Average vibratory duration per pile (minutes)	Approximate number of impact strikes per pile	Number of piles per day per hammer	Estimated total number of hours of installation and removal	Number of days of installation and removal
North Trestle (Segment 1b)												
North Shore Work Trestle.	36-inch Steel Pipe ...	0	194	100	.....	.....	194	50	40	3	162	65
Work Trestle	36-inch Steel Pipe ...	182	.....	100	12	120	170	50	40	2	152	91
Jump Trestle	36-inch Steel Pipe ...	42	38	100	3	120	77	50	40	2	65	39
Permanent Piles	54-inch, Concrete Cylinder Pipe.	102	0	140	.....	.....	102	.....	2,100	1	204	102
North Island (Segment 2a)												
North Island Abutment.	AZ 700–19 Steel Sheet.	96	0	20	.....	.....	96	30	.....	10	48	10
Willoughby Bay (Segment 3c)												
Jump Trestle	36-inch Steel Pipe ...	84	76	100	.....	.....	160	50	40	2	134	80
Work Trestle	36-inch Steel Pipe ...	0	126	100	.....	.....	126	50	.....	2	105	63
Permanent Piles	24-inch Concrete Square Pipe.	102	0	140	.....	.....	102	.....	2,100	1	204	102

TABLE 3—NUMBERS AND TYPES OF PILES TO BE INSTALLED AND REMOVED DURING LOA YEAR TWO FOR EACH HRBT PROJECT COMPONENT AND SEGMENT—Continued

Project component	Pile size/type and material	Total number of piles to be installed	Total number of piles to be removed	Embedment length (feet)	Number of piles down-the-hole	Average down-the-hole duration per pile (minutes)	Number of piles vibrated/hammered	Average vibratory duration per pile (minutes)	Approximate number of impact strikes per pile	Number of piles per day per hammer	Estimated total number of hours of installation and removal	Number of days of installation and removal
Casing	42-inch Steel Pipe ...	60	60	60	.....	.....	120	30	.....	6	60	20
South Trestle (Segment 3a)												
Work Trestle	36-inch Steel Pipe ...	100	0	100	14	120	86	50	40	2	84	50
Jump Trestle	36-inch Steel Pipe ...	175	175	100	10	120	350	50	40	2	292	175
Temporary MOT * Trestle.	36-inch Steel Pipe ...	105	0	100	10	120	95	50	.....	2	80	48
Permanent Piles	54-inch Concrete Cylinder Pipe.	168	0	140	.....	.....	168	.....	2,100	1	336	168
South Island (Segment 2a)												
Settlement Reduction Piles.	24-inch Steel Pipe, Steel.	370	0	85	.....	.....	370	60	40	6	370	62
Deep Foundation Piles.	30-inch Steel Pipe, Concrete Filled.	425	0	85	42	120	383	60	40	6	425	71
South Island Abutment.	AZ 700–19 Steel Sheet.	12	24	20	.....	.....	36	30	.....	10	18	4
South Island Expansion.	AZ 700–26 Steel Sheet.	378	378	70	.....	.....	756	30	.....	10	189	76
Total .....	.....	2,401	1,071	.....	.....	.....	.....	.....	.....	.....	.....	1,226

* CCA = Chromated Copper Arsenate; MOT = Maintenance of Traffic; TBM = Tunnel Boring Machine.

TABLE 4—NUMBERS AND TYPES OF PILES TO BE INSTALLED AND REMOVED DURING LOA YEAR THREE FOR EACH HRBT PROJECT COMPONENT AND SEGMENT

Project component	Pile size/type and material	Total number of piles to be installed	Total number of piles to be removed	Embedment length (feet)	Number of piles down-the-hole	Average down-the-hole duration per pile (minutes)	Number of piles vibrated/hammered	Average vibratory duration per pile (minutes)	Approximate number of impact strikes per pile	Number of piles per day per hammer	Estimated total number of hours of installation and removal	Number of days of installation and removal
North Trestle (Segment 1b)												
Jump Trestle	36-inch Steel Pipe ...	228	232	100	9	120	451	50	40	2	376	226
Permanent Piles	54-inch, Concrete Cylinder Pipe.	187	0	140	.....	.....	187	.....	2,100	1	374	187
North Shore Abutment.	AZ 700–19 Steel Sheet.	62	62	20	.....	.....	124	30	.....	10	62	13
North Island (Segment 2a)												
North Island Abutment.	AZ 700–19 Steel Sheet.	32	128	20	.....	.....	160	30	.....	10	80	16
Willoughby Bay (Segment 3c)												
Jump Trestle	36-inch Steel Pipe ...	460	468	100	.....	.....	928	50	40	2	774	464
Work Trestle	36-inch Steel Pipe ...	0	86	100	.....	.....	86	50	.....	2	72	43
South Trestle (Segment 3a)												
Jump Trestle	36-inch Steel Pipe ...	245	245	100	14	120	476	50	40	2	397	238
Demolition Trestle ...	36-inch Steel Pipe ...	15	0	100	2	120	13	50	40	2	13	30
Work Trestle	36-inch Steel Pipe ...	0	182	100	.....	.....	182	50	.....	2	152	91
Temporary MOT * Trestle.	36-inch Steel Pipe ...	0	110	100	.....	.....	110	50	.....	2	92	55
Permanent Piles	54-inch Concrete Cylinder Pipe.	196	0	140	.....	.....	196	.....	2,100	1	392	196
South Island (Segment 2a)												
South Island Abutment.	AZ 700–19 Steel Sheet.	46	46	20	.....	.....	92	30	.....	10	46	10
Total .....	.....	1,471	1,559	.....	.....	.....	.....	.....	.....	.....	.....	1,569

* CCA = Chromated Copper Arsenate; MOT = Maintenance of Traffic; TBM = Tunnel Boring Machine.

TABLE 5—NUMBERS AND TYPES OF PILES TO BE INSTALLED AND REMOVED DURING LOA YEAR FOUR FOR EACH HRBT PROJECT COMPONENT AND SEGMENT

Project component	Pile size/type and material	Total number of piles to be installed	Total number of piles to be removed	Embedment length (feet)	Number of piles down-the-hole	Average down-the-hole duration per pile (minutes)	Number of piles vibrated/hammered	Average vibratory duration per pile (minutes)	Approximate number of impact strikes per pile	Number of piles per day per hammer	Estimated total number of hours of installation and removal	Number of days of installation and removal
North Trestle (Segment 1b)												
Demolition Trestle ...	36-inch Steel Pipe ...	344	172	100	24	120	492	50	40	2	410	246
Permanent Piles	54-inch, Concrete Cylinder Pipe.	85	0	140	.....	.....	85	.....	2,100	1	170	85

TABLE 5—NUMBERS AND TYPES OF PILES TO BE INSTALLED AND REMOVED DURING LOA YEAR FOUR FOR EACH HRBT PROJECT COMPONENT AND SEGMENT—Continued

Project component	Pile size/type and material	Total number of piles to be installed	Total number of piles to be removed	Embedment length (feet)	Number of piles down-the-hole	Average down-the-hole duration per pile (minutes)	Number of piles vibrated/hammered	Average vibratory duration per pile (minutes)	Approximate number of impact strikes per pile	Number of piles per day per hammer	Estimated total number of hours of installation and removal	Number of days of installation and removal
North Shore Abutment.	AZ 700–19 Steel Sheet.	62	62	20	.....	.....	124	30	.....	10	62	13
South Trestle (Segment 3a)												
Demolition Trestle ...	36-inch Steel Pipe ...	57	72	100	10	120	119	50	40	2	99	60
Work Trestle	36-inch Steel Pipe ...	0	74	100	.....	.....	74	50	.....	2	62	37
Temporary MOT * Trestle.	36-inch Steel Pipe ...	0	108	100	.....	.....	108	50	.....	2	90	54
Permanent Piles	54-inch Concrete Cylinder Pipe.	194	0	140	.....	.....	194	.....	2,100	1	388	194
South Island (Segment 2a)												
TBM Platform	36-inch Steel Pipe ...	0	216	140	.....	.....	216	60	.....	2	216	108
Conveyor Trestle	36-inch Steel Pipe ...	0	84	100	.....	.....	84	50	.....	3	70	42
Total .....	.....	742	788	.....	.....	.....	.....	.....	.....	.....	.....	839

TABLE 6—NUMBERS AND TYPES OF PILES TO BE INSTALLED AND REMOVED DURING LOA YEAR FIVE FOR EACH HRBT PROJECT COMPONENT AND SEGMENT

Project component	Pile size/type and material	Total number of piles to be installed	Total number of piles to be removed	Embedment length (feet)	Number of piles down-the-hole	Average down-the-hole duration per pile (minutes)	Number of piles vibrated/hammered	Average vibratory duration per pile (minutes)	Approximate number of impact strikes per pile	Number of piles per day per hammer	Estimated total number of hours of removal	Number of days of removal
North Trestle (Segment 1b)												
Moorings	42-inch Steel Pipe ...	0	36	60	.....	.....	36	30	.....	6	18	6
Moorings	24-inch Steel Pipe ...	0	30	60	.....	.....	30	30	.....	6	15	5
Work Trestle	36-inch Steel Pipe ...	0	182	100	.....	.....	182	50	.....	2	152	91
Demolition Trestle ...	36-inch Steel Pipe ...	0	172	100	.....	.....	172	50	.....	2	144	86
North Island (Segment 2a)												
Moorings	42-inch Steel Pipe ...	0	80	60	.....	.....	80	30	.....	6	40	14
Willoughby Bay (Segment 3c)												
Moorings	42-inch Steel Pipe ...	0	50	60	.....	.....	50	30	.....	6	25	9
Moorings	24-inch Steel Pipe ...	0	18	60	.....	.....	18	30	.....	6	9	3
Moorings (Safe Haven).	42-inch Steel Pipe ...	0	90	60	.....	.....	90	30	.....	6	45	15
Willoughby Spit (Segment 3b)												
Dock on Spuds, Floating Dock.	36-inch Steel Pipe ...	0	8	100	.....	.....	8	50	.....	3	7	3
Dock on Piles, Fixed Pier.	36-inch Steel Pipe ...	0	44	100	.....	.....	44	50	.....	3	37	15
Finger Piers on Timber Piles.	16-inch CCA *, Timber.	0	36	60	.....	.....	36	30	.....	4	18	9
South Trestle (Segment 3a)												
Moorings	42-inch Steel Pipe ...	0	41	60	.....	.....	41	30	.....	6	21	7
Moorings	24-inch Steel Pipe ...	0	18	60	.....	.....	18	30	.....	6	9	3
South Island (Segment 2a)												
Mooring	42-inch Steel Pipe ...	0	25	60	.....	.....	25	30	.....	6	36	5
Total .....	.....	0	830	.....	.....	.....	.....	.....	.....	.....	.....	271

TABLE 7—NUMBERS OF TEMPLATE PILES (UP TO 36-INCH STEEL PIPE PILES) TO BE INSTALLED AND REMOVED USING A VIBRATORY HAMMER FOR THE HRBT PROJECT

Project component/location	Pile size/type and material	Estimated number of template piles to be installed	Estimated number of template piles to be removed	Average down-the-hole duration per pile (minutes)	Average vibratory duration per template pile (minutes)	Number of piles per day per component (install and removal)
North Trestle Permanent Piles	54-inch Concrete Cylinder Pipe	750	750	.....	5	8
South Trestle Permanent Piles	54-inch Concrete Cylinder Pipe	1,080	1,080	.....	5	8
Willoughby Bay Permanent Piles	24-inch Concrete Square Pipe	672	672	.....	5	8
Willoughby Spit Fixed Pier *	36-inch Steel Pipe	59	59	.....	5	16
Willoughby Spit Floating Pier *	36-inch Steel Pipe	11	11	.....	5	16
South Island Deep Foundation Piles ...	30-inch Steel Pipe, Concrete Filled	676	676	120	5	16

TABLE 7—NUMBERS OF TEMPLATE PILES (UP TO 36-INCH STEEL PIPE PILES) TO BE INSTALLED AND REMOVED USING A VIBRATORY HAMMER FOR THE HRBT PROJECT—Continued

Project component/location	Pile size/type and material	Estimated number of template piles to be installed	Estimated number of template piles to be removed	Average down-the-hole duration per pile (minutes)	Average vibratory duration per template pile (minutes)	Number of piles per day per component (install and removal)
South Island Settlement Reduction Piles.	24-inch Steel Pipe	526	526	.....	5	16
Estimated Total Template Pile Driving Actions.	.....	3,774	3,774	.....	.....	.....
Total number of Temporary Template Pile Driving action.	.....	7,548		.....	.....	.....

* The piles at Willoughby Spit will be temporary piles for the two temporary piers being constructed to allow barge access; however, these piles will be using a template for installation.

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

Comments and Responses

We published a Proposed Rule in the **Federal Register** on January 8, 2021 (86 FR 1588). During the 30-day comment period, we received a letter from the Marine Mammal Commission (Commission), and comments from two members of the general public. All substantive recommendations are responded to here. The comments are available online at: <https://www.fisheries.noaa.gov/action/incidental-take-authorization-hampton-roads-bridge-tunnel-expansion-project-hampton-0>.

Comment 1: The Commission recommended that NMFS publish a corrected notice in the **Federal Register** that includes, at a minimum, the dates and the correct number(s) of days within a year the activities are expected to occur, the correct input parameters for estimating the extents of the Level A harassment zones, the correct proposed shut-down zones, and the revised numbers of Level A and B harassment takes for Year 5 and provide a 30-day comment period from when the corrected notice publishes. The Commission further recommended that NMFS refrain from publishing any final rule until the correct shut-down zones have been made available for the public to provide meaningful comments during a 30-day comment period, which the Commission asserted would fulfill NMFS's requirements under the Administrative Procedure Act.

Response: NMFS does not agree with the Commission and does not adopt the recommendation. NMFS disagrees that the information presented in association with the proposed rule was insufficient to facilitate public review and comment. NMFS agrees that minor formatting

issues occurred in some tables, likely due to their size and complexity. A number of the Commission's suggested corrections are, for the most part, differences of opinion on how available data should be applied to our analysis and, in each case, we have presented reasons why we disagree with specific recommendations. If we did agree that there actually was an error or that the Commission's logic is more appropriate to implement, we have made the recommended changes. We note many of the recommendations by the Commission are detail-oriented and, in NMFS' view, do not provide additional conservation value or meaningfully influence any of the analyses underlying the necessary findings. NMFS is confident that our negligible impact and least practicable adverse impact determinations are valid, and we note that the Commission did not provide any information to the contrary. Overall, there are no substantial changes or new information that would lead us to reach any other conclusions regarding the impact to marine mammals. Any increase in take numbers resulted from, NMFS increasing the number of Level A and B harassment takes for Year 5 by assuming that construction would take the full year instead of a partial year (312 work days instead of 181 work days). For these reasons, NMFS is not republishing a notice of proposed rulemaking.

Comment 2: The Commission recommended that NMFS should determine the appropriate timeframes over which sound exposure levels should be accumulated when estimating the extents of the Level A harassment zones. The Commission also recommended that NMFS prioritize resolving this issue in the near future and consider incorporating animat modeling into its user spreadsheet.

Response: NMFS generally concurs with this recommendation and has

prioritized the issue. NMFS is also exploring the applicability of utilizing animat models.

Comment 3: The Commission recommended that NMFS (1) refrain from using any assumed reductions in the operational parameters or presumed residency time when estimating the extents of the Level A harassment zones, (2) verify that a maximum of only one 54-inch concrete pile can be installed at a given location on a given day and, if the impact hammers at North and South Trestle would be in close proximity (500–700 m), assume that the Level A harassment zones would overlap and two piles would be installed per day rather than one, and (3) re-estimate the extents of the Level A harassment zones for all scenarios for HRCP's activities, re-estimate the numbers of Level A harassment takes as necessary, and revise the shut-down zones accordingly in the preamble to and the final rule.

Response: The Commission repeatedly asserts that NMFS' assumptions in evaluating potential Level A harassment are "arbitrary," and states that NMFS' assumptions are made in an "effort to reduce the size of the Level A harassment zones." NMFS disagrees. Although we acknowledge the general lack of data available to inform a species- and location-specific understanding of likely individual residence time in the vicinity of a construction project, the approach espoused by the Commission, in which individual animals are assumed to remain in the construction area for extended periods of time, would be unnecessarily precautionary in many cases. As is typical for marine construction areas, the affected areas considered for this activity are located in urbanized and/or industrialized settings, encompass generally degraded habitat relative to other nearby available habitat, and do not include areas of particular importance for foraging or

other important behaviors. In this context, and given what should be considered generally to be aversive stimulus (*i.e.*, noise from construction activity), it is unrealistic to assume that individual animals remain present for extended periods of time. Therefore, NMFS makes reasonable assumptions to more realistically represent the likely potential for Level A harassment to occur.

