DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 217

[Docket No. 240524–0146]

RIN 0648–BL96

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to the New England Wind Project, Offshore Massachusetts

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

ACTION: Final rule; notification of issuance of letter of authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA), as amended, NMFS hereby promulgates regulations to govern the incidental taking of marine mammals by Avangrid Renewables, LLC, (Avangrid), the parent company of the original applicant, Park City Wind, LLC (Park City Wind), during the construction of the New England Wind Project (the Project), an offshore wind energy project, developed in two phases, known as Park City Wind (phase 1) and Commonwealth Wind (phase 2), in Federal and State waters off of Massachusetts, specifically within the Bureau of Ocean Energy Management (BOEM) Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) Lease Areas (OCS–A 0534 and OCS–A 0561) and the southwest (SW) portion of Lease Area OCS–A 0501 (collectively referred to as the Lease Area), and along an export cable routes to sea-to-shore transition points (collectively, the Project Area), over the course of 5 years (March 27, 2025, through March 26, 2030). The proposed rule for this action concerned only Lease Areas OCS–A 0534 and the SW portion of Lease Area OCS–A 0501. However, after publication of the proposed rule, Lease Area OCS–A 0534 was segregated into two portions: OCS–A 0534 and OCS–A 0561. Phase 1 remained with Park City Wind (OCS–A 0534) while phase 2 (OCS–A 0561) was assigned to a sister company named Commonwealth Wind, LLC (subsidiary of Avangrid). As a result of this, Park City Wind requested that the Letter of Authorization (LOA), if issued, be issued to Avangrid, who would oversee the construction of the both phases of the Project by its two subsidiaries. These regulations, which allow for the issuance of a LOA for the incidental take of marine mammals during construction-related activities within the Project Area during the effective dates of the regulations, 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: This rule is effective from March 27, 2025, through March 26, 2030.

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

SUPPLEMENTARY INFORMATION:

Availability

A copy of the application and supporting documents, as well as a list of the references cited in this document, may be obtained online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.* In case of problems accessing these documents, please call the contact listed above (see **FOR FURTHER INFORMATION CONTACT**).

Purpose and Need for Regulatory Action

This final rule, as promulgated, provides a framework under the authority of the MMPA (16 U.S.C. 1361 *et seq.*) for NMFS to authorize the take of marine mammals incidental to construction of the Project within the Project Area. NMFS received a request from the applicant to incidentally take a small number of marine mammals from 39 species of marine mammals. After reviewing the request and making the required findings, NMFS could authorize the take, by harassment only, of 38 species, representing 38 stocks (19 species by Level A harassment and all 38 species by Level B harassment) incidental to the applicant's 5 years of construction activities. The applicant did not request and NMFS neither anticipates nor allows take by serious injury or mortality incidental to the specified activities in this final rulemaking.

Legal Authority for the Final Action

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, regulations are promulgated (when applicable), and public notice and an opportunity for public comment are provided.

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). If such findings are made, NMFS must prescribe the permissible methods of taking, ''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 as ''mitigation''); and requirements pertaining to the monitoring and reporting of such takings.

As noted above, the applicant did not request and NMFS neither anticipates nor would allow take by serious injury or mortality incidental to the specified activities in this final rulemaking. Relevant definitions of MMPA statutory and regulatory terms are included below:

- *Citizen*—individual U.S. citizens or any corporation or similar entity if it is organized under the laws of the United States or any governmental unit defined in 16 U.S.C. 1362(13) (50 CFR 216.103);
- *Take*—to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal (16 U.S.C. 1362);
- *Incidental Harassment, Incidental Taking and Incidental, but not Intentional, Taking*—an accidental taking. This does not mean that the taking is unexpected, but rather it includes those takings that are infrequent, unavoidable or accidental (50 CFR 216.103);
- *Serious Injury*—any injury that will likely result in mortality (50 CFR 216.3);
- *Level A harassment*—any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild (16 U.S.C. 1362; 50 CFR 216.3); and
- *Level B harassment*—any act of pursuit, torment, or annoyance which 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 (16 U.S.C. 1362).

Section 101(a)(5)(A) of the MMPA and the implementing regulations at 50 CFR part 216, subpart I, provide the legal basis for proposing and, if appropriate, issuing this rule containing 5-year regulations and associated LOA. This final rule also establishes required mitigation, monitoring, and reporting requirements for the in-water specified activities.

Summary of Major Provisions Within the Final Rule

The major provisions within this final rule include:

- Allowing NMFS to authorize, under a LOA, the take of small numbers of marine mammals by Level A harassment and/or Level B harassment (50 CFR 217.322) incidental to the Project and prohibiting take of such species or stocks in any manner not permitted (50 CFR 217.323) (*e.g.,* mortality or serious injury);
- Establishing a seasonal moratorium on impact pile driving and drilling during January 1 through April 30, annually, as well as avoiding impact pile driving and drilling in December in order to minimize impacts to North Atlantic right whales (*Eubalaena glacialis*). Impact pile driving and drilling must not be planned in December; however, it may then only occur if necessary to complete the Project within a given year and with prior approval by NMFS (*e.g.,* as a result of unforeseen circumstances such as unanticipated weather delays, unexpected technical difficulties). LOA Holder must notify NMFS in writing by September 1 of that year that pile driving or drilling cannot be avoided and circumstances are expected to necessitate pile driving or drilling in December;
- Establishing a seasonal moratorium on vibratory pile driving (*i.e.,* vibratory setting of piles) during December 1 through May 31, annually, to minimize impacts to North Atlantic right whales (*Eubalaena glacialis*);
- Establishing a seasonal moratorium on the detonation of unexploded ordnance or munitions and explosives of concern (UXO/MEC) from December 1 through May 31, annually. UXO/MEC detonation must not be planned for December or May in order to minimize impacts to North Atlantic right whales (*Eubalaena glacialis*); however, UXO/MEC detonation may occur in December or May with NMFS' approval on a case-by-case basis only.
- Requirements for UXO/MEC detonations to only occur if all other means of removal are impracticable (*i.e.,* As Low As Reasonably Practicable (ALARP) risk mitigation procedure)), conducting UXO/MEC detonations during daylight hours only, and limiting detonations to one per 24 hour period;
- Conducting both visual and passive acoustic monitoring (PAM) by trained, NMFS-approved Protected Species Observers (PSOs) and PAM operators before, during, and after select in-water construction activities;
- Establishing clearance and shutdown zones for all in-water construction activities to prevent or reduce the risk of Level A harassment and to minimize the risk of Level B harassment, including a delay or shutdown of foundation impact pile driving and delay to UXO/MEC detonation if a North Atlantic right whale is observed at any distance by PSOs or acoustically detected within certain distances;
- Establishing minimum visibility and PAM monitoring zones during foundation installation activities (*i.e.,* impact pile driving, vibratory pile driving, and drilling);
- Requiring use of at least two noise attenuation devices during all foundation installation activities and UXO/MEC detonations to reduce noise levels to those modeled assuming a broadband 10 decibel (dB) attenuation;
- Requiring sound field verification (SFV) requirements during foundation installation and UXO/MEC detonations to measure in situ noise levels for comparison against the modeled results.
- Requiring SFV during the operational phase of the Project;
- Requiring soft-start during impact pile driving and ramp-up during the use of high-resolution geophysical (HRG) marine site characterization survey equipment;
- Requiring various vessel strike avoidance measures;
- Requiring various measures during fisheries monitoring surveys, such as removing gear from the water if marine mammals are considered at-risk or are interacting with gear;
- Requiring regular and situational reporting including, but not limited to, information regarding activities occurring, marine mammal observations and acoustic detections, and sound field verification monitoring results; and
- Requiring monitoring of the North Atlantic right whale sighting networks, Channel 16, and PAM data, as well as reporting any sightings to the NMFS or sighting network.

Through adaptive management, as described in the provisions established in these regulations, NMFS Office of Protected Resources may modify (*e.g.,* delete, revise, or add to) the existing mitigation, monitoring, or reporting measures summarized above and required by the LOA.

NMFS must withdraw or suspend an LOA issued under these regulations, after notice and opportunity for public comment, if it finds the methods of taking or the mitigation, monitoring, or reporting measures are not being substantially complied with or the authorized take is having, or may have, more than a negligible impact on the concerned species or stock (16 U.S.C. 1371(a)(5)(B); 50 CFR 216.106(e)). Additionally, failure to comply with the requirements of the LOA may result in civil monetary penalties and knowing violations may result in criminal penalties (16 U.S.C. 1375; 50 CFR 216.106(g)).

Fixing America's Surface Transportation Act (FAST–41)

This project is covered under title 41 of the Fixing America's Surface Transportation Act, or ''FAST–41.'' FAST–41 includes a suite of provisions designed to expedite the environmental review for covered infrastructure projects, including enhanced interagency coordination as well as milestone tracking on the public-facing Permitting Dashboard. FAST–41 also places a 2-year limitations period on any judicial claim that challenges the validity of a Federal agency decision to issue or deny an authorization for a FAST–41 covered project (42 U.S.C. 4370m–6(a)(1)(A)).

The Project is listed on the Permitting Dashboard, where milestones and schedules related to the environmental review and permitting for the Project can be found at *https://www.permits.performance.gov/permitting-project/new-england-wind.*

Summary of Request

On December 1, 2021, the original applicant, Park City Wind, a limited liability company registered in the State of Delaware and wholly owned subsidiary of Avangrid submitted a request for the promulgation of regulations and issuance of an associated 5-year LOA to take, by harassment only, marine mammals incidental to construction activities associated with implementation of the New England Wind Project (hereafter ''Project'') offshore of Massachusetts in the BOEM Lease Area OCS–A 0534 and the possible use of the SW portion of Lease Area OCS–A 0501. The request was for the incidental, but not intentional, taking of a small number of 39 marine mammal species by Level B harassment (for all species or stocks) and by Level A harassment (for 19 species or stocks). Park City Wind did

not request, and NMFS neither expects nor would allow under this rule, take by serious injury or mortality to occur for any marine mammal species or stock incidental to the specified activities.

In response to our questions and comments, and following extensive information exchange between Park City Wind and NMFS, the applicant submitted a final revised application on July 13, 2022. NMFS deemed it adequate and complete on July 20, 2022. This final application is available on NMFS' website at *https://www.fisheries.noaa.gov/protected-resource-regulations.*

On August 22, 2022, NMFS published a notice of receipt (NOR) of the adequate and complete application in the **Federal Register** (87 FR 51345), requesting public comments and information during a 30-day public comment period. During the NOR public comment period, NMFS received comment letters from one private citizen and one non-governmental organization (ALLCO Renewable Energy Limited). NMFS reviewed all submitted material and took the material into consideration during the drafting of the proposed rule.

In January 2023 and again in March 2023, Park City Wind submitted memos to NMFS detailing updates and changes to their ITA application (''Update Application''). These memos updated the density models using the 2022 Roberts *et al.* density models, project foundation installation and potential UXO/MEC detonation schedules, vibratory pile driving (*i.e.,* vibratory setting of piles) assessment, and mitigation of drilling activity. In addition, the applicant detailed development of their fisheries monitoring program and associated mitigation measures. In a May 2023 memo, Park City Wind submitted corrected take estimate amounts for foundation installation activities and total take requested across all activities. These updates were reflected in the proposed rule. These memos are available on the NMFS website at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-park-city-wind-llc-construction-new-england-wind-offshore-wind.*

On June 8, 2023, NMFS published a proposed rule for the Project in the **Federal Register** (88 FR 37606). In the proposed rule, NMFS synthesized all of the information provided by the applicant, all best available scientific information and literature relevant to the proposed project, made preliminary small numbers and negligible impact determinations, and outlined, in detail, proposed mitigation designed to effect the least practicable adverse impacts on marine mammal species and stocks, as well as proposed monitoring and reporting measures. The public comment period on the proposed rule was open for 30 days from June 8, 2023 through July 10, 2023. A summary of public comments received during this 30-day period are described in the Comments and Responses section. The public comments are available to be viewed on the Federal e-Rulemaking Portal at *https://www.regulations.gov.*

In January 2024, Park City Wind submitted a final draft of the new modeling and associated acoustic ranges, exposure estimates, and take estimates. Within these memos, the applicant revised the model(s) used and model assumptions for foundation installation activities and updated the acoustic ranges, exposure ranges, exposure estimates, take estimates, and amount of requested take as a result. The model changes are detailed in the *Modeling and Take Estimates* section in this final rule. NMFS accepted the updated modeling and has reflected the changes to the distance to thresholds, exposure estimates, and take estimates within the final rule. A description of these changes can be found below in the *Modeling and Take Estimates* section. This January 2024 Application Update is on NMFS website at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-park-city-wind-llc-construction-new-england-wind-offshore-wind.*

On May 6, 2024, Park City Wind notified NMFS that it had requested that BOEM segregate a portion of lease area OCS–A–0534, which would then be assigned to another subsidiary of Avangrid, Commonwealth Wind, LLC, as lease area OCS–A 0561. Park City Wind requested to NMFS that the incidental take regulation (ITR) governing take of marine mammals incidental to activities associated with both phases of the Project and the associated LOA (if issued by NMFS) be issued to Park City Wind's parent company, Avangrid, a limited liability company registered in the State of Oregon, who would oversee phase 1 (constructed and operated by Park City Wind) and phase 2 (constructed and operated by Commonwealth Wind) of the New England Wind Project. The lease segregation, completed by BOEM on May 15, 2024, did not alter the geographic location or size of the area in which the project would be built, nor did the applicant request any changes to the construction schedule, planned activities, or take. In short, no substantive changes to the Project were requested. As a result, where appropriate, Avangrid, owner of Park City Wind, has henceforth been incorporated as the applicant or LOA Holder throughout this final rule.

NMFS previously issued one Incidental Harassment Authorization (IHA) to Park City Wind for the taking of small numbers of marine mammals incidental to marine site characterization surveys, using HRG of the Project's phase 1 (Park City Wind) in the BOEM Lease Area OCS–A 0534 (87 FR 44087, July 7, 2022); phase 2 was not part of this authorization (Commonwealth Wind). However, no work occurred under this initial IHA and Park City Wind requested a reissuance of the IHA with new effective dates. NMFS reissued the IHA (88 FR 88892, December 26, 2023) with the new effective dates of March 1, 2024, through February 28, 2025. NMFS has also previously issued an IHA to Avangrid, owner of Park City Wind, LLC, to take small numbers of marine mammals incidental to HRG surveys in BOEM Lease Area (OCS–A 0508) off the coasts of North Carolina and Virginia (84 FR 31032, June 28, 2019). To date, Park City Wind and Avangrid have complied with all IHA requirements (*e.g.,* mitigation, monitoring, and reporting). Applicable monitoring results may be found in the Estimated Take of Marine Mammals section. If available, the full monitoring reports can be found on NMFS' website at *https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.*

On August 1, 2022, NMFS announced proposed changes to the existing North Atlantic right whale vessel speed regulations (87 FR 46921, August 1, 2022) to further reduce the likelihood of mortalities and serious injuries to endangered right whales from vessel collisions, which are a leading cause of the species' decline and a primary factor in an ongoing Unusual Mortality Event (UME). Should a final vessel speed rule be issued and become effective during the effective period of this ITR—or any other MMPA incidental take authorization (ITA)—the authorization holder will be required to comply with any and all applicable requirements contained within the final rule. Specifically, where measures in any final vessel speed rule are more protective or restrictive than those in this or any other MMPA authorization, authorization holders will be required to comply with the requirements of the rule. Alternatively, where measures in this or any other MMPA authorization are more restrictive or protective than those in any final vessel speed rule, the measures in the MMPA authorization

will remain in place. The responsibility to comply with the applicable requirements of any vessel speed rule will become effective immediately upon the effective date of any final vessel speed rule and, when notice is published on the effective date, NMFS will also notify Avangrid if the measures in the speed rule were to supersede any of the measures in the MMPA authorization such that they were no longer required.

Description of the Specified Activity

Overview

Avangrid plans to construct and operate two offshore wind projects within OCS–A 0534 and OCS–A 0561: Park City Wind (phase 1, 0534) and Commonwealth Wind (phase 2, 0561) (collectively called New England Wind; hereinafter referred to as ''Project''). The Project will occupy all of Lease Area OCS–A 0534, OCS–A 0561, and potentially a portion of Lease Area OCS–A 0501 in the event that Vineyard Wind 1 does not develop spare or extra positions included in Lease Area OCS–A 0501. If Vineyard Wind 1 does not develop spare or extra positions in Lease Area OCS–A 0501, those positions would be assigned to Lease Area OCS–A 0534.

The Project will consist of several different types of permanent offshore infrastructure, including wind turbine generators (WTGs) and associated foundations, electrical service platforms (ESPs) and their foundations, inter-array cables, offshore export cables, and scour protection. Specifically, activities to construct the Project include the installation of 41–62 WTGs and 1–2 ESPs in phase 1 by impact and vibratory pile driving and, in the event of an obstruction, drilling. Phase 2 depends upon the final footprint of phase 1. Phase 2 is expected to include the installation of 64–88 WTGs and 1–3 ESP positions by impact and vibratory pile driving and, in the event of an obstruction, drilling. In total, up to 129 WTGs and 2–5 ESPs may be constructed at a maximum of 130 positions (2 positions may potentially have co-located ESPs (*i.e.,* two foundations installed at one grid position), resulting in 132 foundations). Additional activities will include cable installation, site preparation activities (*e.g.,* dredging), HRG surveys, the potential detonations of up to 10 UXO/MEC, and conducting several types of fishery and ecological monitoring surveys. Multiple vessels will transit within the Project Area and between ports and the wind farm to perform the work and transport crew, supplies, and materials. All offshore cables will connect to onshore export cables, substations, and grid connections in Barnstable County, Massachusetts. Marine mammals exposed to elevated noise levels during pile driving, drilling, UXO/MEC detonations, or site characterization surveys may be taken by Level A harassment and/or Level B harassment, depending on the specified activity. A detailed description of the construction project is provided in the proposed rule as published in the **Federal Register** (88 FR 37606, June 8, 2023).