For purposes of estimated take by Level A harassment, NMFS assumed that the number of piles, and therefore pile strikes, installed on a given day was 50 percent of the total that was actually planned. Since the marine mammals proposed for authorization are highly mobile, it is unlikely that an animal would remain within an established Level A harassment zone during the entire installation/removal process involving multiple piles throughout a given day. To provide a more realistic estimate of take by Level A harassment, NMFS assumed that an animal would occur within the injury zone for 50 percent of the driving time, (which for purposes of zone size calculation equates to 50 percent of the piles and strikes planned for installation).

HRCP also plans to install a single 54-inch concrete pile at a given driving location per day. Since the largest estimated Level A harassment isopleth is 420 m (*i.e.* low-frequency cetaceans) and the North and South Trestle are a minimum of 500 m apart, the Level A harassment zones associated with each site would not overlap.

Given the information provided above, there is no reason for NMFS to re-estimate the extents of the Level A harassment zones, re-estimate the numbers of Level A harassment takes or revise the shut-down zones.

Comment 4: The Commission recommended that NMFS (1) fully describe the regression analysis or extrapolation method (including the actual source level data points, associated references, and type of regression) used for estimating the SELs-s source level for DTH pile installation of 60-inch piles, (2) explain why such a method was not used for SPLpeak source levels and why NMFS believes that an SPLpeak source level would be the same for 30-, 36-, and 42-inch piles as 60-inch piles, and (3) ensure appropriate review of the regression analysis for the SELs-s source level for 60-inch piles and justification for the SPLpeak source level for 60-inch piles before publishing any final rule, and (4) ensure appropriate review of all regression analyses, extrapolation methods, and proxy source levels for DTH pile installation for all related

incidental take authorizations; and (5) specify when it uses source levels associated with different pile types or sizes as proxies and what the differences are.

Response: In summary, NMFS ran regressions in the R programming language (version 3.5.1) using the R Commander Graphical User Interface. Data were average source levels from recordings of single piles and available covariates (*e.g.*, water depth, pile depth, hole size, distance of sound source measurement) where NMFS had access to both published and unpublished DTH monitoring data. The Generalized Linear Model routine in R Commander was used to assess the fit of linear and non-linear multiple regression models of the data. Model assumptions were assessed graphically and mathematically and the best fit of models that fit statistical assumptions and retained statistically significant covariates was chosen mathematically. The best fit model was used to calculate the source level for the extrapolated hole size. The calculated source level was then rounded to the next highest integer decibel for use in this action. The extrapolation technique and software packages employed by NMFS and described below are commonly used and widely accepted by the scientific community.

NMFS did not use SPLpeak source levels when calculating zones as the SEL metric typically results in largest isopleths. Using peak levels in situations when there are a large number of strikes per day will not provide the largest harassment isopleths. NMFS has reviewed the DTH data and methodologies that were utilized and that were used in developing our interim guidance and determined they are the best available.

In Table 11 in the notice of proposed rule, NMFS specified the pile sizes of the proxies it used for impact and vibratory driving. Table 11 in this notice has been revised to display the different pile sizes that were used as proxies for DTH installation. NMFS will include this type of information as appropriate in future ITAs.

Comment 5: The Commission recommended that NMFS (1) have its experts in underwater acoustics and bioacoustics review and finalize as soon as possible, its recommended proxy source levels for impact pile driving of the various pile types and sizes, (2) compile and analyze the source level data for vibratory pile driving of the various pile types and sizes in the near term, and (3) ensure action proponents use consistent and appropriate proxy source levels in all future rulemakings

and proposed incidental harassment authorizations.

Response: NMFS concurs with the Commission's recommendation and has prioritized these efforts.

Comment 6: The Commission recommended that NMFS refrain from using the 7-dB source level reduction factor for far-field impacts (≤ 100 m) and consult with acousticians regarding the appropriate source level reduction factor, if any, to use to minimize far-field effects on marine mammals.

Response: NMFS does not agree with the Commission's assessment on bubble curtain efficacy that is based on near- and far-distance (referred as "near-field" and "far-field" by the Commission). The Commission noted information provided in Illingworth and Rodkin (2012) suggesting that, in some cases, sound level reductions in the far field may be less (4 to 5 dB reduction approximately 120–750 m from the source). Although the measured levels at far-distances (*i.e.*, >100 m) showed less differences (*e.g.*, 4–5 dB) from those that were measured at near source at 10 m (*e.g.*, 8 dB), this is likely due to propagation effects that some of the sediment-borne acoustic energy that was not attenuated by the bubble curtain re-emerged into the water-column at much further distances. However, this information should not be used to suggest that a different noise level reduction needs to be used for long-distance (Level B harassment distance) impact assessment. Since the applicant used a conservative practical spreading approximation of propagation loss (*i.e.*, $15 \log(r)$), acoustic energy that is lost due to boundary refraction and reflection is not considered in determining the impact distances, and this loss is in addition to the practical spreading. Therefore, the small differences at far-distances between with and without bubble curtains indicates that the bubble curtain is less effective in attenuating additional acoustic energy beyond that within the water column.

Comment 7: NMFS used the average of average daily counts of seals (13.6) at the Chesapeake Bay Bridge Tunnel (CBBT) to estimate take for the HRBT project. The Commission recommended that NMFS re-estimate the number of Level B harassment takes of harbor seals based on the maximum daily count (45 seals) at the CBBT haul-out sites added to the percentage of the Eastern Shore haul-out sites average of the daily average count (18.3 seals) that occur in the Chesapeake Bay (36 percent). This equates to an additional 7 seals per day for a daily total of 52 takes.

Response: There are no known seal haul outs in the James River and within the Core Monitoring Area which is the area expected to be ensnared during most of the pile installation and removal activities. The CBBT is over 9 nautical miles and the Eastern Shore is approximately 24 nautical miles from the HRBT. Sightings of seals at the HRBT are low and occur only during winter months, November through April. The HRBT project is currently operating under an IHA that authorizes 2,184 takes by Level A and Level B harassment combined for harbor seals. The analysis for the IHA used an average take of 13.6 harbor seals per day. The project began pile installation in September and no seals have been sighted during 5 months of construction under the Project's Marine Mammal Monitoring and Mitigation Program. The estimated 14 harbor seals per day is based on Jones *et al.* (2020), concurring that activities at HRBT would not take the maximum daily harbor seals sighted at CBBT (45 animals). Based on current sighting data and previous sighting trends, 13.6 harbor seals per day is an appropriate estimate which results in 2,122 combined takes by Level A and Level B harassment per year. NMFS does not concur with the Commission's recommendation.

Comment 8: The Commission recommended that NMFS (1) re-estimate the numbers of Level A harassment takes for each species and each of the first four years of activities based on the percentages of days in which the Level A harassment zones exceed the shut-down zones and (2) authorize the revised numbers of Level A harassment takes in addition to the unreduced Level B harassment takes as estimated by the various take estimation methods in the final rule.

Response: The Commission has recommended one reasonable approach for estimating takes by Level A harassment. Given that there are no standard protocols for take estimation, it may reasonably be calculated through other means. NMFS has provided justification for the numbers of take by Level A harassment authorized for each species in the Estimated Take section and refers the reader there.

In response to the Commission's informal comment regarding the lack of certainty of construction plans in Year 5 which was submitted in response to the Notice of Receipt of HRCP's application (85 FR 63256; October 7, 2020), takes for all species were revised and are shown in Table 31. It was assumed that there would be a full year of in-water work (312 days). However, the work would consist of removal of

temporary piles. Level A harassment zones associated with this type of activity are small. Therefore, no takes by Level A harassment have been authorized for year 5.

Comment 9: Based on the size of the harassment zones and the fact that PSOs cannot keep track of individuals, particularly harbor seals, as they move amongst the numerous adjacent sites, the Commission stated that an individual could be enumerated as being taken by both Level A and Level B harassment in the same day at the same location and/or at different sites. The Commission noted that this could be an issue for other species as well. As such, the Commission recommended that NMFS not reduce the Level B harassment takes by the Level A harassment takes and authorize the full number of Level B harassment takes for each species.

Response: NMFS agrees that it is possible that a seal or (other marine mammal) could be taken more than once on any given day at the same or at a different activity location. However, this is likely true for most other incidental take authorizations, especially those where the project features more than one active pile installation/removal location. It is unclear how the Commission's approach would reduce or eliminate the potential for double counting of animals. HRCP and NMFS are assuming that a certain number of seals (13.6) could be taken per day in the Level B harassment zone. Of this number, some subset may enter, and remain inside the Level A harassment zone long enough to experience Level A harassment. The Commission referred to previous IHAs where NMFS assumed that there would be a given number of Level B harassment takes per day that were added to a given number of takes by Level A harassment which are not a subset of the Level B harassment takes. Either approach is acceptable as long as an accompanying explanation is provided. Therefore, NMFS does not agree with the Commission's recommendation and does not adopt it.

Comment 10: The Commission recommended that NMFS require HRCP to (1) conduct sound source and sound propagation measurements of (a) impact installation of at least three 24-inch and three 54-inch concrete piles and three 36-inch piles with and three 36-inch piles without a bubble curtain, (b) vibratory installation using multiple hammers over multiple days of activities when three or more hammers are used in the Core Monitoring Area, (c) jetting of at least 3 42-inch piles, and (4) DTH pile installation of six 30-inch,

three 36-inch, and three 60-inch piles using near-field and far-field hydrophones placed mid-water column and (2) include in its hydroacoustic monitoring report all of the aforementioned elements. The Commission also recommended that NMFS require HRCP to increase the sizes of the shut-down zones and Level A harassment zones if the measured data indicate that the zones were underestimated.

Response: NMFS does not concur with these recommendations. NMFS agrees that there would be value in conducting sound source verification on some of the piles for which DTH installation data is not available. However, HRCP has not budgeted for the sound source verification and propagation measurements as described by the Commission and a requirement of this nature would not be practicable. Note that HRCP is conducting a hydroacoustic monitoring study as a condition of the US Army Corps of Engineers (USACE) and Virginia Marine Resources Commission (VMRC) permits, and it is being designed in collaboration with NMFS Greater Atlantic Regional Field Office staff to minimize impacts on Atlantic sturgeon. It is likely that some of the pile sizes, pile types, and pile installation methods described by the Commission will be measured and provide value. The study results and preliminary data will be summarized in annual reports, and a final report will be made available at the end of the study.

Comment 11: The Commission recommended that NMFS prohibit HRCP from installing or removing new piles after daylight hours in section 217.24 of the final rule and in any LOA issued under the final rule.

Response: NMFS does not fully concur with the Commission's recommendation. While HRCP has no intention of conducting pile driving activities at night, it is unnecessary to preclude such activity should the need arise (e.g., on an emergency basis or to complete driving of a pile begun during daylight hours, should the construction operator deem it necessary to do so). We disagree with the statement that a prohibition on pile driving activity outside of daylight hours would help to ensure that HRCP is effecting the least practicable adverse impact on the affected species, and the Commission does not justify this assertion.

Comment 12: The Commission recommended that NMFS revise section 217.25(f)(9) in the final rule to require HRCP to report the number of individuals of each species detected within the Level A and B harassment zones, and estimates of the number of

marine mammals taken by Level A and B harassment, by species.

Response: We do not fully concur with the Commission's recommendation and do not adopt it as stated. NMFS agrees with the recommendation to require HRCF to report the number of individuals of each species detected within the Level A and Level B harassment zones and NMFS has already included this requirement in the proposed regulations, and has included it in the final regulations (§ 217.25(f)(9)) and the final authorization (6(c)(viii)). NMFS does not agree with the recommendation to require HRCF to report estimates of the numbers of marine mammals taken by Level A and Level B harassment. The Commission does not explain why it believes this requirement is necessary, nor does it provide recommendations for methods of generating such estimates in a manner that would lead to credible results. NMFS does not agree that the basic method described in footnote 22 of the Commission's 19 November 2020 letter should be expected to yield estimates of total take such that readers of HRCF's report should have confidence that the estimates are reasonable representations of what may have actually occurred.

Comment 13: The Commission recommended that, for the final rule, NMFS include requirements in section 217.25(f) that HRCF include in its monitoring report (1) the estimated percentages of the Level A and B harassment zones that were not visible and the estimated percentage of activities that occurred during nighttime hours, (2) an extrapolation of the estimated takes by Level A and B harassment based on the number of observed exposures within the Level A and B harassment zones and the percentages of the Level A and B harassment zones that were not visible or percentage of activities that occurred during nighttime hours (*i.e.*, extrapolated takes), and (3) the total number of Level A and B harassment takes based on both the observed and extrapolated takes for each species.

Response: We do not fully concur with the Commission's recommendation and do not adopt it as stated. NMFS does agree that HRCF should report the estimated percentage(s) of the Level A and Level B harassment zones that were not visible, and has included this requirement in the final regulations (§ 217.25(f)(3)) and the final authorization (6(c)(iv)). These pieces of information—numbers of individuals of each species detected within the harassment zones and the estimated percentage(s) of the harassment zones

that were not visible—may be used to glean an approximate understanding of whether HRCF may have exceeded the amount of take authorized. Although the Commission does not explain its reasoning for offering these recommendations, NMFS recognizes the basic need to understand whether an LOA-holder may have exceeded its authorized take. The need to accomplish this basic function of reporting does not require that NMFS require applicants to use methods we do not have confidence in to generate estimates of “total take” that cannot be considered reliable.

Comment 14: The Commission recommended that NMFS reinforce that HRCF must keep a running tally of the total Level A and B harassment takes, both observed and extrapolated, for each species consistent with section 217.24(a)(10) of the final rule.

Response: The LOA indicates the number of takes authorized for each species. We agree that HRCF must ensure they do not exceed authorized takes, but do not concur with the Commission's repeated recommendations regarding the need for NMFS to oversee incidental take authorization (ITA)-holders' compliance with issued ITAs, including the use of a “running tally” of takes. Regardless of the Commission's substitution of the word “reinforce” for the word “ensure,” as compared with its prior recommendations for other actions, compliance with the terms of an issued LOA remains the responsibility of the LOA-holder.

Comment 15: A private citizen expressed concern that the planned project would require HRCF or NMFS to physically move marine animals away from their natural habitat near the project site to some other location in the Chesapeake Bay. Another private citizen noted that while transportation and relocation of marine mammals may result in Level A and Level B harassment of marine mammals, animals would be spared exposure to construction activities that could result in extreme injury and death.

Response: There will be no capture and relocation of marine mammals away from the project site by NMFS, HRCF, or any other entity. Marine mammals are free to move away from or remain in close proximity to the project area. Neither NMFS nor HRCF will engage in any activities specifically directed to attract or deter marine mammals. Seals that move away from the project area will find suitable natural habitat across much of the lower Chesapeake Bay. Numerous seal haul-outs are located in the lower Bay which are used by seals primarily during the winter.

Changes From Proposed to Final Regulations

NMFS increased take for all species by assuming that pile driving activities would take place for a full year (312 work days per year) during year 5 instead of a partial year (181 work days per year) as was assumed for the proposed rule (86 FR 1588; January 8, 2021) which resulted in increased take numbers for all species. Consequently Table 24, Table 26, Table 29, Table 30 and Table 31 in this notice have been revised to reflect this change. The work in Year 5 is anticipated to consist of removal of temporary piles, and Level A harassment zones associated with this type of activity are small; therefore, no takes by Level A harassment are anticipated or have been authorized for Year 5, and this is reflected in the revised take estimates in those revised tables. Note that table numbers remain unchanged from the proposed rule (86 FR 1588; January 8, 2021). Table 3, Table 14, Table 15, Table 32 and Table 33 have been revised to correct formatting errors found in the proposed rule (86 FR 1588; January 8, 2021). In Table 33, shutdown zones were rounded up to the nearest 5-m increment instead of the nearest 10-m increment for consistency. NMFS has revised Table 11 to display the SL sources as well as pile sizes that were used for DTH installation. NMFS has included a requirement that HRCF should report the estimated percentage(s) of the Level A and Level B harassment zones that were not visible. This may be found in the § 217.25(f)(3) of the regulations. NMFS received an informal comment from the Commission indicating that the HRCF should use 5 PSOs with one stationed at the CBBT when multiple hammers are used. NMFS agreed with this recommendation. However, after careful consideration it was concluded that placing a PSO on the CBBT could present safety hazard. Therefore, this measure will not be required.

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SAR); <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region> 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 8 lists all species with expected potential for occurrence in the project area and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2020). 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 mortality is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

Marine mammal abundance estimates presented in this document represent the total number of individuals that make up a given stock or the total number estimated within a particular study or survey area. NMFS's stock abundance estimates for most species

represent the total estimate of individuals within the geographic area, if known, that comprises that stock. For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS's U.S. Atlantic and Gulf of Mexico SARs (e.g., Hayes *et al.*, 2020). All values presented in Table 8 are the most recent available at the time of publication and are available in the 2019 SARs (Hayes *et al.*, 2020) and draft 2020 SARS available at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports>.