Dates and Duration

Avangrid anticipates activities resulting in harassment to marine mammals occurring throughout all 5 years of the final rule (table 1). Offshore Project activities are expected to begin in March 2025, after issuance of the 5-year LOA, and continue through March 2030. Avangrid anticipates the following construction schedule over the 5-year period. Avangrid has noted that these are the best and conservative estimates for activity durations, but that the schedule may shift due to weather, mechanical, or other related delays. Additional information on dates and activity-specific durations can be found in the proposed rule and are not repeated here.

TABLE 1—ACTIVITY SCHEDULE TO CONSTRUCT AND OPERATE THE PROJECT

Project activity	Expected timing	Expected duration
HRG Surveys	Q1 2025–Q4 2029	Any time of the year, up to 25 days per year.
Scour Protection Pre- or Post-Installation	Q1 2025–Q4 2029	Any time of the year.
WTG and ESP Foundation Installation, Schedule A	Q2–Q4 2026 and 2027 [1]	Up to 8 months per year.
WTG and ESP Foundation Installation, Schedule B	Q2–Q4 2026, 2027, and 2028 [1]	Up to 8 months per year.
Horizontal Directional Drilling at Cable Landfall Sites.	Q4 2025–Q2 2026	Up to 150 days.
UXO/MEC Detonations	Q2–Q4 2025 and 2026	Up to 6 days in 2025 and 4 days in 2026. No more than 10 days total.
Inter-array Cable Installation	Q3–Q4 2026 and Q2 2027–Q2 2028	Phase 1: 5 months; Phase 2: 10 months.
Export Cable Installation and Termination	Q2 2026–Q2 2028	Phase 1: 8–9 months; Phase 2: 13–17 months.
Fishery Monitoring Surveys	Q1 2025–Q4 2029	Any time of year.
Turbine Operation	Initial turbines operational 2027, all turbines operational by 2028.	

Note: Project activities are anticipated to start no earlier than Q1 2025. Q1 = January through March; Q2 = April through June; Q3 = July through September; Q4 = October through December. The Project is divided into two phases: Park City Wind (phase 1) and Commonwealth Wind (phase 2).

[1] Foundation installation pile driving and drilling would be limited to May 1–December 31, annually; however, impact pile driving and drilling in December will not be planned but may occur due to unforeseen circumstances (*e.g.,* unanticipated extended weather delays, unexpected technical difficulties) and with NMFS approval. Vibratory pile driving (*e.g.,* vibratory setting of piles) must not occur December 1–May 31, annually.

Specified Geographical Region

A detailed description of the Specified Geographical Region, identified as the Mid-Atlantic Bight, is provided in the proposed rule (88 FR 37606, June 8, 2023). Since the proposed rule was published, no changes have been made to the Specified Geographical Region. This final rule provides clarity on the boundaries of the Mid-Atlantic Bight, which spans from Cape Hatteras, North Carolina to Cape Cod, Massachusetts and extends into the western Atlantic to the 100-m isobath. All of Avangrid's specified activities (*i.e.,* pile driving and drilling of WTG and ESP foundations; number of possible UXO/MEC detonations (n=10); placement of scour protection; trenching, laying, and burial activities associated with the installation of the export cable route and inter-array cables; HRG site characterization surveys; and WTG operation) are concentrated in the Lease Area and cable corridor offshore Massachusetts. Avangrid would also concentrate vessel use within this area;

however, some limited vessel movement may occur outside this area.

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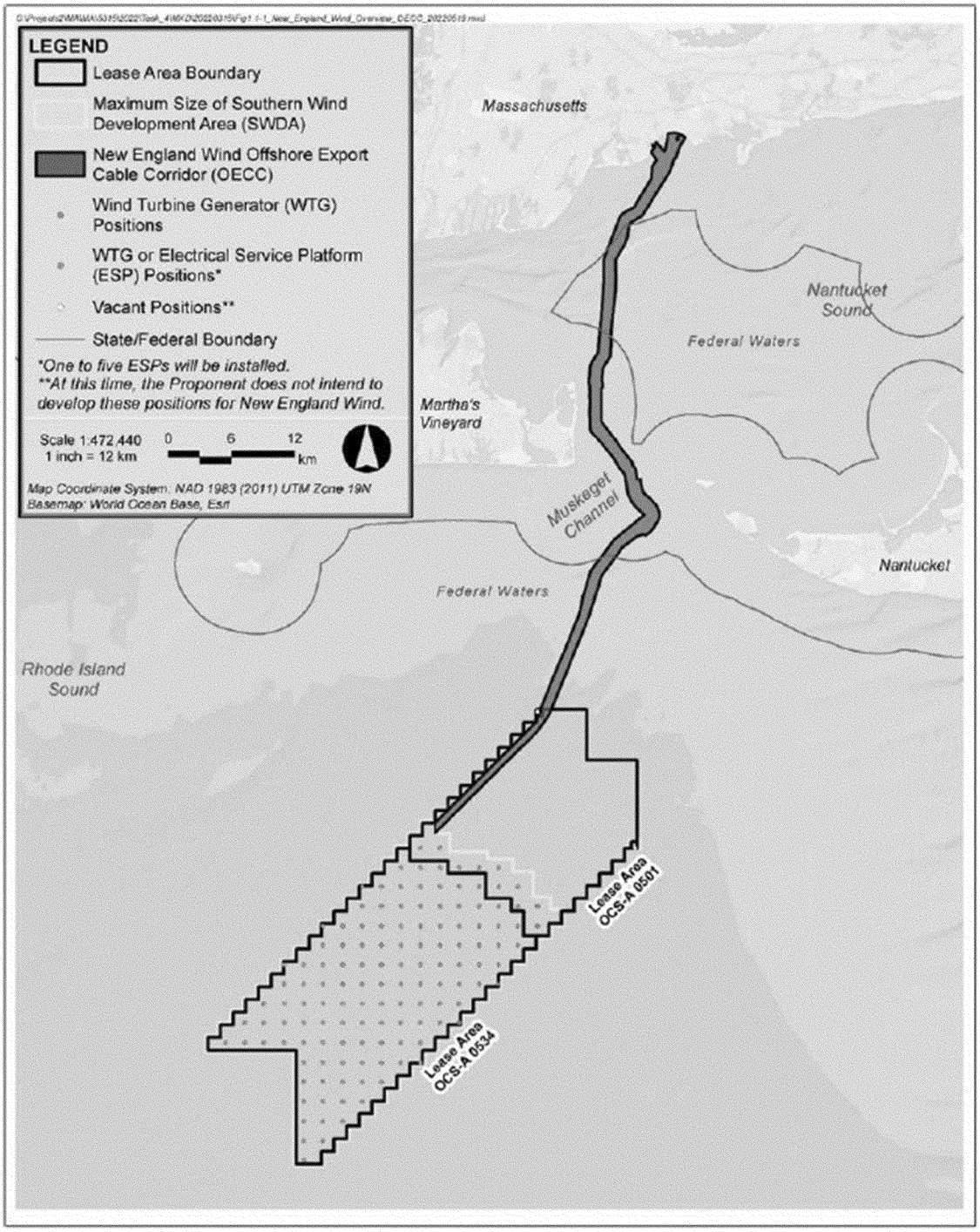

Figure 1 – Lease Area and Cable Corridor

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Comments and Responses

NMFS published a proposed rule in the **Federal Register** on June 8, 2023 (88 FR 37606) for a 30-day public comment period. The proposed rule described, in detail, the specified activities, the specified geographical region of the specified activities, the marine mammal species that may be affected by these activities, and the anticipated effects on marine mammals. In the proposed rule, we requested that interested persons submit relevant information, suggestions, and comments on Park City Wind's (now Avangrid's) request for the promulgation of regulations and issuance of an associated LOA described therein, our estimated take analyses, the

preliminary determinations, and the proposed regulations.

NMFS received 41 comment submissions, including comments from the Marine Mammal Commission (Commission), several non-governmental organizations, and private citizens, all of which are available for review on *https://www.regulations.gov.* Some of these comments were out-of-scope or not applicable to the Project (*e.g.,* general opposition to or support of offshore wind projects, concerns for other species outside NMFS' jurisdiction) and are not described herein or discussed further. Non-governmental organizations included: Long Island Commercial Fishing Association, Responsible Offshore Development Alliance, and Green Oceans. These letters, and the Commission's, contained substantive information that NMFS considered in this final rule, including comments related to the estimated take analysis, final determinations, and final mitigation, monitoring, and reporting requirements. A summary of comments are described below, along with NMFS' responses.

Modeling and Take Estimates

Comment 1: The Commission has stated that, due to uncertainty in how NMFS will be addressing their previously submitted comments for other final offshore wind rulemakings, they are not providing ''an exhaustive letter regarding similar issues'' for the proposed action. They have stated that, in lieu of this, they incorporate by reference all previously submitted comment letters for past proposed rules (*i.e.,* Empire Wind, Dominion Energy Virginia, Sunrise Wind, Revolution Wind, Ocean Wind 1, South Fork Wind) and that NMFS should specifically review these previously submitted letters (*e.g.,* Sunrise Wind (88 FR 8996, February 10, 2023), Revolution Wind (87 FR 79072, December 23, 2022), and Ocean Wind 1 (87 FR 64868, October 26, 2022) and incorporate, where applicable, relevant information in the context of the Project. They specifically noted that these general concerns could include ''underestimated numbers of Level A and B harassment takes (including failing to round up to group size), incomplete SFV measurement requirements, insufficient mitigation and monitoring measures, errors and omissions in the preamble to and the proposed rule, and the general issue of quality control and quality assurance in NMFS's preparation of proposed incidental take authorizations.''

Response: NMFS acknowledges the receipt of a comment letter on the proposed Project by the Commission, as well as receipt of comment letters from the Commission for the other referenced proposed projects. We appreciate that, in the past, the Commission has provided very specific and detailed comments and suggestions on NMFS' actions, as a collaborative effort to improve both the ITAs themselves as well as the conservation benefits for NMFS' trust species. Because the Commission did not provide specific comments on the proposed rule for the Project, we cannot address any specific concerns. However, we can address general themes of concern raised in previous letters, and, inasmuch as another specific comment is applicable here, we refer the Commission back to our previous responses.

Overall, the Commission's letters raised concerns over concern underestimated Level A and B harassment zones and numbers of takes, incomplete SFV measurement requirements, insufficient mitigation and monitoring measures, errors and omissions in the proposed rule and its preamble, and the general issue of quality control and quality assurance in NMFS's preparation of proposed ITAs. With respect to mitigation, monitoring and reporting requirements, we have thoroughly addressed the Commission's previous concerns and have updated final rules, including this one, accordingly. Lastly, any ''omissions'' and ''general issues of quality control and quality assurance'' from one action are less likely to be present in another action as updates are carried through across actions (although NMFS does not agree that every example previously raised by the Commission was, in fact, an error).

Comment 2: Commenters recommend NMFS re-estimate and authorize Level A harassment takes based on modeling results for the worst-case scenario rather than presuming an arbitrary 80- or 100-percent reduction for mitigation efficacy and/or a 10-dB sound attenuation for impact pile driving, re-estimate and authorize Level B harassment takes based on more conservative assumptions for the pile-driving scenarios that could occur (including only one monopile or fewer than four pin piles installed per day), re-estimate the various mortality, Level A harassment, and Level B harassment zones and numbers of takes based on 0 dB of sound attenuation for UXO/MEC detonations and authorize Level A and B harassment takes, including behavior takes, that could result from UXO/MEC detonations, and increase any Level A or B harassment takes to mean group size (including updates that reflect the results of more recent marine mammal surveys in the Rhode Island-Massachusetts WEA). Other commenters had similar comments. Commenter(s) also suggested that the numbers of takes, particularly with respect to the North Atlantic right whale, rely on mitigation methods that remain unproven.

Response: NMFS disagrees that our analysis should carry forward take estimates based on the worst-case scenario that assumes no reduction of impacts results from the mitigation and notes that the commenter did not present any data supporting their recommendation. As described in the proposed rule, this final rule reasonably assumes that the mitigation efforts will be effective at reducing the potential for Level A harassment calculated in the density-based models. The models do not account for mitigation (except with respect to assuming attenuation and seasonal restrictions) and, therefore, it is reasonable to assume the model overestimates Level A harassment. Further, while the scientific literature documents marine mammals are likely to avoid loud noises such as pile driving (*e.g.,* Brandt *et al.,* 2016, Nowack *et al.,* 2004), avoidance was not quantitatively considered in the take estimates (although NMFS reasonably predicts this natural behavior will further reduce the potential for Level A harassment).

In the proposed rule, NMFS described the best available science, which supports the assumption that at least 10 dB of attenuation can be reliably achieved using noise attenuation systems such as a double bubble curtain. The commenter did not provide reason for why they believe this was an overestimate nor did they suggest an alternative amount of attenuation NMFS should consider other than zero attenuation. Other commenters expressed similar support stating that bubble curtains are not effective for low-frequency cetaceans. NMFS agrees that attenuation levels vary by frequency band and that bubble curtains attenuate higher frequency sounds more effectively; however, NMFS disagrees that lower frequency bands, which are important to consider when evaluating impacts, are not attenuated at all. The data from Bellmann (2021), shows that for both single and double bubble curtains, more than 10 dB of attenuation was achieved for bands as low as 32 Hz. And while it is true that performance diminishes significantly at lower frequencies (<32 Hz), those bands also contain significantly less pile driving sound and is 16+ dB outside the most susceptible frequency range for low-frequency cetaceans.

NMFS recognizes that the key to effective mitigation is the ability to detect marine mammals to trigger such mitigation. Avangrid is required to undertake extensive monitoring to maximize marine mammal detection effectiveness. The reduction to the density-based take estimate appropriately reflects and acknowledges the monitoring efforts, including the placement of three PSOs on the pile driving platform and dedicated PSOs vessel(s) and PAM.

NMFS agrees that there is potential for behavioral disturbance from a single detonation per day and disagrees that ''behavior takes'' were omitted and have not been accounted for. However, the behavioral threshold for underwater detonations identified by the Commission (5 dB less than the temporary threshold shift (TTS) is only applicable to multiple detonations per day. NMFS is not aware of evidence to support the assertion that animals will have behavioral responses that would qualify as take to temporally and spatially isolated explosions at received levels below the TTS threshold. Accordingly, the current take estimate framework allows for the consideration of behavioral disturbance resulting from single explosions specifically if they are exposed above the TTS threshold, as opposed to the 5-dB lower threshold for behavioral disturbance from multiple detonations. We acknowledge in our analysis that individuals exposed above the TTS threshold may also be harassed by direct behavioral, disruption and those potential impacts are considered in the negligible impact determination. The distances to harassment thresholds have not changed from the application and proposed rule and are presented in this final rule. Take estimates did not change as a result of including this additional information.

Comment 3: Commenter(s) claimed that NMFS thresholds are outdated, primarily because scientific literature demonstrates examples where behavioral disturbances have been documented where received levels are lower than 160 dB. Moreover, the commenter suggested that estimating the extent of Level B take from impact driving using the 160dB (impulsive) threshold is flawed because an animal may be exposed to several hours of pile driving per day which should be considered continuous and that, although impulsive at the source, the sound from impact driving may be received as a continuous source at a distance. Commenter(s) stated that vessel noise is not included in the effects and that it should be included in calculations for harassment zones (as a continuous noise source) and as a source of take. For these reasons, commenter(s) suggested the proposed rule underestimates the takes by Level B harassment and ''zones of impact''; thus NMFS' small numbers and negligible impact determination is flawed.

Response: For the reasons described below, NMFS disagrees that the 160-dB threshold for behavioral harassment is not supported by the best available science and that the small numbers and negligible impact determinations are flawed based on the use of this threshold in the take estimate analysis. The potential for behavioral response to an anthropogenic source can be highly variable and context-specific (Ellison *et al.,* 2012). While NMFS acknowledges the potential for Level B harassment at exposures to received levels below 160 dB rms, it should also be acknowledged that not every animal exposed to received levels above 160 dB rms will respond in ways constituting behavioral harassment. There are a variety of studies indicating that contextual variables play a very important role in response to anthropogenic noise, and the severity of effects are not necessarily linear when compared to a received level (RL). Several studies (*e.g.,* Nowacek *et al.,* 2004 and Kastelein *et al.,* 2012 and 2015) showed there were behavioral responses to sources below the 160 dB threshold but also acknowledged the importance of context in these responses. For example, Nowacek *et al.* (2004) reported the behavior of five out of six North Atlantic right whales was disrupted at RLs of only 133–148 dB re 1 μPa (returning to normal behavior within minutes) when exposed to an alert signal. However, the authors also reported that none of the whales responded to noise from transiting vessels or playbacks of ship noise even though the RLs were at least as loud and contained similar frequencies to those of the alert signal. The authors state that a possible explanation for whales responding to the alert signal and not responding to vessel noise is due to the whales having been habituated to vessel noise while the alert signal was a novel sound. In addition, the authors noted differences between the characteristics of the vessel noise and alert signal, which may also have played a part in the differences in responses to the two noise types. Therefore, it was concluded that the signal itself, as opposed to the RL, was responsible for the response. DeRuiter *et al.* (2012) also indicate that variability of responses to acoustic stimuli depends not only on the species receiving the sound and the sound source, but also on the social, behavioral, or environmental contexts of exposure. Finally, behavioral responses depend on many contextual factors, including range to source, RL above background noise, novelty of the signal, and differences in behavioral state (Ellison *et al.,* 2012, Gong *et al.,* 2014). Similarly, Kastelein *et al.* (2015) examined behavioral responses of a harbor porpoise to sonar signals in a quiet pool but stated behavioral responses of harbor porpoises at sea would vary with context such as social situation, sound propagation, and background noise levels.