TABLE 8—MARINE MAMMAL SPECIES LIKELY TO OCCUR NEAR THE PROJECT AREA

Common name	Scientific name	Stock	ESA/ MMPA status; strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Order Cetartiodactyla—Cetacea—Superfamily Mysticeti (baleen whales)						
Family Balaenopteridae (rorquals): Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	-,-; N	1,396 (0; 1,380; see SAR)	22	58
Superfamily Odontoceti (toothed whales, dolphins, and porpoises):						
Family Delphinidae: Bottlenose dolphin	<i>Tursiops truncatus</i>	Western North Atlantic (WNA) Coastal, Northern Migratory. WNA Coastal, Southern Migratory. Northern North Carolina Estuarine System (NNCES).	-,-; Y -,-; Y -,-; Y	6,639 (0.41; 4,759; 2011)	48	12.2–21.5
				3,751 (0.06; 2,353; 2011)	23	18.3
				823 (0.06; 782; 2017)	7.8	7–29.8
Family Phocoenidae (porpoises): Harbor porpoise	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy	-,-; N	95,543 (0.31; 74,034; see SAR)	851	217
Order Carnivora—Superfamily Pinnipedia						
Family Phocidae (earless seals): Harbor seal	<i>Phoca vitulina</i>	WNA	-; N	75,834 (0.15; 66,884, see SAR)	2,006	350
Gray seal ⁴	<i>Halichoerus grypus</i>	WNA	-; N	27,131 (0.19; 23,158, see SAR)	1,359	5,410

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-assessment-reports-region>. CV is coefficient of variation; N_{min} is the minimum estimate of stock abundance. In some cases, CV is not applicable.

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

⁴ The NMFS stock abundance estimate applies to U.S. population only, however the actual stock abundance is approximately 451,431.

As indicated above, all five species (with seven managed stocks) in Table 8 temporally and spatially co-occur with the activity to the degree that take is reasonably likely to occur, and we are authorizing take.

A detailed description of the species likely to be affected by HRCF's project, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the proposed rule (86 FR 1588; January 8, 2021); since that time, other than minor stock assessment changes, we are not aware of any

changes in the status of these species and stocks; therefore, detailed descriptions are not provided here. Please refer to the proposed rule for these descriptions (86 FR 1588; January 8, 2021). Please also refer to NMFS' website (<https://www.fisheries.noaa.gov/find-species>) for generalized species accounts.

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure

to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species have equal hearing capabilities (e.g., Richardson *et al.*, 1995; Wartozok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have

been successfully completed for mysticetes (*i.e.*, low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen

based on the approximately 65 decibel (dB) threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically

implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in Table 9.

TABLE 9—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, <i>Kogia</i> , river dolphins, cephalorhynchid, <i>Lagenorhynchus cruciger</i> & <i>L. australis</i>)	275 Hz to 160 kHz.
Phocid pinnipeds (PW) (underwater) (true seals)	50 Hz to 86 kHz.
Otariid pinnipeds (OW) (underwater) (sea lions and fur seals)	60 Hz to 39 kHz.

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

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

For more detail concerning these groups and associated frequency ranges, please see NMFS (2018) for a review of available information. Five marine mammal species (three cetacean and two phocid pinniped species) have the reasonable potential to co-occur with the planned construction activities. Please refer to Table 8. Of the cetacean species that may be present, one is classified as a low-frequency cetacean (*i.e.*, humpback whale) one is classified as a mid-frequency cetacean (*i.e.*, bottlenose dolphin), and one is classified as a high-frequency cetacean (*i.e.*, harbor porpoise).

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

The effects of underwater noise from HRCP's activities have the potential to result in harassment of marine mammals in the vicinity of the survey area. The proposed rule (86 FR 1588; January 8, 2021) included a discussion of the effects of anthropogenic noise on marine mammals and the potential effects of underwater noise from HRCP's construction activities on marine mammals and their habitat. That information and analysis is incorporated by reference into this final rule and is not repeated here; please refer to the proposed rule (86 FR 1588; January 8, 2021).

The Estimated Take section 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 Mitigation Measures section, to draw conclusions regarding the likely impacts of these activities on the reproductive success or survivorship of individuals and how those impacts on individuals are likely to impact marine mammal species or stocks. We also provided additional description of sound sources in our proposed rule (86 FR 1588; January 8, 2021).

Estimated Take

This section provides an estimate of the number of incidental takes authorized by NMFS through the LOA, which will inform both NMFS' consideration of small numbers and the negligible impact determination.

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

Authorized takes would primarily be by Level B harassment, as noise generated from in-water pile driving (vibratory and impact) 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 low- and high-frequency species and phocids because predicted auditory injury zones are larger than for mid-frequency species. Auditory injury is unlikely to occur for mid-frequency species. The required mitigation and monitoring measures are expected to minimize the severity of such taking to the extent practicable.

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

Generally speaking, we estimate take by considering: (1) Acoustic thresholds above which marine mammals will be behaviorally disturbed 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 basic factors can contribute to a basic calculation to provide an initial prediction of takes, additional information that can qualitatively inform take estimates is also sometimes available (*e.g.*, previous monitoring results or average group size). Below, we describe the factors considered here in more detail and present the take estimate.

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 experience behavioral disturbance (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment).

Level B Harassment for non-explosive sources—Though significantly driven by

received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed by varying degrees by other factors related to the source (e.g., frequency, predictability, duty cycle), the environment (e.g., bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of Level B harassment. NMFS predicts that marine mammals are likely to experience behavioral disturbance in a manner we consider Level B harassment when exposed to underwater anthropogenic

noise above received levels of 120 dB re 1 μ Pa (rms) for continuous (e.g., vibratory pile-driving, drilling) and above 160 dB re 1 μ Pa (rms) for non-explosive impulsive (e.g., seismic airguns) or intermittent (e.g., scientific sonar) sources.

HRCP's planned activity includes the use of continuous (vibratory pile driving, DTH pile installation) and impulsive (impact pile driving, DTH pile installation), sources, and therefore the 120 and 160 dB re 1 μ Pa (rms) criteria are applicable. Note that the 120 dB criterion is used for DTH pile installation, as the continuous noise produced through the activity will produce the largest harassment isopleths.

Level A harassment for non-explosive sources—NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0)

(Technical Guidance, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). As noted previously, HRCP's planned activity includes the use of impulsive (impact pile driving, DTH pile installation) and non-impulsive (vibratory pile driving/removal, DTH pile installation) sources.

These thresholds are provided in the Table 10 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2018 Technical Guidance, which may be accessed at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance>.

TABLE 10—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 μ Pa, and cumulative sound exposure level (L_E) has a reference value of 1 μ Pa²s. In this Table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI 2013). However, peak sound pressure is defined by ANSI as incorporating frequency weighting, which is not the intent for this Technical Guidance. Hence, the subscript "flat" is being included to indicate peak sound pressure should be flat weighted or unweighted within the generalized hearing range. The subscript associated with cumulative sound exposure level thresholds indicates the designated marine mammal auditory weighting function (LF, MF, and HF cetaceans, and PW and OW pinnipeds) and that the recommended accumulation period is 24 hours. The cumulative sound exposure level thresholds could be exceeded in a multitude of ways (i.e., varying exposure levels and durations, duty cycle). When possible, it is valuable for action proponents to indicate the conditions under which these acoustic thresholds will be exceeded.

Ensonified Area

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

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

Sound source levels (SSLs) for each method of installation and removal were estimated using empirical measurements from similar projects in Norfolk and Little Creek (Craney Island),

elsewhere in Virginia, or outside of Virginia (California, Florida, Washington, Alaska) (Table 11). It is assumed that jetting will be quieter than vibratory installation of the same pile size, but data for this activity are limited; therefore, SSLs for vibratory installation have been applied to jetting.

DTH pile installation includes drilling (non-impulsive sound) and hammering (impulsive sound) to penetrate rocky substrates (Denes *et al.* 2016; Denes *et al.* 2019; Reyff and Heyvaert 2019). DTH pile installation was initially thought to be a primarily non-impulsive noise source. However, Denes *et al.* (2019) concluded from a study conducted in Virginia, nearby the location for this project, that DTH should be characterized as impulsive based on Southall *et al.* (2007), who stated that signals with a >3 dB difference in sound pressure level in

a 0.035-second window compared to a 1-second window can be considered impulsive. Therefore, DTH pile installation is treated as both an impulsive and non-impulsive noise source. In order to evaluate Level A harassment, DTH pile installation activities are evaluated according to the impulsive criteria. Level B harassment isopleths are determined by applying non-impulsive criteria and using the 120 dB threshold which is also used for vibratory driving. This approach ensures that the largest ranges to effect for both Level A and Level B harassment are accounted for in the take estimation process.

The source level employed to derive Level B harassment isopleths for DTH pile installation of all pile sizes was derived from the Denes *et al.* (2016) study at Kodiak, Alaska. The median

source value for drilling was reported to be 166 dB RMS.

The source level employed to derive Level A harassment isopleths for DTH pile installation of piles/holes above 24-inch up to 42-inch in diameter came from a combination of (whichever

higher for given metric) Reyff and Heyvaert (2019), Denes *et al.* (2019), and Reyff (2020). For pile/holes 60-inch in diameter, values were provided by Reyff (Reyff personal communication) and are shown in Table 11. Note that during

some driving scenarios bubble curtains will be used to reduce sound source levels by 7 dB from the values recorded by Denes *et al.* (2019) at the nearby Chesapeake Bay Bridge Tunnel. These are also noted in Table 11.

TABLE 11—SUMMARY OF PROJECT SOUND SOURCE LEVELS (a 10 m)

Method and pile type	Sound source level at 10 meters			Literature source
	dB rms			
Vibratory Hammer:				
42-inch steel pile	168			Austin <i>et al.</i> 2016.
36-inch steel pile	167			DoN 2015.
30-inch steel pile, concrete filled	167			DoN 2015.
24-inch steel pile	161			DoN 2015.
16-inch CCA timber pile *	162			Caltrans 2015.
AZ 700–19 steel sheet pile	160			Caltrans 2015.
AZ 700–26 steel sheet pile	160			Caltrans 2015.
Jetting:				
42-inch steel pile	161			Austin <i>et al.</i> 2016
Method and pile type	Sound source level at 10 meters			Literature source
	dB rms	dB SEL	dB peak	
DTH Pile Installation:				
30-inch and 36-inch steel pipe piles	¹ 166	² 164	³ 196	Denes <i>et al.</i> 2016, 2019; Reyff and Heyvaert 2019; Reyff 2020.
60-inch steel pipe pile	¹ 166	175	196	Denes <i>et al.</i> 2016; Reyff pers. comm.
Impact Hammer:				
36-inch steel pile	193	183	210	Caltrans 2015; Chesapeake Tunnel Joint Venture 2018.
36-inch steel pile, attenuated **	186	176	203	Caltrans 2015; Chesapeake Tunnel Joint Venture 2018 ⁺ .
30-inch steel pile, concrete filled	195	186	216	DoN 2015.
30-inch steel pile, concrete filled, attenuated ** ...	188	179	209	DoN 2015.
24-inch steel pile	190	177	203	Caltrans 2015.
24-inch steel pile, attenuated **	183	170	196	Caltrans 2015.
54-inch concrete cylinder pile ***	187	177	193	MacGillivray <i>et al.</i> 2007.
24-inch concrete square pile	176	166	188	Caltrans 2015.

Note: It is assumed that noise levels during pile installation and removal are similar. dB = decibel; SEL = sound exposure level; dB peak = peak sound level; rms = root mean square; DoN = Department of the Navy; CCA = Chromated Copper Arsenate, Caltrans = California Department of Transportation.

* SSL taken from 12-inch timber piles in Norfolk, Virginia.

** SSLs are a 7 dB reduction from Chesapeake Tunnel Joint Venture 2018 values due to usage of a bubble curtain.

*** SSLs taken from 36-inch concrete square piles, no project specific information provided.

+ The primary literature source for 36-inch steel pipe attenuated piles is Caltrans 2015; however, the Chesapeake Tunnel Joint Venture 2018 is also cited due to the proximity of the project to the HRBT Project.

¹ SSL for Level B harassment based on DTH-installation of 24-inch steel pile (Denes *et al.* 2016).

² SSL for Level A harassment based on DTH-installation of 42-inch steel piles (Reyff and Heyvaert 2019).

³ SSL for Level A harassment based on DTH-installation of 42-inch steel piles (Reyff 2020).

Simultaneous use of hammers could result in increased SPLs and harassment zone sizes given the proximity of the component driving sites and the rules of decibel addition. Impact pile installation is projected to take place concurrently at 3 to 4 locations and there is the potential for as many as 7 pile installation locations operating concurrently. NMFS (2018b) handles overlapping sound fields created by the use of more than one hammer differently for impulsive (impact hammer and Level A harassment zones for drilling with a DTH hammer) and

continuous sound sources (vibratory hammer and Level B harassment zones for drilling with a DTH hammer) (See Table 12). It is unlikely that the two impact hammers would strike at the same instant, and therefore, the SPLs will not be adjusted regardless of the distance between impact hammers. In this case, each impact hammer will be considered to have its own independent Level A and Level B harassment zones and drilling with a DTH hammer will be considered to have its own independent Level A harassment zones. It will be unlikely that more than one DTH

hammer will be used within a day at more than one location; therefore, only one DTH hammer was included in the multiple hammer calculations for Level B harassment zones.

When two continuous noise sources, such as vibratory hammers, have overlapping sound fields, there is potential for higher sound levels than for non-overlapping sources. The method described below was used by Washington State Department of Transportation (WSDOT) and has been used by NMFS (WSDOT 2020).

When two or more vibratory hammers are used simultaneously, and the

isopleth of one sound source encompasses the sound source of another isopleth, the sources are considered additive and combined using the following rules (Table 12) for addition of two simultaneous vibratory

hammers, the difference between the two SSLs is calculated, and if that difference is between 0 and 1 dB, 3 dB are added to the higher SSL; if difference is between 2 or 3 dB, 2 dB are added to the highest SSL; if the

difference is between 4 to 9 dB, 1 dB is added to the highest SSL; and with differences of 10 or more decibels, there is no addition.

TABLE 12—RULES FOR COMBINING SOUND LEVELS GENERATED DURING PILE INSTALLATION

Hammer types	Difference in SSL	Level A harassment zones	Level B harassment zones
Vibratory, Impact	Any	Use impact zones	Use vibratory zone.
Impact, Impact	Any	Use zones for each pile size and number of strikes.	Use zone for each pile size.
Vibratory, Vibratory	0 or 1 dB	Add 3 dB to the higher source level ...	Add 3 dB to the higher source level.
	2 or 3 dB	Add 2 dB to the higher source level ...	Add 2 dB to the higher source level.
	4 to 9 dB	Add 1 dB to the higher source level ...	Add 1 dB to the higher source level.
	10 dB or more	Add 0 dB to the higher source level ...	Add 0 dB to the higher source level.

When three or more continuous sound sources are used concurrently, such as vibratory hammers, the three overlapping sources with the highest SSLs are identified. Of the three highest SSLs, the lower two are combined using the above rules, then the combination of

the lower two is combined with the highest of the three

It is common for pile installation to start and stop multiple times as each pile is adjusted and its progress is measured and documented. For short durations, it is anticipated that multiple hammers could be in use simultaneously. Following an approach

modified from WSDOT in their Biological Assessment manual and described in Table 13, decibel addition calculations were carried out for possible combinations of vibratory installations of 24-, 30-, 36-, and 42-inch steel pipe piles throughout the Project area.

TABLE 13—POSSIBLE VIBRATORY PILE COMBINATIONS

Method		24	24+24	30/36	42	30/36+24	24+42	30/36+30/36	42+30/36	42+42
Pile diameter (inches)	SSL (dB)	161	164	167	168	168	169	170	171	171
Vibratory:										
24	161	164	166	168	169	169	169	171	171	172
DTH	166	167	168	170	170	170	171	172	172	172
30/36	167	168	169	170	171	171	171	172	172	172
42	168	169	169	171	171	171	172	172	172	173

These source levels are used to compute the Level A harassment zones and to estimate the Level B harassment zones.

Level A Harassment Zones

When the NMFS' Technical Guidance (2016) was published, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which may result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths

when more sophisticated 3D modeling methods are not available, and NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For stationary sources such as in-water pile driving activities during the HRBT project, NMFS User Spreadsheet predicts the closest distance at which, if a marine mammal remained at that distance the whole duration of the activity, it would incur PTS.

Inputs used in the User Spreadsheet (Table 14 and Table 15) and the resulting isopleths are reported below (Table 14). Level A harassment thresholds for impulsive sound sources (impact pile driving, DTH pile installation) are defined for both SELcum and Peak SPL, with the threshold that results in the largest modeled isopleth for each marine mammal hearing group used to establish the effective Level A harassment isopleth.

For purposes of estimated take by Level A harassment, NMFS assumed that the strike rate for impact pile installation was 50 percent of the estimated number of strikes displayed in Table 14 and 15. Similarly, for vibratory driving NMFS assumed that the driving time for each pile was 50 percent of the estimated total. For the DTH hammer calculations, Reyff and Heyvaert 2019 identified a strike rate of 10 Hz. This was also reduced by 50 percent to 5 Hz which to achieve the same 50 percent Level A harassment reduction as was done for impact and vibratory driving. Strikes per Pile values were not altered when calculating Level A harassment zones for DTH pile installation.