NMFS uses 160 dB (rms) as the received sound pressure level for estimating the onset of Level B behavioral harassment takes for impulsive/intermittent sound sources, and this is currently considered the best available science while acknowledging that the 160 dB_{rms} step-function approach is a simplistic approach. While it may be true because of reverberation that impulsive pile driving strikes may ''stretch'' as their sound travels through the environment, we do not classify these sounds as continuous, like drilling and vibratory pile driving. NMFS' behavioral harassment thresholds consider instantaneous exposure to noise and are based on a received level. These thresholds do not account for duration of exposure, as our PTS onset thresholds do. Thus, whether an individual was exposed to a few pile driving strikes or exposed for several hours of pile driving, the 160-dB threshold would still apply. While it is correct that in practice it works as a step-function (*i.e.,* animals exposed to received levels above the threshold are considered to be ''taken'' and those exposed to levels below the threshold are not), it is in fact intended as a sort of mid-point of likely behavioral responses, which are extremely complex depending on many factors including species, noise source, individual experience, and behavioral context. What this means is that, conceptually, the function recognizes that some animals exposed to levels below the threshold will in fact react in ways that appropriately considered take while others that are exposed to levels above the threshold will not. Use of the 160-dB threshold allows for a simplistic quantitative estimate of take while we can qualitatively address the variation in responses across different received levels in our discussion and analysis.

Overall, we reiterate the lack of scientific consensus regarding what criteria might be more appropriate. Defining sound levels that disrupt behavioral patterns is difficult because

responses depend on the context in which the animal receives the sound, including an animal's behavioral mode when it hears sounds (*e.g.,* feeding, resting, or migrating), prior experience, and biological factors (*e.g.,* age and sex). Other contextual factors, such as signal characteristics, distance from the source, and signal to noise ratio, may also help determine response to a given received level of sound. Therefore, levels at which responses occur are not necessarily consistent and can be difficult to predict (Southall *et al.,* 2007; Ellison *et al.,* 2012; Southall *et al.,* 2021). For example, Gomez *et al.* (2016) reported that RL was not an appropriate indicator of behavioral response. Further, the seminal reviews presented by Southall *et al.* (2007), Gomez *et al.* (2016), and Southall *et al.* (2021) did not suggest any specific new criteria due to lack of convergence in the data. Undertaking a process to derive defensible exposure-response relationships, as suggested by Tyack and Thomas (2019), is complex. The recent systematic review by Gomez *et al.* (2016) was unable to derive criteria expressing these types of exposure-response relationships based on currently available data.

NMFS acknowledges that there may be methods of assessing likely behavioral responses to acoustic stimuli that better capture the variation and context-dependency of those responses than the simple 160 dB step-function used here; there is no agreement on what that method should be or how more complicated methods may be implemented by applicants. NMFS is committed to continuing its work in developing updated guidance with regard to acoustic thresholds but pending additional consideration and process, is reliant upon an established threshold that is reasonably reflective of best available science.

NMFS disagrees that vessel noise would result in take and, therefore, be necessary to include in the take calculations in this final rule. Vessels produce low-frequency noise, primarily through propeller cavitation, with main energy in the 5–300 hertz (Hz) frequency range. Source levels range from about 140 to 195 decibels (dB) referenced to 1 (re 1) μPa (micropascal) at 1 m (National Research Council (NRC), 2003; Hildebrand, 2009), depending on factors such as vessel type, load, and speed, and vessel hull and propeller design. Studies of vessel noise show that it appears to increase background noise levels in the 71–224 Hz range by 10–13 dB (Hatch *et al.,* 2012; McKenna *et al.,* 2012; Rolland *et al.,* 2012). As discussed in the Negligible Impact Analysis and Determination section (specifically the *Auditory Masking or Communication Impairment* section) of both the proposed and final rule, the level of masking that could occur from the specified activities will have a negligible impact on marine mammals, including North Atlantic right whales. Inherent in the concept of masking is the fact that the potential for the effect is only present during the times that the animal and the sound source are in close enough proximity for the effect to occur. In addition, this time period would need to coincide with a time that the animal was utilizing sounds at the masked frequency). As our analysis (both quantitative and qualitative components) indicates, because of the relative movement of whales and vessels, as well as the stationary nature of a majority of the activities, we do not expect these exposures with the potential for masking to be of a long duration within a given day. Further, because of the relatively low density of North Atlantic right whales during months when most of project activities would be occurring (*i.e.,* May through November in most cases), and the relatively large area over which the vessels will travel and where the activities will occur, we do not expect any individual North Atlantic right whales to be exposed to potentially masking levels from these surveys for more than a few days in a year. Furthermore, as many of the activities are occurring in clusters and specific areas rather than sporadically dispersed in the Project Area (*i.e.,* foundation installation all occurs in the same general area, nearshore cable installation activities occur in relatively similar and nearby areas), animals are likely to temporarily avoid these locations during periods where activities are occurring but are expected to return once activities have ceased.

As noted above, any masking effects of the project's activities are expected to be limited in duration, if present. For HRG surveys, given the likelihood of significantly reduced received levels beyond short distances from the transiting survey vessel, the short duration of potential exposure, the lower likelihood of extensive additional contributors to background noise offshore and within these short exposure periods, and the fact that the frequency of HRG signals are primarily above those used in social communication or for detection of other important clues, we believe that the incremental addition of the survey vessel is unlikely to result in more than minor and short-term masking effects. For pile driving and drilling, and especially foundation installation, masking effects are more likely given the larger zones and longer durations, and animals that approach the source could experience temporary masking of some lower frequency cues. However, any such effects would be localized to the areas around these stationary activities, which means that whales transiting through the area could adjust their transit away from the construction location and return once the activity has completed. As described in the ''Potential Effects of the Activities on Marine Mammals'' section of the proposed rule, NMFS acknowledges the noise contributions of vessels to the soundscape and the potential for larger vessels such as commercial shipping vessels, especially, to mask mysticete communication. For the activity as a whole, including the operation of supporting vessels for Avangrid's activities, any masking that might potentially occur would likely be incurred by the same animals predicted to be exposed above the behavioral harassment threshold, and thereby accounted for in the analysis. NMFS notes that the commenter did not provide additional scientific information for NMFS to consider to support its concern.

Comment 4: Commenter(s) recommended that NMFS should consider the best available data regarding North Atlantic right whale abundance in the project area, as well as the most comprehensive models for estimating marine mammal take and developing robust mitigation measures.

Response: The MMPA and its implementing regulations require that ITRs be established based on the best scientific evidence available. NMFS generally considers the information in the most recent U.S. Atlantic and Gulf of Mexico Marine Mammal Stock Assessments Report (SAR; Hayes *et al.,* 2023) to be the best scientific evidence available for a particular marine mammal stock because of the MMPA's rigorous SAR procedural requirements, which includes peer review by a statutorily established Scientific Review Group. Since publication of the proposed rule, NMFS has released the draft 2023 Stock Assessment Report indicating the North Atlantic right whale population abundance is estimated as 340 individuals based on sighting data through December 31, 2021 (89 FR 5495, January 29, 2024). NMFS has used the best scientific evidence available in the analysis of this final rule. This new stock abundance estimate, which is based on the analysis from Pace *et al.* (2017) and subsequent

refinements found in Pace (2021), provides the best scientific evidence available, and in this case, the most recent estimate, including improvements to NMFS's right whale abundance model. NMFS notes this estimate aligns with the 2022 North Atlantic Right Whale Report Card (Pettis *et al.,* 2022) estimate (also 340) based on sighting data through August 2022 but, as described above, the SARs are peer reviewed by other scientific review groups prior to being finalized and published and the Report Card is published independently by Consortium members without undertaking this peer review process. Based on this, NMFS has considered all relevant information regarding North Atlantic right whale, including the information cited by the commenters. However, NMFS has relied on the draft 2023 SAR in this final rule as it reflects the best scientific evidence available.

We further note that this change in abundance estimate does not change the estimated take of North Atlantic right whales or authorized take numbers, nor affect our ability to make the required findings under the MMPA for Avangrid's construction activities.

NMFS evaluates the models used by applicants to support take estimates to ensure that they are methodologically sound and incorporate the best science available. NMFS also requires use of the Roberts *et al.* (2016, 2023) density data and SARs abundance estimates for all species, both of which represent the best scientific evidence available regarding marine mammal occurrence.

Comment 5: Commenter(s) stated that Level A harassment in the form of a Permanent Threshold Shift (PTS) would result in deafness and lead to mortality. It was also asserted that Level B harassment in the form of a TTS is temporary deafness which could result in an increased risk of vessel strike. Lastly, that NMFS has refused to acknowledge the lack of available data on low frequency cetacean hearing or potential behavioral impacts from noise on low frequency cetacean species.

Response: Neither the proposed rule or this final rule allow mortality or serious injury of marine mammals to be authorized. The best scientific evidence available indicates that the anticipated impacts from the specified activities potentially include avoidance, cessation of foraging or communication, TTS and PTS, stress, masking, *etc.* (as described in the Effects of the Specified Activities on Marine Mammals and their Habitat section in the proposed rule). NMFS defines a threshold shift as a change, usually an increase, in the threshold of audibility at a specified frequency or portion of an individual's hearing range above a previously established reference level expressed in decibels (NMFS, 2018). Threshold shifts can be permanent (PTS), in which case there is an irreversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range or temporary, in which there is reversible increase in the threshold of audibility at a specified frequency or portion of an individual's hearing range and the animal's hearing threshold would fully recover over time (Southall *et al.,* 2019a). When PTS occurs, there can be physical damage to the sound receptors in the ear (*i.e.,* tissue damage) whereas TTS represents primarily tissue fatigue and is reversible (Henderson *et al.,* 2008). In addition, other investigators have suggested that TTS is within the normal bounds of physiological variability and tolerance and does not represent physical injury (*e.g.,* Ward, 1997; Southall *et al.,* 2019a). Therefore, NMFS does not consider TTS to constitute auditory injury or deafness as it is a temporary form of hearing impairment. Repeated sound exposure that leads to TTS could cause PTS. For this project, as stated in the proposed rule, no more than a small degree of PTS is expected to be associated with any of the incurred Level A harassment, given it is unlikely that animals would stay in the close vicinity of a source for a duration long enough to produce more than a small degree of PTS. PTS would consist of minor degradation of hearing capabilities occurring predominantly at frequencies one-half to one octave above the frequency of the energy produced by pile driving or instantaneous UXO/MEC detonation (*i.e.,* the low-frequency region below 2 kHz) (Cody and Johnstone, 1981; McFadden, 1986; Finneran, 2015), not severe hearing impairment. If hearing impairment occurs from either impact pile driving or UXO/MEC detonation, it is most likely that the affected animal would lose a few decibels in its hearing sensitivity, which in most cases is not likely to meaningfully affect its ability to forage and communicate with conspecifics.

As stated in the proposed rule, NMFS acknowledges that there is limited data on threshold shifts in marine mammals. Relationships between TTS and PTS thresholds have not been studied in marine mammals, and there is no PTS data for cetaceans. However, such relationships are assumed to be similar to those in humans and other terrestrial mammals. Noise exposure can result in either a permanent shift in hearing thresholds from baseline (PTS; a 40 dB threshold shift approximates a PTS onset; *e.g.,* Kryter *et al.,* 1966; Miller, 1974; Henderson *et al.,* 2008) or a temporary, recoverable shift in hearing that returns to baseline (a 6 dB threshold shift approximates a TTS onset; *e.g.,* Southall *et al.,* 2019). Based on data from terrestrial mammals, a precautionary assumption is that the PTS thresholds, expressed in the unweighted peak sound pressure level metric (PK), for impulsive sounds (such as impact pile driving pulses) are at least 6 dB higher than the TTS thresholds and the weighted PTS cumulative sound exposure level thresholds are 15 (impulsive sound) to 20 (non-impulsive sounds) dB higher than TTS cumulative sound exposure level thresholds (Southall *et al.,* 2019a). Given the higher level of sound or longer exposure duration necessary to cause PTS as compared with TTS, PTS is less likely to occur as a result of these activities, but it is possible and a small amount has been proposed for authorization for several species. For more detailed information on PTS and TTS, please see the Hearing Threshold Shift and Negligible Impact Determination sections of the proposed rule.

NMFS disagrees that the potential effects to species as a result of the project's specified activities would result in increased risk of vessel strikes. Please see our response to *Comment 8* for more details on the vessel strike avoidance requirements required by this final rule.

Comment 6: A commenter suggested that NMFS' low-frequency cetacean weighting function is inaccurate because it applies a 2-pole High-pass filter set at 200 Hz, while Southall *et al.* (2007) suggested moving the high-pass filter down to 7Hz. The commenter was also concerned that applying any weighting function underestimates the potential impacts on marine mammals because they claim applying a weighting function assumes that when hearing is less sensitive at the outer limits of the hearing range, the effects to the animal (potential for adverse impact) will be insignificant or non-existent unless inordinately loud. They also claimed that there is no empirical evidence that NMFS' weighting curve aligns with mysticetes infrasonic hearing. Further, they assert signal kurtosis was not accounted for in NMFS analysis and should be included in any predictive impact models. Commenter(s) also state that the spreading model is inadequate for modeling noise levels as it does not account for reflection off the water's surface or from other sources.

Response: The marine mammal weighting functions in NMFS' 2018 Revised Technical Guidance do not contain any filters. Furthermore, the Revised Technical Guidance provides generalized hearing ranges for marine mammal species, where the low-frequency cetacean lower bounds of the hearing range start at 7 kHz. These weighting functions are meant to reflect the hearing groups' susceptibility to noise-induced hearing loss and are based on audiogram data, as well as TTS data. Furthermore, for impulsive sources, there are peak sound pressure level criteria that are unweighted. Thus, impacts of noise on hearing will not be underestimated. For low-frequency cetaceans, since direct measurements of hearing ability are lacking, weighting functions are based on a multitude of information, including anatomical studies and modeling (Houser *et al.,* 2001; Parks *et al.,* 2007; Tubelli *et al.,* 2012; Cranford and Krysl 2015); vocalizations (see reviews in Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008); taxonomy; and behavioral responses to sound (Dahlheim and Ljungblad, 1990; see review in Reichmuth, 2007). Finally, kurtosis is an additional metric to determine if a sound is impulsive versus non-impulsive (*i.e.,* kurtosis is a measure of the ''peakedness'' of a noise waveform, with the impulsive components (Qiu *et al.,* 2020). As described in the proposed rule and NMFS' Technical Guidance (NMFS, 2018), NMFS applies different thresholds in an impact analysis for impulsive and non-impulsive sources. Impact pile driving is categorized as an impulsive sound. Thus, while kurtosis was not assessed directly, whether a sound is impulsive or non-impulsive is inherently considered in our analyses when assessing the potential for PTS (*i.e.,* deciding which acoustic thresholds are appropriate based on sound source characteristics that include a source's impulsiveness). Therefore, kurtosis (the impulsivity of a sound source) is accounted for in NMFS analysis.

Potential impacts to marine mammal nervous systems through exposure to sound were discussed in the proposed rule in the Potential Effects of Underwater Sound on Marine Mammals section. NMFS assumes that the reference to ''injury-causing'' SPL by the commenter is the potential for a permanent threshold shift (PTS).

NMFS disagrees that the spreading model is inadequate. The degree to which underwater sound propagates away from a sound source is dependent on a variety of factors, which notably includes the frequency and directivity of the source, water depth (or bathymetry), the reflective or absorptive nature of the seabed, and other factors. Spherical spreading occurs in a perfectly unobstructed (free-field) environment not limited by depth or water surface, resulting in a 6-dB reduction in sound level for each doubling of distance from the source (20 × log[range]). Spherical spreading can be thought of as a 'direct path' model, as all sound in the water column is assumed to have arrived via a direct path from the source. Cylindrical spreading occurs in an environment in which sound propagation is bounded by the water surface and sea bottom, resulting in a reduction of 3 dB in sound level for each doubling of distance from the source (10 × log[range]). Both cylindrical spreading and the often used 'practical spreading' model are multi-path models, in that they account for sound which may consist of both direct paths and paths consisting of reflections from the seabed and the sea surface.

As described in the proposed rule, the area of water ensonified at or above the RMS 160-dB threshold was calculated using a simple model of sound propagation loss, which accounts for the loss of sound energy over increasing range. Our use of the spherical spreading model, is a reasonable approximation over the relatively short ranges involved. Even in conditions where cylindrical spreading (where propagation loss = 10 × log [range]; such that there would be a 3-dB reduction in sound level for each doubling of distance from the source) may be appropriate (*e.g.,* non-homogenous conditions where sound may be trapped between the surface and bottom), this effect does not begin at the source. Rather, spreading is typically more or less spherical from the source out to some distance, and then may transition to cylindrical (Richardson *et al.,* 1995). Further, for these types of surveys, NMFS has determined that spherical spreading is a reasonable assumption even in relatively shallow waters, as the reflected energy from the seafloor will be much weaker than the more dominant, direct path energy. This is a result of the typically high-frequency and often downward directed nature of most HRG sources. Similar arguments, related to the validity of spherical spreading in shallow water for some HRG sources, have been made in literature (Ruppel *et al.,* 2022), and NMFS has relied on this approach for past ITAs with similar equipment, locations, and depths. NMFS' User Spreadsheet tool assumes a ''safe distance'' methodology for mobile sources where propagation loss is spherical spreading (20LogR) (*https://media.fisheries.noaa.gov/2020-12/User_Manual%20_DEC_2020_508.pdf?null*), and NMFS calculator tool for estimating isopleths to Level B harassment thresholds also incorporates the use of spherical spreading. NMFS has determined that spherical spreading is the most appropriate form of propagation loss for these surveys and represents the best scientific information available.