Since the marine mammals authorized for take are highly mobile, it is unlikely that an animal would remain within an established Level A harassment zone for the entire duration or number of strikes associated with installation or removal of a specified

number of piles throughout a given day. This was done to provide more realistic take estimates by Level A harassment. NMFS applied this reduction across all pile sizes, types, and installation/

removal methods as shown in Tables 14 and 15. Additionally, note that under some driving scenarios a 7 dB attenuation was applied to impact installation of 24-inch steel, 30-inch

Steel, and 36-inch steel due to use of bubble curtains as shown in Table 14.

The calculated Level A isopleths for different size pile and driving types are shown in Tables 16–18.

TABLE 14—USER SPREADSHEET INPUT PARAMETERS USED FOR CALCULATING LEVEL A HARASSMENT ISOPLETHS FOR VIBRATORY AND IMPACT HAMMERS *

Model parameter	Steel sheet	16-inch timber	24-inch steel			24-inch concrete	30-inch steel, concrete filled			36-inch steel						42-inch steel		54-inch concrete
	Vib	Vib	Vib	Imp	Imp-bubble	Imp	Vib	Imp	Imp-bubble	Vib	Vib	Vib	Vib	Imp	Imp-bubble	Vib	Jetting	Imp
Spreadsheet Tab	A.1	A.1	A.1	E.1	E.1	E.1	A.1	E.1	E.1	A.1	A.1	A.1	A.1	E.1	E.1	A.1	A.1	E.1
Weighting Factor Adjustment (kHz)	2.5	2.5	2.5	2	2	2	2.5	2	2	2.5	2.5	2.5	2.5	2	2	2.5	2.5	2
Sound Pressure Level (SPL _{rms})	160	162	161	190	183	176	167	195	188	167	167	167	167	193	186	168	161	187
SEL _{ss} (L _E , p, single strike) at 10 meters				177	170	166		186	179					183	176			177
L _p , 0-pk at 10 meters				203	196	188		216	209					210	203			193
Number of piles within 24-hour period	10	4	6	6	6	1	6	6	6	1	8 & 16	2 & 3	2	2 & 3	2	6	1	1
Estimated Duration to drive a single pile (min)	30	30	30/60				60			50	5	50	60			30	30	
50% of Duration to drive a single pile (min)	15	15	15/30				30			25	2.5	25	30			15	15	
Transmission loss coefficient	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Distance from sound pressure level (SPL _{rms}) measurement (m)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Estimated Strikes per pile				40	40	2,100		40	40					40	40			2,100
50% of Strikes per pile				20	20	1,050		20	20					20	20			1,050

* To provide a more realistic estimate of take by Level A harassment, NMFS assumes that an animal would occur within the vicinity of the construction activity for 50 percent of the pile installation and removal time. HRCP has implemented this reduction across all pile sizes, types, and installation and removal methods. For purposes of vibratory installation, the duration of installation was reduced by half to accomplish the reduction. For impact installation, the number of strikes per pile was reduced by half to accomplish the reduction.

TABLE 15—USER SPREADSHEET INPUT PARAMETERS USED FOR CALCULATING LEVEL A HARASSMENT ISOPLETHS FOR DRILLING WITH A DTH HAMMER *

Model parameter	30-inch steel, concrete filled	36-inch steel	60-inch steel
	DTH	DTH	DTH
Spreadsheet Tab	E.2	E.2	E.2
Weighting Factor Adjustment (kilohertz)	2	2	2
SEL _{ss} (L _E , p, single strike) at 10 meters	164	164	175
L _p , 0-pk at 10 meters	196	196	196
Number of piles per day	6	2	3
Duration to drive a pile (minutes)	120	120	120
Transmission loss coefficient	15	15	15
Distance from source (meters)	10	10	10
Estimated Number of Strikes per 24-hour period	432,000	144,000	216,000
50% of Strikes per 24-hour period	216,000	72,000	108,000
Strike rate (Hz) average strikes per second	10	10	10
50% of Strike rate (Hz) average strikes per second	5	5	5

* To provide a more realistic estimate of take by Level A harassment, NMFS assumes that an animal would occur within the vicinity of the construction activity for 50 percent of the pile installation and removal time, which equates to 50 percent of the piles planned for installation and removal. HRCP has implemented this reduction across all pile sizes, types, and installation and removal methods. For drilling with a DTH hammer installation, the strike rate (Hz) was reduced by half to accomplish the reduction. A 10 Hz strike rate was identified from Reyff and Heyvaert 2019 which was then reduced by 50% to 5 Hz to accomplish the 50% Level A reduction.

TABLE 16—CALCULATED DISTANCES TO LEVEL A HARASSMENT ISOPLETHS DURING VIBRATORY INSTALLATION, AND VIBRATORY REMOVAL AND JETTING INSTALLATION WITH NO ATTENUATION

Project component	Pile size/type	Minutes per pile (reduced by half)	Number of piles per day	Level A harassment isopleth distance (meters)				Level A harassment isopleth areas (km²)			
				Cetaceans			Pinnipeds	Cetaceans			Pinnipeds
				LF	MF	HF	PW	LF	MF	HF	PW
Vibratory Hammer											
North Trestle:											
Moorings	42-inch Pipe, Steel	15	6	27	3	39	16	.....	.....	<0.01	.....
Template Piles	36-inch Pipe, Steel	2.5	8	9	1	13	5	.....	.....	<0.01	.....

TABLE 16—CALCULATED DISTANCES TO LEVEL A HARASSMENT ISOPLETHS DURING VIBRATORY INSTALLATION, AND VIBRATORY REMOVAL AND JETTING INSTALLATION WITH NO ATTENUATION—Continued

Project component	Pile size/type	Minutes per pile (reduced by half)	Number of piles per day	Level A harassment isopleth distance (meters)				Level A harassment isopleth areas (km ²)			
				Cetaceans			Pinnipeds	Cetaceans			Pinnipeds
				LF	MF	HF	PW	LF	MF	HF	PW
North Shore Work Trestle, Jump Trestle, Work Trestle, Demolition Trestle.	36-inch Pipe, Steel	25	2	16	2	23	10	.....	.....	<0.01	.....
Moorings	24-inch Pipe, Steel	15	6	9	1	14	6	.....	.....	<0.01	.....
North Shore Abutment.	AZ 700–19 Sheet, Steel.	15	10	11	1	16	7	.....	.....	<0.01	.....
North Island:											
Moorings	42-inch Pipe, Steel	15	6	27	3	39	16	.....	.....	<0.01	.....
Hampton Creek Approach Channel Marker.	Existing, 36-inch Pipe, Steel.	25	1	10	1	15	6	.....	.....	<0.01	.....
North Island Expansion.	AZ 700–26 Sheet, Steel.	15	10	11	1	16	7	.....	.....	<0.01	.....
North Island Abutment.	AZ 700–19 Sheet, Steel.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Island Abutment.	AZ 700–19 Sheet, Steel.	15	10	11	1	16	7	.....	.....	<0.01	.....
South Island Expansion.	AZ 700–26 Sheet, Steel.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Settlement Reduction Piles.	24-inch Pipe, Steel	30	6	15	2	21	9	.....	.....	.....	.....
Deep Foundation Piles.	30-inch Pipe, Steel, Concrete Filled.	30	6	36	4	53	22	.....	.....	.....	.....
TBM Platform	36-inch Pipe, Steel	30	2	18	2	26	11	.....	.....	.....	.....
Conveyor Trestle.	36-inch Pipe, Steel	25	3	20	2	30	13	.....	.....	.....	.....
Moorings	42-inch Pipe, Steel	15	6	27	3	39	16	.....	.....	<0.01	.....
Template Piles	36-inch Pipe, Steel	2.5	16	14	2	20	8	.....	.....	<0.01	.....
South Trestle:											
Template Piles	36-inch Pipe, Steel	2.5	8	9	1	13	5	.....	.....	<0.01	.....
Moorings, Casings.	42-inch Pipe, Steel	15	6	27	3	39	16	.....	.....	<0.01	.....
Work Trestle, Jump Trestle, Demolition Trestle, Temporary MOT Trestle.	36-inch Pipe, Steel	25	2	16	2	23	10	.....	.....	.....	.....
Moorings	24-inch Pipe, Steel	15	6	9	1	14	6	.....	.....	.....	.....
Willoughby Bay:											
Moorings	24-inch Pipe, Steel	15	6	9	1	14	6	.....	.....	<0.01	.....
Work Trestle, Jump Trestle.	36-inch Pipe, Steel	25	2	16	2	23	.....	.....	.....	10	.....
Moorings (Safe Haven).	42-inch Pipe, Steel	15	6	27	3	39	16	.....	.....	<0.01	.....
Casing	42-inch Pipe, Steel	15	6	27	3	39	16	.....	.....	<0.01	.....
Template Piles	36-inch Pipe, Steel	2.5	8	9	1	13	5	.....	.....	<0.01	.....
Willoughby Spit Laydown Area:											
Finger Piers on Timber Piles.	16-inch CCA, Timber.	15	4	8	1	12	5	.....	.....	<0.01	.....
Dock on Spuds, Dock on Piles.	36-inch Pipe, Steel	25	3	20	2	30	13	.....	.....	<0.01	.....
Template Piles	36-inch Pipe, Steel	2.5	16	14	2	20	8	.....	.....	<0.01	.....
Jetting											
Willoughby Bay:											
Casing	42-inch Pipe, Steel	15	1	3	1	4	2	.....	.....	<0.01	.....

TABLE 17—CALCULATED DISTANCES TO LEVEL A HARASSMENT ISOPLETHS DURING IMPACT INSTALLATION AND DTH PILE INSTALLATION WITH NO ATTENUATION

Project component	Pile size/type	Number of strikes per pile or strike rate* (reduced by half)	Number of piles per day	Level A harassment isopleth distance (meters)				Level A harassment isopleth areas (km²)			
				Cetaceans		Pinnipeds		Cetaceans		Pinnipeds	
				LF	MF	HF	PW	LF	MF	HF	PW
North Trestle											
Permanent Piles	54-inch Pipe, Concrete Cylinder.	1,050	1	411	15	490	220	0.53	<0.001	0.75	0.15
Work Trestle, Jump Trestle, Demolition Trestle.	36-inch Pipe, Steel	20	2	117	5	140	63	0.04	<0.001	0.06	0.01
South Island											
Settlement Reduction Piles.	24-inch Pipe, Steel	20	6	97	4	116	52	0.02	<0.001	0.03	0.01
Deep Foundation Piles.	30-inch Pipe, Steel, Concrete Filled.	20	6	386	14	459	207	0.35	<0.001	0.49	0.10
South Trestle											
Work Trestle, Jump Trestle, Demolition Trestle, Temporary MOT Trestle.	36-inch Pipe, Steel	20	2	117	5	140	63	0.04	<0.001	0.06	0.01
Permanent Piles	54-inch Pipe, Concrete Cylinder.	1,050	1	411	15	490	220	0.53	<0.001	0.75	0.15
Willoughby Bay											
Work Trestle, Jump Trestle.	36-inch Pipe, Steel	20	2	117	5	140	63	0.04	<0.001	0.06	0.01
Permanent Piles	24-inch Pipe, Concrete Square.	1,050	1	76	3	91	41	0.02	<0.001	0.03	<0.01
Willoughby Spit Laydown Area											
Dock on Spuds, Dock on Piles.	36-inch Pipe, Steel	20	3	154	6	183	82	0.12	0.09	<0.001	0.03
DTH Pile Installation* North Trestle											
Work Trestle, Jump Trestle, Demolition Trestle.	36-inch Pipe, Steel	36,000	2	936	34	1,115	501	1.81	<0.01	2.27	0.78
Casing	60-inch Pipe, Steel	36,000	3	6,633	236	7,901	3,550	34.04	0.18	43.75	13.03
South Island											
Deep Foundation Piles.	30-inch Pipe, Steel, Concrete Filled.	36,000	6	1,946	70	2,318	1,042	8.28	<0.01	11.30	2.49
South Trestle											
Work Trestle, Jump Trestle, Temporary MOT Trestle, Demolition Trestle.	36-inch Pipe, Steel	36,000	2	936	34	1,115	501	2.67	<0.01	3.67	0.79
Casing	60-inch Pipe, Steel	36,000	3	6,633	236	7,901	3,550	77.50	0.18	102.16	27.12

* For DTH Hammer calculations, a 10 Hz strike rate was identified from Reyff and Heyvaert 2019 which was then reduced by 50% to 5 Hz to accomplish the 50% Level A harassment reduction. Strikes per Pile values were not reduced for DTH methods.

TABLE 18—CALCULATED DISTANCES TO LEVEL A HARASSMENT ISOPLETHS DURING IMPACT INSTALLATION WITH ATTENUATION

Project component	Pile size/type	Number of strikes per pile (reduced by half)	Number of piles per day	Level A harassment isopleth distance (meters)				Level A harassment isopleth areas (km ²)			
				Cetaceans		Pinnipeds		Cetaceans		Pinnipeds	
				LF	MF	HF	PW	LF	MF	HF	PW
Impact Hammer											
South Island:											
Settlement Reduction Piles.	24-inch Pipe, Steel	20	6	33	2	40	18	<0.01			
Deep Foundation Piles.	30-inch Pipe, Steel, Concrete Filled.	20	6	132	5	157	71	0.04	<0.001	0.06	0.01
South Trestle:											
Temporary MOT Trestle.	36-inch Pipe, Steel	20	2	40	2	48	22	<0.001		0.007	0.002
Jump Trestle											
Work Trestle											

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:

$$TL = B * \log_{10} (R1/R2),$$

Where

TL = transmission loss in dB

B = transmission loss coefficient; for practical spreading equals 15

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

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

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 HRCP's planned activity.

Using the practical spreading model, HRCP determined underwater noise would fall below the behavioral effects threshold of 120 dB rms for marine mammals at a maximum radial distance

of 15,849 m for vibratory pile driving of 42- and 36-inch diameter piles. Other activities including impact driving and vibratory installation sheet piles have smaller Level B harassment zones. All Level B harassment isopleths are reported in Table 19 below. It should be noted that based on the geography of the project area, and pile driving locations, in many cases sound will not reach the full distance of the Level B harassment isopleth. The radial distances provided in Table 19 and Table 20 are shown as calculated. However, the land areas presented in these tables take into account truncation by various land masses in the project area and only shows the in-water ensonified area.

TABLE 19—DISTANCES TO LEVEL B HARASSMENT ISOPLETHS FOR DIFFERENT PILE SIZES AND TYPES AND METHODS OF INSTALLATION AND REMOVAL WITH NO ATTENUATION

Location and component	Method and pile type	Level B isopleth (m), unattenuated	Level B area unattenuated (km ²)
Vibratory Hammer (Level B Isopleth = 120 dB)			
North Trestle:			
Moorings	42-inch steel piles	15,849	96.78
Template Piles	36-inch steel piles	13,594	85.53
Demolition Trestle	36-inch steel piles	13,594	85.53
North Shore Work Trestle	36-inch steel piles	13,594	85.53
Jump Trestle	36-inch steel piles	13,594	85.53
Work Trestle	36-inch steel piles	13,594	85.53
Moorings	24-inch steel piles	5,412	25.34
North Shore Abutment	AZ 700–19 steel sheet piles	4,642	19.81
North Island:			
Moorings North	42-inch steel piles	15,849	103.86
Moorings South	42-inch steel piles	15,849	201.04
Hampton Creek Approach Channel Marker	36-inch steel pile	13,594	93.99
North Island Expansion North	AZ 700–26 steel sheet piles	4,642	26.06
North Island Expansion South	AZ 700–26 steel sheet piles	4,642	36.73
North Island Abutment North	AZ 700–19 steel sheet piles	4,642	26.06
North Island Abutment	AZ 700–19 steel sheet piles	4,642	36.73
South			
South Island:			
Moorings	42-inch steel piles	15,849	246.86
Template Piles	36-inch steel piles	13,594	81.75

TABLE 19—DISTANCES TO LEVEL B HARASSMENT ISOPLETHS FOR DIFFERENT PILE SIZES AND TYPES AND METHODS OF INSTALLATION AND REMOVAL WITH NO ATTENUATION—Continued