Comment 7: Commenter(s) stated that auditory injury can occur below the PTS threshold and could occur below the TTS threshold. Further, that noise levels that did not manifest in PTS soon after an exposure event could cause irreversible neural damage in mammals after repeated or cumulative exposure. They also stated that the threshold for tissue injury has been found to occur at lower threshold than the threshold for TTS onset (Houser, 2021). NMFS' nearly singular focus on PTS distance (distance from activity at which partial or full permanent deafness will be induced in the whale) as the only indicator of ''take'' (premature death or reproductive failure affecting the population) is not reasonable. NMFS has no empirically derived direct measure of thresholds for PTS harm, but rather PTS is modeled from (limited) TTS data. NMFS is inappropriately defining ''harm'' to low-Frequency baleen whales as NMFS does not have any empirically-determined benchmark for what is the injury-causing sound pressure level (SPL) against which to measure the proposed activities.

Response: NMFS's TTS thresholds represent an onset of noise-induced hearing loss (*i.e.,* 6 dB threshold shift) and are considered the minimum threshold shift clearly larger than any day-to-day or session-to-session variation in a subject's normal hearing ability (Schlundt *et al.,* 2000; Finneran *et al.,* 2000; Finneran *et al.,* 2002). There have been no indications that in marine mammals TTS occurs below our current thresholds. Furthermore, as Houser 2021 indicates ''There are relatively few studies demonstrating that TTS can be associated with the destruction of tissue. To date, relevant studies have only been performed in terrestrial laboratory animals.'' Studies on terrestrial mammals indicating neuropathy from noise exposure are associated with threshold shifts of 40 to 50 dB. Finally, PTS is defined as a threshold shift that does not fully recover back to baseline levels. It should not be assumed that an animal with PTS is deaf.

As stated in the proposed rule and reiterated here, there are no PTS data available for cetaceans and only one instance of PTS being induced in older harbor seals (Reichmuth *et al.,* 2019). However, available TTS data (of mid-frequency hearing specialists exposed to mid- or high-frequency sounds (Southall *et al.,* 2007; NMFS, 2018; Southall *et al.,* 2019)) suggest that most threshold shifts occur in the frequency range of the source up to one octave higher than the source. We would anticipate a similar frequency range affected for PTS. Further, no more than a small degree of PTS is expected to be associated with any of the incurred Level A harassment, given it is unlikely that animals would stay in the close vicinity of a source for a duration long enough to produce more than a small degree of PTS. More information on PTS and TTS–PTS shift can be found in the ''Negligible Impact Analysis and Determination'' and the ''Potential Effects of Underwater Sound on Marine Mammals'' sections in the proposed rule. Furthermore, NMFS also relies on our behavioral harassment thresholds to assess potential effects occurring below levels associated with PTS and TTS. For information on the 160 dB threshold (onset of Level B behavioral harassment), please see our response to *Comment 3.* For more information related to PTS, please see our response to *Comment 5.*

Mitigation

Comment 8: Commenter(s) requested NMFS add to or modify the vessel strike avoidance mitigation measures contained within the proposed rule. Recommendations included ''strengthening vessel speed restrictions'', and if weather or other conditions limit the range of observation, shutdown zones (including for transiting vessels) will be initiated keeping 500 meters (m) away from North Atlantic right whale. A commenter also incorrectly claimed that vessel speed restrictions are not fully mandated or enforced for offshore wind vessels.

Response: NMFS acknowledges that vessel strikes pose a risk to all large whales, including North Atlantic right whales and the proposed rule and this final rule require multiple mitigation measures to effect the least practicable adverse impact from vessels on marine mammals. These measures are more restrictive than other industrial, commercial, military, and recreational vessels. All transiting vessels (regardless of speed or size) are required to have a dedicated visual observer watching for marine mammals. In the event a marine mammal is observed under certain circumstances, the vessel must slow to 10 kn or less or, if within separation zones (which are encoded in regulation (62 FR 6729, March 17, 1997) or follow marine mammal viewing guidelines), turn away from and slow engines to neutral. In any SMA, DMA, Slow Zone (the latter two of which are currently voluntary for other vessels), Avangrid must operate vessels at 10 kn or less. Further, between November 1 and April 30, all vessels, regardless of size, in the specified geographical region must operate at 10 kn or less (11.5 mph). NMFS has determined it is impracticable for all vessels to travel 10 kn or less at all times and is not necessary to achieve the least practicable adverse impact given the mitigation discussed above. As described above, in many cases, there are no alternatives to the 10 kn or less speed restriction. However, NMFS has determined that when whales are less likely to be in the area and visual and acoustic monitoring is conducted, Avangrid vessels could travel at over 10 kn. NMFS has determined that the monitoring required, including both direct marine mammal monitoring and situational awareness monitoring and reporting, are sufficient to allow Avangrid vessels to travel at speeds greater than 10 kn when vessel strike risk is lowest when not subjected to the previously described restrictions.

In this final rule, NMFS is requiring that all vessels associated with Avangrid's activities must be equipped with a properly installed, operational Automatic Identification System (AIS) device and Avangrid must report all Maritime Mobile Service Identify (MMSI) numbers to NMFS Office of Protected Resources, thus facilitating monitoring of vessel speeds. In addition, NMFS maintains an Enforcement Hotline for members of the public to report violations of vessel speed restrictions. NMFS is not requiring PSOs to be onboard every transiting vessel as it is impracticable due to potential limited space on the vessels. However, as described in the proposed rule and carried forward in this final rule, Avangrid must have dedicated visual observers onboard all vessels with no other concurrent duties. The dedicated visual observer may be a PSO or a trained crew member.

Avangrid provided information pertaining to the types and number of vessels necessary to construct the project. They are also required to submit a Marine Mammal Vessel Strike Avoidance Plan, which must include, but is not limited to, more detail on ports used and means by which they would abide by the extensive measures outlined here. While NMFS acknowledges that vessel strikes can result in injury or mortality, we have analyzed the potential for vessel strike resulting from Avangrid's activity and, in consideration of the required mitigation measures specific to vessel strike avoidance included in the final rule NMFS has determined that the potential for vessel strike is so low as to be discountable and thus, no vessel strikes are expected or authorized to occur. These measures also ensure the least practicable adverse impact on species or stocks and their habitat.

Comment 9: Commenter(s) asserted an independent review of mitigation measures should be required due to limitations associated with visual monitoring and PAM.

Response: The MMPA does not require an independent review of mitigation measures. In contrast, it does require notice and opportunity for public comment (16 U.S.C. 1371(a)(5)(A)(i)). The public comment period is a means by which the public (*i.e.,* independent reviewers) are able to provide NMFS with mitigation measure recommendations supported by scientific evidence that NMFS takes into consideration when finalizing the rulemaking.

Comment 10: Commenter(s) recommended clarification should be included in the LOA that explicitly states if a shutdown would be initiated as a result of weather or other conditions that limit the range of observation.

Response: The comment refers to a 500-m shutdown zone for North Atlantic right whales; therefore, NMFS assumes the recommendation is referring to HRG surveys, a low impact activity. As described in the proposed rule and this final rule, PSOs are required to monitor the shutdown zone during operations. During periods of low visibility, alternative monitoring technology (*i.e.,* infrared or thermal cameras) must be used to monitor these zones. This final rule clarifies that when the shutdown zones become obscured for brief periods (no more than 30 minutes) due to inclement weather, survey operations may continue (*i.e.,* no shutdown is required) so long as no marine mammals have been detected. Further, the shutdown requirement is waived for certain genera of small delphids. As noted above, take of marine mammals from HRG surveys is limited overall, take by Level B harassment only is expected to occur only within a small area in close proximity to the vessel, and no Level A harassment is expected to result from exposure to the surveys even in the

absence of mitigation. There is a low likelihood that short periods of obscured visibility might potentially coincide with a marine mammal entering the shutdown zone, and a shutdown not occurring. While such an event may result in a higher level exposure than would occur if the shutdown happened, such an exposure would still not be expected to result in a Level A take and would be brief and not change the number of takes or our evaluation of their likely effects, which again, are expected to be comparatively minor. Additionally, the frequent delay and/or cessation of HRG surveys creates operational challenges and impracticalities for applicants. Altogether, the required measures affect the least practicable adverse impact on the affected species.

Comment 11: Commenter(s) recommended that NMFS require mitigation measures that meet the least practicable adverse impact standard (*e.g.,* impacts of underwater noise be minimized to the fullest extent feasible) coupled with a robust monitoring and reporting program to ensure compliance.

Response: As described in both the proposed rule and this final rule, NMFS has included requirements for mitigation measures that effect the least practicable adverse impact on marine mammal species or stocks and their habitat, as required under the MMPA (16 U.S.C. 1371(a)(5)(A)(i)(II). As they relate to underwater noise, the mitigation measures include sound attenuation methods that successfully (evidenced by required sound field verification measurements) reduce real-world noise levels produced by impact pile driving, vibratory pile driving, and drilling of foundation installation to, at a minimum, the levels modeled assuming 10 dB of attenuation. NMFS clarifies that, because no unattenuated piles may be driven, there is no way to confirm a 10-dB reduction; rather, in situ SFV measurements will be conducted to ensure that sound levels are at or below those modeled assuming a 10-dB reduction. In addition to the SFV requirements in the proposed rule, consistent with the Biological Opinion (BiOp), we added to this final rule the requirement that Avangrid must conduct ''Abbreviated SFV'' monitoring (consisting of a single acoustic recorder placed at an appropriate distance from the pile) on all foundation installations for which the complete SFV monitoring (*i.e.,* ''Thorough SFV''), as required in the proposed rule, is not carried out. NMFS is requiring that these SFV results must be included in the weekly reports. Any indications that distances to the Level A harassment and Level B harassment thresholds for whales are exceeded must be addressed by Avangrid, including an explanation of factors that contributed to the exceedance and corrective actions that were taken to avoid exceedance on subsequent piles.