Location and component	Method and pile type	Level B isopleth (m), unattenuated	Level B area unattenuated (km ²)
TBM Platform	36-inch steel piles	13,594	81.75
Conveyor Trestle	36-inch steel piles	13,594	81.75
Deep Foundation Piles	30-inch steel piles, concrete filled	13,594	194.04
Settlement Reduction Piles	24-inch steel piles	5,412	45.10
South Island Expansion	AZ 700–26 steel sheet piles	4,642	34.69
South Island Abutment	AZ 700–19 steel sheet piles	4,642	34.69
South Trestle:			
Moorings, Casings	42-inch steel piles	15,849	305.30
Template Piles	36-inch steel piles	13,594	235.60
Temporary MOT Trestle	36-inch steel piles	13,594	235.60
Jump Trestle	36-inch steel piles	13,594	235.60
Work Trestle	36-inch steel piles	13,594	235.60
Demolition Trestle	36-inch steel piles	13,594	235.60
Moorings	24-inch steel piles	5,412	55.87
Willoughby Bay:			
Moorings (Safe Haven)	42-inch steel piles	15,849	5.52
Moorings	42-inch steel piles	15,849	5.52
Casing	42-inch steel piles	15,849	5.52
Template Piles	36-inch steel piles	13,594	5.52
Work Trestle	36-inch steel piles	13,594	5.52
Jump Trestle	36-inch steel piles	13,594	5.52
Moorings	24-inch steel piles	5,412	5.52
Willoughby Spit Laydown Area:			
Template Piles	36-inch steel piles	13,594	74.45
Dock on Spuds	36-inch steel piles	13,594	74.45
Dock on Piles	36-inch steel piles	13,594	74.45
Finger Piers	16-inch CCA timber piles	6,310	40.62
DTH Pile Installation (Level B Isopleth = 120 dB)			
North Trestle Casings	60-inch steel piles	11,659	72.28
North Trestle Work Trestle, Jump Trestle, Demolition Piles, Templates.	36-inch steel piles	11,659	72.28
South Island Deep Foundation Piles	30-inch steel piles, concrete filled	11,659	152.79
South Trestle Casings	60-inch steel piles	11,659	184.12
South Trestle Work Trestle, Jump Trestle, Demolition Trestle, Temporary MOT Trestle, Templates.	36-inch steel piles	11,659	14.12
Willoughby Bay Templates	36-inch steel piles	11,659	5.52
Jetting (Level B Isopleth = 120 dB)			
Willoughby Bay:			
Casing	42-inch steel piles	5,412	5.52
Impact Hammer (Level B Isopleth = 160 dB)			
North Trestle:			
Permanent Piles	54-inch concrete cylinder piles	631	1.14
Work Trestle	36-inch steel piles	1,585	3.81
Jump Trestle	36-inch steel piles	1,585	3.81
Demolition Trestle	36-inch steel piles	1,585	3.81
South Island:			
Deep Foundation Piles	30-inch steel piles, concrete filled	2,154	9.91
Settlement Reduction Piles	24-inch steel piles	1,000	2.29
South Trestle:			
Permanent Piles	54-inch concrete cylinder piles	631	1.25
Work Trestle	36-inch steel piles	1,585	6.84
Jump Trestle	36-inch steel piles	1,585	6.84
Temporary MOT Trestle	36-inch steel piles	1,585	6.84
Demolition Trestle	36-inch steel piles	1,585	6.84
Willoughby Bay:			
Permanent Piles	24-inch concrete cylinder piles	117	0.04
Work Trestle	36-inch steel piles	1,585	3.15
Jump Trestle	36-inch steel piles	1,585	3.15
Willoughby Spit Laydown Area:			
Dock on Spuds	36-inch steel piles	1,585	6.03
Dock on Piles	36-inch steel piles	1,585	6.03

TABLE 20—DISTANCES TO LEVEL B HARASSMENT ISOPLETHS FOR INSTALLATION AND REMOVAL OF STEEL PIPE PILES WITH ATTENUATION BUBBLE CURTAIN

Location and component	Method and pile type	Level B isopleth (m), attenuated	Level B area attenuated (km ²)
Impact Hammer (Level B Isopleth = 160 dB)			
South Island:			
Deep Foundation Piles	30-inch steel piles, concrete filled	736	1.25
Settlement Reduction Piles	24-inch steel piles	341	0.27
South Trestle:			
Temporary MOT Trestle, Work Trestle, Jump Trestle.	36-inch steel piles	541	0.68

The daily duration in which more than one vibratory hammer or DTH pile installation could occur is difficult to predict and quantify. As noted previously, DTH pile installation is considered by NMFS to be both impulsive and continuous. Therefore, decibel addition will not be used to calculate Level A harassment zones during concurrent DTH pile installation activities. The Level A harassment zones for each DTH activity will be based on a single DTH hammer. To simplify implementation of Level A harassment zones for use of more than one vibratory hammer within a day and/or during simultaneous use of multiple vibratory hammers with overlapping isopleths, whether at a single site or

multiple sites, Level A harassment zone sizes were calculated for the longest anticipated duration of the largest pile sizes that could be installed within a day. For example, if 18 42-inch steel pipe piles were installed with a vibratory hammer on a single day by multiple hammers with overlapping sound fields, the Level A harassment zone for each of the functional hearing groups likely to be present near the project area would remain smaller than 100 meters as shown in Table 21 with the largest Level A harassment zone being 81 m for harbor porpoises. However, it is highly unlikely that a harbor porpoise could accumulate enough sound from the installation of multiple piles in multiple locations for

the duration required to meet the calculated Level A harassment threshold. Furthermore, installation of 18 42-inch steel pipe piles likely represents an unrealistic level of efficiency that will not be achieved in the field. Other combinations of pile sizes and numbers would result in Level A harassment zones smaller than 100 meters. To be precautionary, shutdown zones outlined in Table 21 for each species will be implemented for each vibratory hammer on days when it is anticipated that multiple vibratory hammers will be used, whether at a single or multiple sites. This mitigation measure would also minimize the need for onsite coordination among project sites and components.

TABLE 21—DISTANCES TO LEVEL A HARASSMENT ISOPLETHS FOR INSTALLATION OF 42-INCH PILES BY MULTIPLE VIBRATORY HAMMERS

Pile size/type	Minutes per pile (reduced by half)	Number of piles per day	Level A harassment isopleth distance (meters)			
			Cetaceans			Pinnipeds
			LF	MF	HF	PW
42-inch Pipe, Steel	15	18	55	5	81	33

Note: LF = Low-frequency; MF = Mid-frequency; HF = High frequency; PW = Phocids in water. Table does not stipulate the number of active vibratory hammers, as Level A effects are cumulative. The piles per day could be split between multiple hammers and not affect the size of Level A zones.

The size of the Level B harassment zone during concurrent operation of multiple vibratory hammers will depend on the combination of sound sources due to decibel addition of multiple hammers producing continuous noise. The distances to Level B harassment isopleths during simultaneous installation of piles using two or more vibratory hammers is shown in Table 22. As noted previously, pile installation often involves numerous stops and starts of the hammer for each pile. Therefore, decibel addition is applied only when the adjacent continuous sound sources experience overlapping sound fields,

which generally requires close proximity of driving locations. Furthermore, it is expected to be a rare event when three or more 30-, 36-, or 42-inch piles are being installed simultaneously with vibratory hammers.

TABLE 22—DISTANCES TO LEVEL B HARASSMENT ISOPLETHS FOR MULTIPLE HAMMER ADDITIONS

Combined SSL (dB)	Distance to Level B isopleth (meters)
164	8,577
165	10,000
166	11,659

TABLE 22—DISTANCES TO LEVEL B HARASSMENT ISOPLETHS FOR MULTIPLE HAMMER ADDITIONS—Continued

Combined SSL (dB)	Distance to Level B isopleth (meters)
167	13,594
168	15,849
169	18,478
170	21,544
171	25,119
172	29,286
173	34,145

Marine Mammal Occurrence and Take Calculation and Estimation

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. We describe how the information provided above is brought together to produce a quantitative take estimate.

Humpback Whale

While humpback whales are observed near the mouth of the Chesapeake Bay and the nearshore waters of Virginia during winter and spring months, they are relatively rare in the project area. Density data for this species within the project vicinity do not exist or were not calculated because sample sizes were too small to produce reliable estimates of density. Humpback whale sighting data collected by the U.S. Navy near Naval Station Norfolk and Virginia Beach from 2012 to 2015 (Table 22) (Engelhaupt *et al.* 2014, 2015, 2016) and in the mid-Atlantic (including the Chesapeake Bay) from 2015 to 2019 (Table 23) (Aschettino *et al.* 2015, 2016,

2017a, 2018, 2019) did not produce high enough sample sizes to calculate densities, or survey data were not collected during systematic line-transect surveys. However, humpback whale densities have been calculated for populations off the coast of New Jersey, resulting in a density estimate of 0.000130 animals per square kilometer or one humpback whale within the area (off the coast of New Jersey) on any given day of the year (Whitt *et al.* 2015). In the project area, a similar density may be expected, although the project area is much smaller. Aschettino *et al.* (2018) observed and tracked two individual humpback whales in the Hampton Roads (in the James River) area of the project area and over the 5-year project period (2015–2019), tracked 12 individual humpback whales west of the CBBT (Movebank 2020). Based on these data, and the known movement of humpback whales from November through April at the mouth of the Chesapeake Bay, HRCP requested two takes every month from May to October and three to four each month from

November through April for the duration of in-water pile installation and removal. NMFS concurs with the request and is authorizing a total of 183 takes of humpback whales over the 5-year Project period (Table 24). This number is increased from 172 included in the proposed rule due to the increased number of assumed pile driving days in Year 5. Only vibratory extraction is planned for Year 5 which will result in smaller PTS zones. Therefore take by Level A harassment is not expected. The largest Level A harassment zone of 6,633 meters for LF cetaceans is associated with drilling with a DTH installation of 60-inch steel pipe piles (casings) (Table 17). It is unlikely but possible that a humpback whale could enter this area and remain for a sufficient duration to incur PTS. Therefore, HRCP requested and NMFS is authorizing eight humpback whale takes by Level A harassment (2 per year except for Year 5 when there are no requests) and 35 Level B harassment takes each year (Table 24).

TABLE 23—SUMMARY OF INDIVIDUAL HUMPBACK WHALE SIGHTINGS BY MONTH FROM 2012 TO 2019 IN THE CHESAPEAKE BAY

Month	Engelhaupt surveys				Aschettino surveys					
	2012	2013	2014	2015	2015	2016	2017	2018	2019	Total
January		0	0	7	56	43	106	1	30	243
February		0	0	0	5	30	84	0	32	151
March				0	0	10	7	0	1	18
April		2	1	0	0				1	4
May		0	1	0	0	1			4	6
June			0							0
July		0	0	0				1		1
August		0		0						0
September	0	1	0							1
October	0	0	0				2			2
November	0	0	0			21	8	0		29
December			9		42	30	21	11		113
Total	0	3	11	7	103	135	228	13	68	568

* Source: Engelhaupt *et al.* 2014, 2015, 2016 (2012–2015 inshore survey data only; not dedicated humpback whale surveys); Aschettino *et al.* 2015, 2016, 2017a, 2018, 2019 (2015–2019). Monthly survey data from the 2019–2020 season have not been published; however, Aschettino *et al.* 2020b reported that during the 2019/2020 field season, which began 21 December 2019 and concluded 27 March 2020, resulted in 44 humpback whale sightings of 60 individuals.

TABLE 24—SUMMARY OF THE ESTIMATED NUMBERS OF HUMPBACK WHALES POTENTIALLY EXPOSED TO LEVEL A AND LEVEL B HARASSMENT SOUND LEVELS PER MONTH PER YEAR

Year	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Level A	Level B	Annual total
Year 1	4	3	2	2	2	2	2	2	4	4	4	4	2	35	37
Year 2	4	3	2	2	2	2	2	2	4	4	4	4	2	35	37
Year 3	4	3	2	2	2	2	2	2	4	4	4	4	2	35	37
Year 4	4	3	2	2	2	2	2	2	4	4	4	4	2	35	37
Year 5	4	3	2	2	2	2	2	2	4	4	5	5	0	35	35
Monthly 5-Year Total	20	15	10	10	10	10	10	10	20	20	21	21	8	175	183

Bottlenose Dolphin

The total estimated number of takes for bottlenose dolphins in the Project area was estimated using a combined approach of daily sighting rates and

density methods from conventional line-transect vessel surveys near Naval Station Norfolk and adjacent areas near Virginia Beach, Virginia, from August

2012 through August 2015 (Engelhaupt *et al.* 2016).

HRCP estimated potential exposure using daily sighting data for areas west of the HRBT area and within the Core

Monitoring Area (shown in Figure 11–1 in the LOA application) and used seasonal densities of bottlenose dolphins from Engelhaupt *et al.* (2016) for areas northeast of the HRBT Project and outside the Core Monitoring Area. The Core Monitoring Area will encompass the area south of the HRBT and north of the Hampton Roads Monitor-Merrimac Memorial Bridge-Tunnel (Interstate 664) with observers positioned at key areas to monitor the entire geographic area between the bridges. This is the area that will be ensonified during most of the pile installation and removal activities. Depending on placement, the observers will be able to view west/southwest towards Batten Bay and the mouth of the Nansemond River. The largest ensonified southwest radii extend to the south into the James and Nansemond rivers, areas where marine mammal abundance is anticipated to be low and approaching zero. Towards the northeast direction, the largest of the multiple hammer zones may reach beyond the Chesapeake Bay Bridge and Tunnel. However, concurrent vibratory installation of three or more 30-, 36-, or 42-inch piles will occur infrequently.

This approach also factored in the number of days of pile installation and removal, which is estimated to be 312

days per year for 5 years. Due to the complex schedule and the inexact timeline in which parts of the project may be completed ahead of or behind schedule, trying to quantify the exact number of days certain isopleths will be active for the purposes of take estimation is infeasible. However, these calculations reflect the best available data for the areas in and around the Project and represent a conservative estimate of potential exposure based on reasonable assumptions.

Sighting rates (numbers of dolphins per day) were determined for each of the four seasons from observations located in the inshore Chesapeake Bay zone (the Chesapeake Bay waters near Naval Station Norfolk) which were used to estimate potential exposure west of the project site and within the Core Monitoring Area. Sightings per season ranged from 5 in spring to 24 in fall while no bottlenose dolphins were sighted in the winter months in this inshore area (Table 25). Note that the winter sighting total of 0 was a result of truncating winter survey data to only include sighting data within the vicinity of the project location. Bottlenose dolphin abundance was highest in the fall, (24 sightings representing 245 individuals), followed by the spring ($n = 156$), and summer ($n = 115$). This data

was utilized to calculate the number of dolphins per day that could be anticipated to occur in the project area during each season and year. The surveyed width for these surveys was two nautical miles, which encompasses the areas ensonified within the Core Monitoring Area during pile installation and removal (HDR-Mott MacDonald 2020). The number of anticipated days of in-water pile installation and removal for each month was multiplied by the average daily sighting rate estimate of the number of dolphins per month that could be exposed to project noise within the Core Monitoring Area. For the majority of piles being installed and/or removed, the ensonified area is constrained by surrounding land features and does not extend out into Chesapeake Bay. For piles with constrained sound fields, this method is sufficient to calculate potential exposure.

Table 25 depicts values in the average dolphins sighted per day column that are from within the Core Monitoring Area, which is smaller and closer to the river mouth. Values in the seasonal density column (individuals per km²) are from outside the Core Monitoring Area which is farther out in the Bay and where there are likely to be more dolphins.

TABLE 25—AVERAGE DAILY SIGHTING RATES AND SEASONAL DENSITIES OF BOTTLENOSE DOLPHINS WITHIN THE PROJECT AREA

Season	Number of sightings per season	Average number of dolphins sighted per day within core monitoring area	Seasonal density outside core monitoring area (individuals/km ²)
Spring, March–May	5	17.33	1.00
Summer, June–August	14	16.43	3.55
Fall, September–November	24	27.22	3.88
Winter, December–February	0	0.00	0.63

Source: Engelhaupt *et al.* 2016.

For each month and year, the average area within the Level B harassment zones and outside the Core Monitoring Area was calculated and used to estimate potential exposure east of the project site and outside the Core Monitoring Area. The weighted average area within the relevant Level B harassment zones outside the Core Monitoring Area was used to calculate potential exposure or take of bottlenose dolphin for each month. The weighting

incorporated the number of piles that produce the different zone sizes ensonified by each pile size/hammer/location. The number of piles with each different zone size was multiplied by its relevant ensonified area; those were then summed and the total was divided by the total number of piles.

For example, if there are 5 piles with a 20 km² Level B harassment zone each and 2 piles with a 50 km² Level B harassment zone, the formula would be:

$$((5 \text{ piles} * 20 \text{ km}^2/\text{pile}) + (2 \text{ piles} * 50 \text{ km}^2/\text{pile})) / (7 \text{ piles}) = \text{weighted average of } 28.6 \text{ km}^2.$$

The sum of potential exposures within the Core Monitoring Area (daily sighting rate method) and outside the Core Monitoring Area (density method for zones that extend into Chesapeake Bay) yields the total number of potential bottlenose dolphin exposures (Table 26) for each month and year.

TABLE 26—MONTHLY AND ANNUAL ESTIMATED DOLPHIN EXPOSURES USING NUMBER/DAY FOR CORE MONITORING AREA, AND DENSITY/KM² FOR AREAS EXTENDING OUTSIDE THE CORE MONITORING AREA INTO CHESAPEAKE BAY

	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Annual total
Dolphin density (#/km ²)	1	1	1	3.55	3.55	3.55	3.88	3.88	3.88	0.63	0.63	0.63	.....
Year 1 In CMA	468	451	451	427	444	427	708	708	681	0	0	0	4,765
Year 1 Out CMA	539	539	539	1,914	1,022	1,022	2,989	2,980	2,963	476	428	953	16,362
Year 2 In CMA	468	451	451	427	444	427	708	708	681	0	0	0	4,763
Year 2 Out CMA	2,297	1,304	706	2,631	2,464	1,627	1,342	6,770	6,758	1,097	1,526	1,498	30,021
Year 3 In CMA	468	451	451	427	444	427	708	708	681	0	0	0	4,764
Year 3 Out CMA	2,440	1,622	1,622	0	0	5,122	0	0	14,058	2,070	2,090	1,537	30,562
Year 4 In CMA	468	451	451	427	444	427	708	708	681	0	0	0	4,764
Year 4 Out CMA	0	0	0	0	0	0	10,146	9,287	6,009	444	0	0	25,884
Year 5 In CMA	468	451	451	427	444	427	708	708	681	0	0	0	4,763
Year 5 Out CMA	360	0	0	0	0	0	0	0	0	0	267	227	854

The largest Level A harassment isopleth is 236 m for DTH pile installation of 60-inch steel pipe piles (casings) at the South Trestle and covers an area less than 0.18 km². Given the daily sightings rates shown in Table 24, and the small Level A harassment zones, HRCF and NMFS do not anticipate that bottlenose dolphins will actually incur Level A harassment. However, because animals may enter into a PTS zone before being sighted, HRCF has requested authorization of Level A harassment for bottlenose dolphins as a precaution. Although NMFS does not agree that a brief sighting of a marine mammal within a Level A harassment zone calculated on the basis of accumulated energy necessarily means that the animal has experienced Level A harassment, we nevertheless propose to authorize take as requested by HRCF. HRCF assumed that approximately 1 percent of the total harassment exposures will be in the form of Level A harassment. HRCF has requested and NMFS is authorizing 127,502 exposures by Level B harassment and 1,222 exposures by Level A harassment of bottlenose dolphins divided among the 5 project construction years (127,502 total exposures – 1,222 Level A harassment takes = 126,280 Level B harassment takes). However, due to the construction schedule, these takes will not occur equally during each year of the LOA. There are no Level A harassment takes authorized for year 5. The maximum annual harassment number for dolphins is 35,326 in Year 3.

The total number of bottlenose dolphin takes by Level A and Level B harassment is expected to be split between three bottlenose dolphin stocks: Western North Atlantic Southern Migratory Coastal; Western North Atlantic Northern Migratory Coastal; and NNCES. There is insufficient data

available to apportion the requested takes precisely to each of these three stocks present in the project area. Given that most of the NNCES stock are found in the Pamlico Sound Estuarine System, the Project will assume that no more than 200 of the requested takes will be from this stock during any given year. Since members of the Western North Atlantic Northern Migratory Coastal and Western North Atlantic Southern Migratory Coastal stocks are thought to occur in or near the Project area in greater numbers, HRCF will conservatively assume that no more than half of the remaining animals will belong to either of these stocks. Additionally, a subset of these takes would likely be comprised of Chesapeake Bay resident dolphins, although the size of that population is unknown. It is assumed that an animal will be taken once over a 24-hour period; however, the same individual may be taken multiple times over the duration of the project. Therefore, both the number of takes for each stock and the affected population percentages represent the maximum potential take numbers.

Harbor Porpoise

Harbor porpoises are rarely seen in the project area although they are known to occur in the coastal waters near Virginia Beach (Hayes *et al.* 2020). They have been sighted on rare occasions in the Chesapeake Bay closer to Norfolk. Density data does not exist for this species within the project area. Sighting data collected by the U.S. Navy near Naval Station Norfolk and Virginia Beach from 2012 to 2015 (Engelhaupt *et al.* 2014, 2015, 2016) did not produce high enough sample sizes to calculate densities. One group of two harbor porpoises was seen during spring 2015 (Engelhaupt *et al.* 2016).

HRCF estimated that one group of two harbor porpoises could be exposed to

project-related underwater noise each month during the spring (March–May) for a total of 6 harbor porpoises takes (*i.e.*, 1 group of 2 individuals per month × 3 months per year = 6 harbor porpoises) per year.

The largest calculated Level A harassment zone for harbor porpoises extends 7,901 m from the noise source during DTH installation of 60-inch steel pipe piles (casings) at the South Trestle, for a harassment area of 102.16 km² (Table 17). However, HRCF has planned a 100-meter shutdown zone for harbor porpoises. HRCF has requested small numbers of take by Level A harassment for harbor porpoises during Years 1–4 of the project. While NMFS does not agree that take by Level A harassment is likely, due to the duration of time a harbor porpoise would be required to remain within the Level A zone to accumulate enough energy to experience PTS, we nevertheless propose to authorize limited take as requested by HRCF. It is anticipated that 2 individuals may enter the Level A harassment zone during pile installation and removal each spring, for a total of 2 potential Level A harassment exposures per year. Therefore, NMFS is authorizing 4 takes by Level B harassment each spring for Years 1 – 4 (6 total exposures – 2 Level A harassment takes = 4 Level B harassment takes). In Year 5, NMFS is authorizing 6 takes by Level B harassment and no takes by Level A harassment.

Harbor Seal

HRCF estimated the expected number of harbor seals in the project area using systematic, land- and vessel-based survey data for in-water and hauled-out seals collected by the U.S. Navy at the CBBT rock armor and portal islands from November 2014 through April 2019 (Rees *et al.* 2016; Jones *et al.* 2018; Jones and Rees 2020). The number of

harbor seals sighted by month from 2014 through 2019, in the Chesapeake Bay waters, in the vicinity (lower Chesapeake Bay along the CBBT) of the

Project, ranged from 0 to 170 individuals Table 27. During the months of June through October (Table 27 and Table 29) harbor seals are not

anticipated to be present in the Chesapeake Bay.

TABLE 27—SUMMARY OF HISTORICAL HARBOR SEAL SIGHTINGS BY MONTH FROM 2014 TO 2019

Month	2014	2015	2016	2017	2018	2019	Monthly average
January			33	120	170	7	82.5
February		39	80	106	159	21	81
March		55	61	41	0	18	43.8
April		10	1	3	3	4	4.2
May		3	0	0	0		0.8
June	Seals not expected to be present						0
July	Seals not expected to be present						0
August	Seals not expected to be present						0
September	Seals not expected to be present						0
October	Seals not expected to be present						0
November	1	0	1	0	3		1.3
December	4	9	24	8	29		14.8

TABLE 28—HARBOR SEAL SURVEY EFFORT, TOTAL COUNT, MAX COUNT ON A SINGLE SURVEY DAY, AND THE AVERAGE NUMBER OF SEALS OBSERVED PER SURVEY DAY AT THE CBBT SURVEY AREA

Field season	Number of survey days	Total seal count	Average daily seal count	Max daily seal count
2014–2015	11	113	10	33
2015–2016	14	187	13	39
2016–2017	22	308	14	40
2017–2018	15	340	23	45
2018–2019	10	82	8	17
Average	14.4	186	13.6	34.8

TABLE 29—SUMMARY OF THE ESTIMATED NUMBERS OF HARBOR SEALS POTENTIALLY TAKEN BY LEVEL A AND LEVEL B HARASSMENT PER MONTH PER YEAR ¹

Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Level A	Level B	Annual total
Year 1	177	367	354	326	367	354	177	424	1,697	2,122
Year 2	177	367	354	326	367	354	177	424	1,697	2,122
Year 3	177	367	354	326	367	354	177	424	1,697	2,122
Year 4	177	367	354	326	367	354	177	424	1,697	2,122
Year 5	177	367	354	326	367	354	177	0	2,122	2,122
Monthly 5-Year Total	884	1,836	1,768	1,632	1,836	1,768	884	1,696	8,910	10,608

¹ Harbor seals not expected June–October.

The estimated total number of harbor seals potentially exposed to in-water noise at harassment levels is 13.6 per day (the average of the 5-year average daily harbor seal count) (Table 28) for 156 days based on a 6-day work week from mid-November to mid-May. Seals are not expected to be present in the Chesapeake Bay from June through October. It is estimated that 13.6 harbor seals could be exposed per day to Project-related underwater noise for 156 days for a total of 2,122 exposures per year.

The largest Level A harassment isopleth associated with drilling with a DTH hammer of 60-inch steel pipe piles (casings) at the South Trestle for harbor seals is 3,550 meters (Table 17) with a Level A harassment zone of 27.12 km². It is possible that harbor seals could enter this or other Level A harassment zones undetected. While NMFS does not believe that take of harbor seals by Level A harassment is likely due to accumulated energy that would be required to experience injury, we nevertheless propose to authorize limited take as requested by HRCP. It is

anticipated that up to 20 percent of the total exposures would be at or above the Level A harassment threshold. Therefore, HRCP has requested and NMFS is authorizing 1,697 takes by Level B harassment and 424 takes by Level A harassment for project years 1–4 and 2,122 Level B harassment takes and no Level A harassment takes of harbor seals for project year 5 since only vibratory extraction will be occurring in the last year. (Table 29).

Gray Seal

Gray seals are expected to be very uncommon in the Project area. As described below, historical data indicate that approximately one gray seal has been seen per year in the Chesapeake Bay. Similar to the harbor seal, HRCP estimated the expected number of gray seals in the Project area using systematic, land- and vessel-based survey data for in-water and hauled-out seals collected by the U.S. Navy at the CBBT rock armor and portal islands from 2014 through 2019 (Rees *et al.*, 2016; Jones *et al.* 2018; Jones and Rees 2020). Gray seals are not expected to be present in the Chesapeake Bay during

the months of March through December. Between 2015 and 2019 only three individual seals were observed, all in the month of February (*i.e.*, 2015, 2016 and 2018).

As a precautionary measure, HRCP assumed that there could be three gray seals taken by Level B harassment during each of the winter months (December through February). Therefore, HRCP requested and NMFS is authorizing nine gray seal takes per year for 5 years (3 gray seals per month \times 3 months per year = 9 gray seals) for a total of 45 takes of gray seals (Table 30). Given the size of the Level A harassment zones and potential for a gray seal to be present within the zone

for sufficient duration to incur injury, eight takes by Level A harassment have also been requested (2 during years 1–4 and 0 during year 5). NMFS concurs with this assessment and is authorizing seven takes by Level B harassment and two takes by Level A harassment per year for years 1–4 (9 takes – 2 takes by Level A harassment = 7 takes by Level B harassment) and 9 takes by Level B harassment, with no authorized takes by Level A harassment, in year 5.

Table 30 below summarizes authorized take numbers by species per project year while Table 31 describes the proposed authorized take for all the species described above as a percentage of stock abundance.

TABLE 30—ESTIMATED TAKE BY LEVEL A AND LEVEL B HARASSMENT, BY SPECIES

Species	2021		2022		2023		2024		2025	
	Level A	Level B	Level A	Level B	Level A	Level B	Level A	Level B	Level A	Level B
Humpback whale	2	35	2	35	2	35	2	35	0	37
Bottlenose dolphin	212	20,915	349	34,435	354	34,972	307	30,341	0	5,617
Harbor porpoise	2	4	2	4	2	4	2	4	0	6
Harbor seal	424	1,697	424	1,697	424	1,697	424	1,697	0	2,121
Gray seal	2	7	2	7	2	7	2	7	0	9

TABLE 31—MAXIMUM ANNUAL ESTIMATED TAKE BY LEVEL A AND LEVEL B HARASSMENT, BY SPECIES AND STOCK IN COMPARISON TO STOCK ABUNDANCE

Species	Stock	Stock abundance	Level A and Level B harassment takes	Percent of stock
Humpback Whale	Gulf of Maine	^b 12,312	37	0.3
Bottlenose Dolphin	WNA Coastal, Northern Migratory ^a	6,639	17,561	264.5
	WNA Coastal, Southern Migratory ^a	3,751	17,561	468.2
	NNCES ^c	823	200	24.3
Harbor Porpoise	Gulf of Maine/Bay of Fundy	95,543	6	<0.01
Harbor Seal	Western North Atlantic	75,834	2,121	2.8
Gray Seal	Western North Atlantic	505,000	9	<0.01

^a Take estimates are weighted based on calculated percentages of population for each distinct stock, assuming animals present would follow same probability of presence in the project area. Please see the Small Numbers section for additional information.

^b West Indies DPS from Bettridge *et al.* 2015.

^c Assumes multiple repeated takes of same individuals from small portion of each stock as well as repeated takes of Chesapeake Bay resident population (size unknown). Please see the Small Numbers section for additional information.

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 such activity, and other means of effecting the least practicable impact on such species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of such species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of

conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)).

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

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

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

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

In addition to the measures described later in this section, HRCP will employ the following mitigation measures:

- For in-water heavy machinery work other than pile driving, if a marine mammal comes within 10 m, operations shall cease and vessels shall reduce speed to the minimum level required to maintain steerage and safe working conditions;

- HRCP will conduct briefings between construction supervisors and crews and the marine mammal monitoring team prior to the start of all pile driving activity and when new personnel join the work, to explain responsibilities, communication procedures, marine mammal monitoring protocol, and operational procedures;

- For those marine mammals for which Level A or Level B harassment take has not been requested, in-water pile installation/removal will shut down immediately if such species are observed within or entering the Level A or Level B harassment zone; and

- If take reaches the authorized limit for an authorized species, pile installation/removal will shut down immediately if these species approach the Level A or Level B harassment zone to avoid additional take.

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

Time Restriction

For pile driving, work would occur only during daylight hours, when visual

monitoring of marine mammals can be conducted. Installation or removal of new piles will not commence after daylight hours.

Shutdown Zones

For all pile driving activities, HRCP will establish shutdown zones for a marine mammal species which correspond to the Level A harassment zones. 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). In some instances, however, large zone sizes will make it impossible to monitor the entirety of the Level A harassment zones.

During use of a single hammer the following measures will be employed by HRCP:

- A minimum 10-meter shutdown zone will be implemented for all species, pile sizes, and hammer types to prevent direct injury of marine mammals;

- A 15-meter shutdown zone will be implemented for seals to prevent direct injury;

- A 100-meter shutdown zone will be implemented for harbor porpoises when utilizing a DTH hammer and impact hammering to prevent direct injury; and

- When the Level A harassment zone is larger than 50 meters, shutdown zones have been rounded up relative to the calculated Level A harassment zones

as a precautionary measure. HRCP will also document the duration any animal spends within the Level A harassment zone;

When two or more vibratory hammers are in use HRCP will employ the following measures:

- A shutdown zone will be implemented for each species for each vibratory hammer on days when it is anticipated that multiple vibratory hammers will be used, whether at a single site or multiple sites;

- A 35-meter shutdown zone will be implemented for harbor seals and gray seals to prevent direct injury;

- An 85-meter shutdown zone will be implemented for harbor porpoise to prevent direct injury; and

- A 55-meter shutdown zone will be implemented for humpback whales to prevent direct injury;

Calculated Level A harassment zones and shutdown zones for each activity and pile size and type are depicted in Table 32 and Table 33. Note that shutdown zones in Table 33 include a 7 dB reduction due to the use of bubble curtains. Compare shutdown zones in Table 32 with Level A harassment zones contained in Tables 16, 17 and 18. Under some pile driving scenarios, the Level A harassment zones are larger than the specified shutdown zones.

TABLE 32—SHUTDOWN ZONES WITH NO ATTENUATION FOR ALL SPECIES

Method	Pile size and type	Minutes (min) per pile or strikes per pile	Number of piles installed or removed per day	Level A harassment isopleth distance (meters)			
				Cetaceans			Pinnipeds
				LF	MF	HF	
Vibratory Installation and Removal.	24-inch Pipe, Steel	15 min	6	¹ 10/55	10	² 14/85	³ 15/35
	30-inch Pipe, Steel, Concrete Filled.	30 min	6	15/55 36/55	.....	21/85 60/85	.....
	36-inch Pipe, Steel	2.5 min	8	10/55	.....	13/85	.....
		2.5 min	16	14/55	.....	20/85	.....
		25 min	1	10/55	.....	15/85	.....
		.....	2	16/55	.....	23/85	.....
		.....	3	20/55	.....	30/85	.....
		30 min	2	18/55	.....	26/85	.....
	42-inch Pipe, Steel	15 min	6	27/55	.....	39/85	.....
	Sheet, Steel	15 min	10	11/55	.....	16/85	.....
	16-inch CCA, Timber.	15 min	4	10/55	.....	12/85	.....
Jetting Down-the-Hole Installation.	42-inch Pipe, Steel	15 min	1	10	.....	10	.....
	30-inch Pipe, Steel, Concrete Filled.	36,000 strikes *	6	1,950	70	100	.....
	36-inch Pipe, Steel	.....	2	940	34	.....	.....
Impact Installation	60-inch Pipe, Steel	.....	3	6,640	240	.....	.....
	24-inch Pipe, Steel	20 strikes	6	100	10	.....	.....

TABLE 32—SHUTDOWN ZONES WITH NO ATTENUATION FOR ALL SPECIES—Continued

Method	Pile size and type	Minutes (min) per pile or strikes per pile	Number of piles installed or removed per day	Level A harassment isopleth distance (meters)			
				Cetaceans			Pinnipeds
				LF	MF	HF	
	30-inch Pipe, Steel, Concrete Filled.			390	14	.....	.....
	36-inch Pipe, Steel		2	120	10	.....	.....
	36-inch Pipe, Steel		3	160	10	.....	.....
	24-inch Pipe, Concrete Square.	1,050 strikes	1	80	10	.....	.....
	54-inch Pipe, Concrete Cylinder.			420	15	.....	.....

¹ A 55-meter shutdown zone will be implemented for humpback whales during concurrent vibratory driving of two or more hammers.

² A 85-meter shutdown zone will be implemented for harbor porpoise during concurrent vibratory driving of two or more hammers.

³ A 35-meter shutdown zone will be implemented for harbor seals and gray seals during concurrent vibratory driving of two or more hammers.

TABLE 33—SHUTDOWN ZONES WITH ATTENUATION FOR ALL SPECIES

Method	Pile size and type	Strikes per pile	Number of piles per day	Level A harassment isopleth distance (meters)			
				Cetaceans			Pinnipeds
				LF	MF	HF	PW
Impact Installation	24-inch Pipe, Steel	20 strikes	6	35	10	40	20
	30-inch Pipe, Steel, Concrete Filled.			135	10	160	75
	36-inch Pipe, Steel	20 strikes	2	40	10	50	25

Protected Species Observers

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

Establishment of Level A and Level B Harassment Zones

HRCP will establish monitoring zones based on calculated Level A harassment isopleths associated with specific pile driving activities and scenarios. These are areas beyond the established shutdown zones in which animals could be exposed to sound levels that could result in Level A harassment in the form of PTS. HRCP will also establish and monitor Level B harassment zones which are areas where SPLs are equal to or exceed the 160 dB rms threshold for impact driving and 120 dB rms

threshold during vibratory driving and DTH pile installation.

The Level A and Level B harassment monitoring zones are given in Tables 16–19.

Monitoring for Level B Harassment

HRCP will monitor the Level B harassment zones to the extent practicable, as well as Level A harassment zones extending beyond shutdown zones. HRCP will monitor at least a portion of the Level B harassment zone on all pile driving days. Monitoring zones provide utility for observing by establishing monitoring protocols for areas adjacent to the shutdown zones. Monitoring zones enable observers to be aware of and communicate the presence of marine mammals in the project area outside the shutdown zone and thus prepare for a potential cessation of activity should the animal enter the shutdown zone.

Bubble Curtains

Use of air bubble curtain systems will be implemented by HRCP during impact driving of steel piles except in situations where the water depth is less than 20 ft in depth. The use of this sound attenuation device will reduce SPLs and the size of the zones of influence for Level A harassment and Level B

harassment. Bubble curtains will meet the following requirements:

- The bubble curtain must distribute air bubbles around 100 percent of the piling perimeter for the full depth of the water column;
- The lowest bubble ring shall be in contact with the mudline and/or rock bottom for the full circumference of the ring, and the weights attached to the bottom ring shall ensure 100 percent mudline and/or rock bottom contact. No parts of the ring or other objects shall prevent full mudline and/or rock bottom contact;
- The bubble curtain shall be operated such that there is proper (equal) balancing of air flow to all bubblers; and
- The applicant shall require that construction contractors train personnel in the proper balancing of air flow to the bubblers and corrections to the attenuation device to meet the performance standards. This shall occur prior to the initiation of pile driving activities.

Soft-Start

The use of soft-start procedures are believed to provide additional protection to marine mammals by providing warning and/or giving marine mammals a chance to leave the area prior to the hammer operating at full

capacity. For impact pile driving, HRCF will be required to provide an initial set of strikes from the hammer at reduced energy, with each strike followed by a 30-second waiting period. This procedure will be conducted a total of three times before impact pile driving begins. 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 required during vibratory or DTH pile driving activities.

If a marine mammal is present within the shutdown zone, ramping up will be delayed until the PSO has determined, through sighting, that the animal(s) has moved outside the shutdown zone. If a marine mammal is present in the Level A or Level B harassment zone, ramping up may begin and a Level A or Level B harassment take will be recorded. If a marine mammal is present in the Level A or Level B harassment zone, HRCF may elect to delay ramping up to avoid a Level A or Level B harassment take. To avoid a take by Level A or Level B harassment, ramping up will begin only after the PSO has determined, through sighting, that the animal(s) has moved outside the corresponding Level A or Level B harassment zone or 15 minutes have passed.

Pre-Activity Monitoring

Prior to the start of daily in-water construction activity, or whenever a break in pile driving of 30 minutes or longer occurs, PSOs will observe the shutdown and monitoring zones for a period of 30 minutes. The shutdown zone will be cleared when a marine mammal has not been observed within the zone for that 30-minute period. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes. If the Level A and Level B harassment zones have been observed for 30 minutes and non-permitted species are not present within the zone, soft start procedures can commence and work can continue even if visibility becomes impaired within the Level A or Level B harassment monitoring zones. When a marine mammal permitted for take by Level A or Level B harassment is present in the Level A or Level B harassment zone, activities may begin and Level A or Level B harassment take will be recorded as appropriate. If work ceases for more than 30 minutes, the pre-activity monitoring of both the Level B harassment and shutdown zone will commence again. Additionally, in-water construction activity must be delayed or cease, if poor environmental conditions

restrict full visibility of the shut-down zone(s) until the entire shut-down zone(s) is visible.

Based on our evaluation of HRCF's planned measures, as well as other measures considered by NMFS, NMFS has determined that the planned 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.

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. NMFS' MMPA implementing regulations further describe the information that an applicant should provide when requesting an authorization (50 CFR 216.104 (a)(13)), including the means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and the level of taking or impacts on populations of marine mammals. Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

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

- Mitigation and monitoring effectiveness.

HRCF will submit a Marine Mammal Monitoring Plan which must be approved by NMFS in advance of the start of construction.

Visual Monitoring

Marine mammal monitoring during pile driving and removal must be conducted by PSOs in a manner consistent with the following:

- Independent PSOs (*i.e.*, not construction personnel) who have no other assigned tasks during monitoring periods must be used;
 - 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;
 - Other PSOs may substitute education (degree in biological science or related field) or training for experience;
 - Where a team of three or more PSOs is required, a lead observer or monitoring coordinator must be designated. The lead observer must have prior experience working as a marine mammal observer during construction; and
 - HRCF must submit PSO Curriculum Vitae for approval by NMFS prior to the onset of pile driving.
- PSOs must have the following additional qualifications:
- 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.

PSOs will be positioned at the best practical vantage point(s). The position(s) may vary based on construction activity and location of piles or equipment. At least one of the monitoring locations will have an

unobstructed view of the pile being driven, and an unobstructed view of the Level A shutdown and Level B harassment zones, Core Monitoring Area, as well as the 100-meter shutdown zone.

Between one and five PSOs will be stationed at locations offering the best available views of the Level A and Level B harassment monitoring zones during in-water pile installation and removal, depending on where active in-water work is taking place. It is anticipated that a PSO will observe from the North Island when in-water pile installation is occurring at the North Island and North Trestle. If the view field is adequate, Level A and Level B harassment zones may be monitored for multiple pile driving locations by the same individual PSO. Two PSOs will be located at the South Island, where they will monitor for marine mammals passing into and out of the Core Monitoring Area as well as monitor the active hammer sites. This location also provides good views to the east for monitoring when zones extend beyond the Core Monitoring Area into Chesapeake Bay. One PSO will be stationed on Willoughby Spit or a similar location that offers the best available views of the Level A and Level B harassment monitoring zones during in-water pile installation and removal within Willoughby Bay. Finally, on days when use of multiple hammers is planned and it is anticipated that the Level B harassment isopleth will encompass the CBBT, a PSO will be located on one of the CBBT Portal Islands to monitor the extended ensonified area. A central position will generally be staffed by the lead PSO, who will monitor the shutdown zones and communicate with construction personnel about shutdowns and take management. PSOs at the pile installation and removal locations will be able to see at least a radius around the construction site that exceeds the largest Level A harassment zone. PSOs will watch for marine mammals entering and leaving the James River and will alert the lead PSO of the number and species sighted, so that no unexpected marine mammals will approach the construction site. This will minimize Level A harassment take of all species.

Decibel addition is not a consideration when sound fields do not overlap at the sound sources. Willoughby Bay is largely surrounded by land, and sound will be prevented from propagating to other Project construction sites. Therefore, Willoughby Bay will be treated as an independent site with its own monitoring and shutdown zones, as well

as observer requirements when construction is taking place within the bay. The Bay is relatively small and will be monitored from the construction site by one to two observers.

Reporting

HRCP would submit an annual draft report for each construction year to NMFS within 90 calendar days of the completion of marine mammal monitoring. A final annual report will be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

The report will detail the monitoring protocol and summarize the data recorded during monitoring.

Specifically, the report must include

- 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 were driven or removed and by what method (*i.e.*, impact or vibratory);
- 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 (if less than the harassment zone distance); and percentages of Level A and Level B harassment zones that are not visible;
- The number of marine mammals observed, by species, relative to the pile location and if pile driving or removal was occurring at time of sighting;
- Age and sex class, if possible, of all marine mammals observed;
- PSO locations during marine mammal monitoring;
- Distances and bearings of each marine mammal observed to the pile being driven or removed for each sighting (if pile driving or removal was occurring at time of sighting);
- Description of any marine mammal behavior patterns during observation, including direction of travel and estimated time spent within the Level A and Level B harassment zones while the source was active;
- Number of marine mammals detected within the harassment zones, by species;
- Detailed information about any implementation of any mitigation triggered (*e.g.*, shutdowns and delays), a description of specific actions that ensued, and resulting behavior of the animal, if any; and
- Description of attempts to distinguish between the number of

individual animals taken and the number of incidences of take, such as ability to track groups or individuals.

If no comments are received from NMFS within 30 days, the draft report will constitute the final report. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments.

In the event that personnel involved in the construction activities discover an injured or dead marine mammal, HRCP shall report the incident to the Office of Protected Resources (OPR) (301-427-8401), NMFS and to the Greater Atlantic Region New England/ Mid-Atlantic Regional Stranding Coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, HRCP must immediately cease the specified activities until NMFS 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 the authorization. HRCP must not resume their activities until notified by NMFS.

The report must include the following information:

- i. Time, date, and location (latitude/ longitude) of the first discovery (and updated location information if known and applicable);
- ii. Species identification (if known) or description of the animal(s) involved;
- iii. Condition of the animal(s) (including carcass condition if the animal is dead);
- iv. Observed behaviors of the animal(s), if alive;
- v. If available, photographs or video footage of the animal(s); and
- vi. General circumstances under which the animal was discovered.

Negligible Impact Analysis and Determination

NMFS has defined negligible impact as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (*i.e.*, population-level effects). An estimate of the number of takes alone is not enough information on which to base an impact determination. In addition to considering estimates of the number of marine mammals that might be "taken" through harassment, NMFS considers other factors, such as the likely nature of any responses (*e.g.*, intensity,

duration), the context of any responses (e.g., critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of the mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS's implementing regulations (54 FR 40338; September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the environmental baseline (e.g., as reflected in the regulatory status of the species, population size and growth rate where known, ongoing sources of human-caused mortality, or ambient noise levels).

To avoid repetition, this introductory discussion of our analyses applies to all of the species listed in Table 31, 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 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.

Pile driving 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 B harassment from underwater sounds generated by pile driving. Potential takes could occur if marine mammals are present in zones ensounded above the thresholds for Level B harassment, identified above, while activities are underway. No serious injury or mortality would be expected even in the absence of mitigation measures.

A limited number of animals could experience Level A harassment in the form of PTS if they remain within the Level A harassment zone long enough during certain impact driving scenarios. However, the number of animal affected and the degree of injury is expected to be limited to, at most, mild PTS. Furthermore, the reproduction or survival of the individual animals is not likely to be affected. It is expected that, if hearing impairments occur, most likely the affected animal would lose a few dB in its hearing sensitivity, which in most cases is not likely to affect its survival and recruitment.

HRCP's planned pile driving activities and associated impacts will occur within a limited portion of the confluence of the Chesapeake Bay area.

Localized noise exposures produced by project activities may cause short-term behavioral modifications in affected cetaceans and pinnipeds. However, as described previously, the mitigation and monitoring measures are expected to further reduce the likelihood of injury as well as reduce behavioral disturbances.

Effects on individuals that are taken by Level B harassment, on the basis of reports in the literature as well as monitoring from other similar activities, will likely be limited to reactions such as increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring) (e.g., Thorson and Reyff 2006). Individual animals, even if taken multiple times, will most likely move away from the sound source and be temporarily displaced from the areas of pile driving, although even this reaction has been observed primarily only in association with impact pile driving. The pile driving activities analyzed here are similar to, or less impactful than, numerous other construction activities conducted along the Atlantic coast, which have taken place with no known long-term adverse consequences from behavioral harassment. Furthermore, many projects similar to this one are also believed to result in multiple takes of individual animals without any documented long-term adverse effects. Level B harassment will be minimized through use of mitigation measures described herein and, if sound produced by project activities is sufficiently disturbing, animals are likely to simply avoid the area while the activity is occurring, particularly as the project is located on a busy waterfront with high amounts of vessel traffic.

As previously described, UMEs have been declared for Northeast pinnipeds (including harbor seal and gray seal) and Atlantic humpback whales. However, we do not expect authorized takes to exacerbate or compound upon these ongoing UMEs. As noted previously, no injury, serious injury, or mortality is expected or authorized, and Level A and Level B harassment takes of humpback whale, harbor seal and gray seal will be reduced to the level of least practicable adverse impact through the incorporation of the required mitigation measures. For the WNA stock of gray seal, the estimated stock abundance is 451,431 animals, including the Canadian portion of the stock (estimated 27,131 animals in the U.S. portion of the stock). Given that only 7 takes by Level B harassment and two takes by Level A harassment are authorized for this stock annually, we do not expect this authorization to

exacerbate or compound upon the ongoing UME.

With regard to humpback whales, the UME does not yet provide cause for concern regarding population-level impacts. Despite the UME, the relevant population of humpback whales (the West Indies breeding population, or distinct population segment (DPS)) remains healthy. Prior to 2016, humpback whales were listed under the ESA as an endangered species worldwide. Following a 2015 global status review (Bettridge *et al.*, 2015), NMFS established 14 DPSs with different listing statuses (81 FR 62259; September 8, 2016) pursuant to the ESA. The West Indies DPS, which consists of the whales whose breeding range includes the Atlantic margin of the Antilles from Cuba to northern Venezuela, and whose feeding range primarily includes the Gulf of Maine, eastern Canada, and western Greenland, was delisted. The status review identified harmful algal blooms, vessel collisions, and fishing gear entanglements as relevant threats for this DPS, but noted that all other threats are considered likely to have no or minor impact on population size or the growth rate of this DPS (Bettridge *et al.*, 2015). As described in Bettridge *et al.* (2015), the West Indies DPS has a substantial population size (i.e., 12,312 (95 percent CI 8,688–15,954) whales in 2004–05 (Bettridge *et al.* 2003)), and appears to be experiencing consistent growth. Further, NMFS is authorizing no more than 37 takes by Level A and Level B harassment annually of humpback whale.

For the WNA stock of harbor seals, the estimated abundance is 75,834 individuals. The estimated M/SI for this stock (350) is well below the PBR (2,006). As such, authorized Level A and Level B harassment takes of harbor seal are not expected to exacerbate or compound upon the ongoing UMEs.

The project is also not expected to have significant adverse effects on affected marine mammals' habitats. The project activities will not modify existing marine mammal habitat for a significant amount of time. The activities may cause some fish to leave the area of disturbance, thus temporarily impacting marine mammals' foraging opportunities in a limited portion of the foraging range; but, because of the relatively small area of the habitat that may be affected (with no known particular importance to marine mammals), the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences. Furthermore, there are no known biologically important areas

(BIAs), ESA-designated critical habitat, rookeries, or features of special significance for foraging or reproduction.

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

- No serious injury or mortality is anticipated or authorized;
- Authorized Level A harassment would be limited and of low degree;
- The intensity of anticipated takes by Level B harassment is relatively low for all stocks;
- The number of anticipated takes is very low for humpback whale, harbor porpoise, and gray seal;
- The specified activity and associated ensonified areas are very small relative to the overall habitat ranges of all species and do not include habitat areas of special significance;
- The lack of anticipated significant or long-term negative effects to marine mammal habitat; and
- The presumed efficacy of the mitigation measures in reducing the effects of the specified activity.

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

Small Numbers

As noted above, only small numbers of incidental take may be authorized under section 101(a)(5)(A) 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 take of take of humpback whale, harbor porpoise,

harbor seal, and gray seal comprises less than one-third of the best available stock abundance estimate for each of these stocks (Table 31). The maximum number of animals authorized to be taken from these stocks would be considered small relative to the relevant stock's abundances even if each estimated taking occurred to a new individual, which is an unlikely scenario.

Three bottlenose dolphin stocks could occur in the project area: WNA Coastal Northern Migratory, WNA Coastal Southern Migratory, and NNCES stocks. Therefore, the estimated takes of bottlenose dolphin by Level B harassment would likely be portioned among these stocks. Based on the stocks' respective occurrence in the area, NMFS estimated that there would be no more than 200 takes from the NNCES stock each year over the five-year period, with the remaining takes evenly split between the northern and southern migratory coastal stocks. Based on consideration of various factors described below, we have determined the maximum number of individuals taken per year would likely comprise less than one-third of the best available population abundance estimate of either coastal migratory stock.

Both the WNA Coastal Northern Migratory and WNA Coastal Southern Migratory stocks have expansive ranges and they are the only dolphin stocks thought to make broad-scale, seasonal migrations in coastal waters of the western North Atlantic. Given the large ranges associated with these stocks it is unlikely that large segments of either stock would approach the project area and enter into the Chesapeake Bay. The majority of both stocks are likely to be found widely dispersed across their respective habitat ranges and unlikely to be concentrated in or near the Chesapeake Bay.

Furthermore, the Chesapeake Bay and nearby offshore waters represent the boundaries of the ranges of each of the two coastal stocks during migration. The WNA Coastal Northern Migratory stock occurs during warm water months from coastal Virginia, including the Chesapeake Bay to Long Island, New York. The stock migrates south in late summer and fall. During cold-water months, dolphins may occur in coastal waters from Cape Lookout, North Carolina, to the North Carolina/Virginia border. During January–March, the WNA Coastal Southern Migratory stock appears to move as far south as northern Florida. From April to June, the stock moves back north to North Carolina. During the warm water months of July–August, the stock is presumed to occupy

coastal waters north of Cape Lookout, North Carolina, to Assateague, Virginia, including the Chesapeake Bay. There is likely some overlap between the northern and southern migratory stocks during spring and fall migrations, but the extent of overlap is unknown.

The Chesapeake Bay and waters offshore of its mouth are located on the periphery of the migratory ranges of both coastal stocks (although during different seasons). Additionally, each of the migratory coastal stocks are likely to be located in the vicinity of the Chesapeake Bay for relatively short timeframes. Given the limited number of animals from each migratory coastal stock likely to be found at the seasonal migratory boundaries of their respective ranges, in combination with the short time periods (~two months) animals might remain at these boundaries, it is reasonable to assume that takes are likely to occur to only a small portion of either of the migratory coastal stocks.

Both migratory coastal stocks likely overlap with the NNCES stock at various times during their seasonal migrations. The NNCES stock is defined as animals that primarily occupy waters of the Pamlico Sound estuarine system (which also includes Core, Roanoke, and Albemarle sounds, and the Neuse River) during warm water months (July–August). Animals from this stock also use coastal waters (≤ 1 km from shore) of North Carolina from Beaufort north to Virginia Beach, Virginia, including the lower Chesapeake Bay. Comparison of dolphin photo-identification data confirmed that limited numbers of individual dolphins observed in Roanoke Sound have also been sighted in the Chesapeake Bay (Young, 2018). Like the migratory coastal dolphin stocks, the NNCES stock covers a large range. The spatial extent of most small and resident bottlenose dolphin populations is on the order of 500 km², while the NNCES stock occupies over 8,000 km² (LeBrecque *et al.*, 2015). Given this large range, it is again unlikely that a preponderance of animals from the NNCES stock would depart the North Carolina estuarine system and travel to the northern extent of the stock's range. However, recent evidence suggests that there is likely a small resident community of NNCES dolphins of indeterminate size that inhabits the Chesapeake Bay year-round (E. Patterson, NMFS, pers. comm.).

Many of the dolphin observations in the Bay are likely repeated sightings of the same individuals. The Potomac-Chesapeake Dolphin Project has observed over 1,200 unique animals since observations began in 2015. Re-sightings of the same individual can be

highly variable. Some dolphins are observed once per year, while others are highly regular with greater than 10 sightings per year (J. Mann, Potomac-Chesapeake Dolphin Project, pers. comm.). Similarly, using available photo-identification data, Engelhaupt *et al.* (2016) determined that specific individuals were often observed in close proximity to their original sighting locations and were observed multiple times in the same season or same year. Ninety-one percent of re-sighted individuals (100 of 110) in the study area were recorded less than 30 km from the initial sighting location. Multiple sightings of the same individual would considerably reduce the number of individual animals that are taken by Level B harassment. Furthermore, the existence of a resident dolphin population in the Bay would increase the percentage of dolphin takes that are actually re-sightings of the same individuals in any given year.

In summary and as described above, the following factors primarily support our determination regarding the incidental take of small numbers of the affected stocks of bottlenose dolphin:

- Potential bottlenose dolphin takes in the project area are likely to be allocated among three distinct stocks;
- Bottlenose dolphin stocks in the project area have extensive ranges and it would be unlikely to find a high percentage of any one stock concentrated in a relatively small area such as the project area or the Chesapeake Bay;
- The Chesapeake Bay represents the migratory boundary for each of the specified dolphin stocks and it would be unlikely to find a high percentage of any stock concentrated at such boundaries; and
- Many of the takes would likely be repeats of the same animals and likely from a resident population of the Chesapeake Bay.

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

Unmitigable Adverse Impact Analysis and Determination

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

such species or stocks for taking for subsistence purposes.

Adaptive Management

The regulations governing the take of marine mammals incidental to HRCF construction activities would contain an adaptive management component. The reporting requirements associated with this final 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 HRCF 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.

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 an incidental take authorization) with respect to potential impacts on the human environment.

This action is consistent with categories of activities identified in Categorical Exclusion B4 (Incidental harassment authorizations (IHAs) 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 determined that the issuance of regulations and the LAO qualifies to be categorically excluded from further NEPA review.

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 insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of designated critical habitat. To ensure ESA compliance for the issuance of incidental take authorizations, NMFS consults internally whenever we propose to authorize take for endangered or threatened species.

No incidental take of ESA-listed species is planned 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.

Classification

Pursuant to the procedures established to implement Executive Order 12866, the Office of Management and Budget has determined that this 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 certified to the Chief Counsel for Advocacy of the Small Business Administration at the proposed rule stage that this action will not have a significant economic impact on a substantial number of small entities. HRCF is the sole entity that would be subject to the requirements in these final regulations, and HRCF is not a small governmental jurisdiction, small organization, or small business, as defined by the RFA. No comments were received regarding this certification or on the economic impacts of the rule more generally. As a result, a regulatory flexibility analysis is not required and none has been prepared.

Notwithstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act (PRA) unless that collection of information displays a currently valid OMB control number. This final rule contains collection-of-information requirements subject to the provisions of the PRA. These requirements have been approved by OMB under control number 0648-0151 and include applications for regulations, subsequent LOAs, and reports.

Waiver of Delay in Effective Date

The Assistant Administrator for Fisheries has determined that there is

good cause under the Administrative Procedure Act to waive the 30-day delay in the effective date (5 U.S.C. 553(d)(3)) of the final rule. HRCF is the only entity subject to the regulations, and it has informed NMFS that it requests that this final rule take effect by March 2021 in order to prevent serious impacts that would result from any stoppage in the project construction schedule. Any delay of enacting the final rule would result in either: (1) Suspension of construction on a major road transport infrastructure project at significantly increased cost; or (2) HRCF's procedural non-compliance with the MMPA (should HRCF conduct pile driving and removal without an LOA), thereby resulting in the potential for unauthorized takes of marine mammals. Due to a project design change occurring in September 2020, HRCF requested to transfer a portion of pile installation from the rulemaking/LOA application to the recently issued IHA (85 FR 48153; August 10, 2020). This resulted in the need for submitting a revised application including re-calculation of estimated take. Given this delay, NMFS was unable to accommodate the 30-day delay of effectiveness period and issue the LOA to HRCF in time to prevent a work stoppage and associated delay in the project schedule. Moreover, HRCF is ready to implement the rule immediately. For these reasons, the Assistant Administrator finds good cause to waive the 30-day delay in the effective date.

List of Subjects in 50 CFR Part 217

Administrative practice and procedure, Marine mammals, Oil and gas exploration, Penalties, Reporting and recordkeeping requirements.

Dated: March 19, 2021.

Samuel D. Rauch, III,

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

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

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

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

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

■ 2. Add subpart W, consisting of §§ 217.210 through 217.219, to read as follows:

Subpart W—Taking and Importing Marine Mammals Incidental to Hampton Roads Connector Partners Construction at Norfolk, Virginia

Sec.

- 217.210 Specified activity and geographical region.
- 217.211 Effective dates.
- 217.212 Permissible methods of taking.
- 217.213 Prohibitions.
- 217.214 Mitigation requirements.
- 217.215 Requirements for monitoring and reporting.
- 217.216 Letters of Authorization.
- 217.217 Renewals and modifications of Letters of Authorization.
- 217.218–217.219 [Reserved]

Subpart W—Taking and Importing Marine Mammals Incidental to Hampton Roads Connector Partners Construction at Norfolk, Virginia

§ 217.210 Specified activity and geographical region.

(a) Regulations in this subpart apply only to the Hampton Roads Connector Partners (HRCF) and those persons it authorizes or funds to conduct activities on its behalf for the taking of marine mammals that occurs in the areas outlined in paragraph (b) of this section and that occurs incidental to construction activities including marine structure maintenance, pile replacement, and select waterfront improvements at the Hampton Roads Bridge Tunnel Expansion Project (HRBT).

(b) The taking of marine mammals by HRCF may be authorized in a Letter of Authorization (LOA) only if it occurs at the Hampton Roads Bridge Tunnel Expansion project location in the James River between Norfolk, VA and Hampton, VA.

§ 217.211 Effective dates.

Regulations in this subpart are effective from April 2, 2021 through April 2, 2026.

§ 217.212 Permissible methods of taking.

(a) Under an LOA issued pursuant to §§ 216.106 of this chapter and 217.216, the Holder of the LOA (hereinafter “HRCF”) may incidentally, but not intentionally, take marine mammals within the area described in § 217.210(b) by Level A and Level B harassment associated with construction activities, provided the activity is in compliance with all terms, conditions, and requirements of the regulations in this subpart and the applicable LOA.

(b) [Reserved]

§ 217.213 Prohibitions.

(a) Except for the takings contemplated in § 217.22 and

authorized by an LOA issued under §§ 216.106 of this chapter and 217.216, it is unlawful for any person to do any of the following in connection with the activities described in § 217.210:

- (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 217.216;
 - (2) Take any marine mammal not specified in such LOA;
 - (3) Take any marine mammal specified in such LOA in any manner that is not authorized by the LOA; or
 - (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.
- (b) [Reserved]

§ 217.214 Mitigation requirements.

(a) When conducting the activities identified in § 217.210(a), the mitigation measures contained in any LOA issued under §§ 216.106 of this chapter and 217.216 must be implemented. These mitigation measures shall include but are not limited to:

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

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

(3) For in-water heavy machinery work other than pile driving, if a marine mammal comes within 10 meters (m), HRCF shall cease operations and reduce vessel speed to the minimum level required to maintain steerage and safe working conditions.

(4) For all pile driving activity, HRCF shall implement a minimum shutdown zone of a 10 m radius around the pile. If a marine mammal comes within or approaches the shutdown zone, such operations shall cease.

(5) For all pile driving activity, HRCF shall implement shutdown zones with radial distances as identified in a LOA issued under §§ 216.106 of this chapter and 217.216. If a marine mammal comes within or approaches the shutdown zone, such operations shall cease.

(6) HRCF shall deploy protected species observers (observers) as indicated in its Marine Mammal Monitoring Plan approved by NMFS.

(7) For all pile driving activities, between one and four observers shall be

stationed at the best vantage points practicable to monitor for marine mammals and implement shutdown/delay procedures.

(8) Monitoring shall take place from 30 minutes prior to initiation of pile driving activity through 30 minutes post-completion of pile driving activity. Pre-activity monitoring shall be conducted for 30 minutes to ensure that the shutdown zone is clear of marine mammals, and pile driving may commence when observers have declared the shutdown zone clear of marine mammals. In the event of a delay or shutdown of activity resulting from marine mammals in the shutdown zone, animals shall be allowed to remain in the shutdown zone (*i.e.*, must leave of their own volition) and their behavior shall be monitored and documented. If a marine mammal is observed within the shutdown zone, a soft-start cannot proceed until the animal has left the zone or has not been observed for 15 minutes. Monitoring shall occur throughout the time required to drive a pile. If in-water pile installation and removal 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).

(9) If a marine mammal approaches or enters the shutdown zone, all pile driving activities at that location shall be halted. In the event of a delay, the activity may not commence or resume until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or fifteen minutes have passed without re-detection of the animal.

(10) Pile driving activity 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.

(11) Should environmental conditions deteriorate (*e.g.*, fog, heavy rain) such that observers are unable to visibly detect marine mammals within the entire shutdown zone then HRCF shall delay pile driving and removal until observers are confident marine mammals within the shutdown zone could be detected.

(12) Monitoring shall be conducted by trained observers, who shall have no other assigned tasks during monitoring periods. Trained observers shall be placed at the best vantage point(s) practicable to monitor for marine

mammals and implement shutdown or delay procedures when applicable through communication with the equipment operator. HRCF shall adhere to the following additional observer qualifications:

(i) Independent observers are required;

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

(iii) Other observers may substitute education (degree in biological science or related field) or training for experience;

(iv) Where a team of three or more observers are required, one observer shall be designated as lead observer or monitoring coordinator. The lead observer must have prior experience working as an observer; and

(v) HRCF must submit PSO CVs for approval by NMFS prior to the beginning of pile driving and drilling.

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

(14) HRCF shall employ bubble curtain systems during impact driving of steel piles except under conditions where the water depth is less than 20 feet in depth. Bubble curtains must meet the following requirements:

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

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

(iii) The bubble curtain must be operated such that there is proper (equal) balancing of air flow to all bubblers.

(iv) HRCF shall require that construction contractors train personnel in the proper balancing of air flow to the bubblers and corrections to the attenuation device to meet the performance standards specified in an LOA issued under §§ 216.106 of this chapter and § 217.216. This shall occur prior to the initiation of pile driving activities.

(b) [Reserved]

§ 217.215 Requirements for monitoring and reporting.

(a) HRCF shall submit a Marine Mammal Monitoring Plan to NMFS for approval in advance of construction.

(b) HRCF shall deploy observers as indicated in its approved Marine Mammal Monitoring Plan.

(c) Observers shall be trained in marine mammal identification and behaviors. Observers shall have no other construction-related tasks while conducting monitoring.

(d) HRCF shall monitor the Level B harassment zones and Level A harassment zones extending beyond the designated shutdown zones to the extent practicable.

(e) HRCF shall monitor the shutdown zones during all pile driving and removal activities.

(f) HRCF shall submit a draft annual monitoring report to NMFS within 90 work days of the completion of annual marine mammal monitoring. The report must detail the monitoring protocol and summarize the data recorded during monitoring. If no comments are received from NMFS within 30 days, the draft report will constitute the final report. If comments are received, a final report addressing NMFS comments must be submitted within 30 days after receipt of comments. Specifically, the report must include:

(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 removed and by what method (*i.e.*, impact or vibratory);

(3) 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, estimated observable distance (if less than the harassment zone distance), and percentages of Level A and Level B harassment zones that are not visible;

(4) The number of marine mammals observed, by species, relative to the pile location and if pile driving or removal was occurring at time of sighting;

(5) Age and sex class, if possible, of all marine mammals observed;

(6) PSO locations during marine mammal monitoring;

(7) Distances and bearings of each marine mammal observed to the pile being driven or removed for each sighting (if pile driving or removal was occurring at time of sighting);

(8) Description of any marine mammal behavior patterns during observation, including direction of travel and estimated time spent within the Level A and Level B harassment zones while the source was active;

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

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

(11) Description of attempts to distinguish between the number of individual animals taken and the number of incidences of take, such as ability to track groups or individuals;

(g) In the event that personnel involved in the construction activities discover an injured or dead marine mammal, HRCP shall report the incident to the Office of Protected Resources (OPR) (301-427-8401), NMFS and to the Greater Atlantic Region New England/Mid-Atlantic Regional Stranding Coordinator as soon as feasible. If the death or injury was clearly caused by the specified activity, HRCP must immediately cease the specified activities until NMFS 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 the authorization. HRCP must 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.

§ 217.216 Letters of Authorization.

(a) To incidentally take marine mammals pursuant to these regulations,

HRCP 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, HRCP 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, HRCP must apply for and obtain a modification of the LOA as described in § 217.217.

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

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

§ 217.217 Renewals and modifications of Letters of Authorization.

(a) An LOA issued under §§ 216.106 of this chapter and 217.216 for the activity identified in § 217.210(a) shall be renewed or modified upon request by the applicant, provided that:

(1) The planned 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) An LOA issued under §§ 216.106 of this chapter and 217.216 for the activity identified in § 217.210(a) may be modified by NMFS under the following circumstances:

(1) HRCP may modify (including augment) the existing mitigation, monitoring, or reporting measures (after consulting with NMFS 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 HRCP'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;

(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 217.216, a LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the **Federal Register** within thirty days of the action.

§ 217.218–§ 217.219 [Reserved]

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