NMFS has required numerous monitoring and reporting requirements which result in a robust compliance program.

Effects Assessment

Comment 12: Several commenters disagreed with NMFS' negligible impact determination, particularly for North Atlantic right whale. These comments included assertions that NMFS did not consider the imperiled population status of North Atlantic right whale; NMFS did not evaluate the cumulative effects of all projects (such as offshore wind construction and operational noise, underwater noise, and site characterization surveys and baseline background levels of ambient noise which result in stress); NMFS did not meaningfully examine the effects of the loss of communication space on marine mammals and, further, seems to misapprehend the spatial and temporal scope of the effects (*e.g.,* masking, disruption to courtship and mating behaviors, foraging/feeding, and TTS, *etc.*); that NMFS did not adequately assess the impact of behavioral disruption on feeding and similar behaviors resulting in decreased body condition nor the asserted increased risk of mortality from TTS; that any effect to the small number of breeding females can adversely affect fecundity and imperil the species; that NMFS has not used the best available science when reaching its NID by using the 160-dB threshold; and that NMFS did not consider whether abandonment of habitat that was designated with the express purpose of preventing vessel strikes would push the species further into a vessel traffic corridor, thereby elevating the risk to the species nor evaluated all the risks to North Atlantic right whale by habitat displacements as sublethal take has can a measurable effect due to the small population.

Response: NMFS is required to authorize the requested incidental take if it finds the total incidental take of small numbers of marine mammals by U.S. citizens ''while engaging in that (specified) activity'' within a specified geographical region during the 5-year period (or less) will have a negligible impact on such species or stock and, where applicable, will not have an unmitigable adverse impact on the availability of such species or stock for subsistence uses (16 U.S.C. 1371(a)(5)(A)). Negligible impact is defined 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 effect on annual rates of recruitment or survival'' (50 CFR 216.103). Consistent with the preamble of NMFS' implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are factored into the baseline, which is used in the negligible impact analysis. Here, NMFS has factored into its negligible impact analysis the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline (*e.g.,* as reflected in the density/distribution and status of the species, population size and growth rate, and other relevant stressors).

The preamble of NMFS' implementing regulations also addresses cumulative effects from future, unrelated activities. Such effects are not considered in making the negligible impact determination under MMPA section 101(a)(5). NMFS considers: (1) cumulative effects that are reasonably foreseeable when preparing a National Environmental Policy Act (NEPA) analysis; and (2) reasonably foreseeable cumulative effects under section 7 of the ESA for ESA-listed species, as appropriate. Accordingly, NMFS has adopted and reviewed BOEM's EIS and as part of its inter-agency coordination. This EIS addresses cumulative impacts related to the Project and substantially similar activities in similar locations. Cumulative impacts regarding the promulgation of the regulations and issuance of a LOA for construction activities planned by Avangrid, have been adequately addressed in the adopted EIS that supports NMFS' determination that this action has been appropriately analyzed under NEPA. Separately, the cumulative effects of the Project on ESA-listed species, including the North Atlantic right whale, were analyzed under section 7 of the ESA when NMFS engaged in formal inter-agency consultation with the NOAA Greater Atlantic Regional Field Office (GARFO). The BiOp for the Project determined that NMFS' promulgation of the rulemaking and issuance of an LOA for construction activities, individually and cumulatively, are likely to adversely affect, but not jeopardize, listed marine mammals.

NMFS disagrees that our negligible impact determination is flawed or not supported. NMFS fully disclosed the imperiled status of North Atlantic right whales in the Description of Marine

Mammals in the Area of Specified Activity section of the proposed rule. The proposed rule, as well as this final rule by reference, fully explains the impacts to North Atlantic right whales is expected to be limited to low-level behavioral harassment (*e.g.,* temporary avoidance or cessation of foraging). The proposed rule also described the Potential effects of behavioral disturbance on marine mammal fitness and that, based on the best available science, behavioral disturbance resulting from the specified activities is not expected to impact individual animals' health or have effects on individual animals' survival or reproduction, thus no detrimental impacts at the population level are anticipated. The commenters do not provide scientific evidence that suggests otherwise. Specifically, the commenters did not provide evidence that any effect to a breeding female would result in reduced fecundity.

Commenters suggested NMFS did not meaningfully evaluate loss of communication space; however, the Effects on Marine Mammals and Their Habitat in the proposed rule contained an analysis on the impacts of masking both in general and from the specified activities. NMFS also disagrees that TTS would result in increased risk of mortality. TTS was fully described in the Potential Effects of Underwater Sound on Marine Mammals and Potential Effects of Disturbance on Marine Mammal Fitness in the proposed rule. NMFS does not anticipate nor authorize serious injury or mortality of any marine mammal species for the specified activities.

NMFS acknowledges that whales may temporarily avoid the area where the specified activities occur. However, NMFS does not anticipate, based on the best available science, that whales will abandon their habitat, as suggested by a commenter, or be displaced in a manner that would result in a higher risk of vessel strike, and the commenter does not provide evidence that either of these effects should be a reasonably anticipated outcome of the specified activity. The primary activity that is anticipated to result in temporary avoidance of the otherwise used habitat is foundation installation pile driving and drilling. Not only would this activity be limited to times of year when North Atlantic right whale presence is low, pile driving and drilling would be intermittent, and only occur for a limited time over the course of 2 or 3 years (depending on schedule type). Together, these factors further reduce the likelihood that this species would be in close enough proximity to the activity to engage in avoidance behavior to the degree it would move into an area of risk (which would be closer to shore) that it could be struck by another vessel.

For NMFS' response on the use of the 160-dB threshold, please see our response to *Comment 3.*

Comment 13: Commenter(s) questioned the validity of NMFS small numbers analysis on the basis that the numbers do not account for the cumulative take numbers from previous, ongoing, or potential projects.

Response: NMFS has provided a reasoned approach to small numbers, as described in the ''Taking Marine Mammals Incidental to Geophysical Surveys Related to Oil and Gas Activities in the Gulf of Mexico'' final rule (86 FR 5322 at 5438, April 19, 2021). Utilizing that approach, NMFS has made the necessary small numbers finding for all affected species and stocks in this case (see Small Numbers section for more detail). Neither the MMPA nor our implementing regulations require the small numbers analysis to consider take from previous, ongoing, or potential projects.

Comment 14: Commenters suggested NMFS failed to account for the cumulative (or additive) impacts on marine mammal species in the analysis and that NMFS should evaluate the cumulative impacts of ongoing and future OSW projects rather than evaluating projects individually, including that NMFS must consider the total number of takes proposed to be authorized across all wind projects. They suggested that NMFS must fully consider the discrete effects of each activity and the cumulative effects of the suite of approved, proposed, and potential activities on marine mammals, including North Atlantic right whales, and ensure that the cumulative effects are not excessive before issuing a LOA.

Response: Neither the MMPA nor NMFS' implementing regulations call for consideration of the take resulting from other specified activities in the negligible impact analysis. The preamble to NMFS' implementing regulations (54 FR 40338, September 29, 1989) states, in response to comments, that the impacts from other past and ongoing anthropogenic activities are to be incorporated into the negligible impact analysis via their impacts on the baseline. Consistent with that direction, NMFS has factored into its negligible impact analysis the impacts of other past and ongoing anthropogenic activities via their impacts on the baseline (*e.g.,* as reflected in the density/distribution and status of the species, population size and growth rate, and other relevant stressors). The 1989 final rule for the MMPA implementing regulations also addressed public comments regarding cumulative effects from future, unrelated activities. There, NMFS stated that such effects are not considered in making findings under section 101(a)(5) concerning negligible impact. In this case, this ITR, as well as other ITRs currently in effect or proposed within the specified geographical region are appropriately considered an unrelated activity relative to the others. The ITRs are unrelated in the sense that they are discrete actions under section 101(a)(5)(A) issued to discrete applicants. Section 101(a)(5)(A) of the MMPA requires NMFS to make a determination that the take incidental to a ''specified activity'' will have a negligible impact on the affected species or stocks of marine mammals.

NMFS' implementing regulations require applicants to include in their request a detailed description of the specified activity or class of activities that can be expected to result in incidental taking of marine mammals, 50 CFR 216.104(a)(1). Thus, the ''specified activity'' for which incidental take coverage is being sought under section 101(a)(5)(A) is generally defined and described by the applicant. Here, Avangrid was the applicant for the ITR, and we are responding to the specified activity as described in that application and making the necessary findings on that basis.

Through the response to public comments in the 1989 implementing regulations (54 FR 40338, September 29, 1989), NMFS also indicated (1) that we would consider cumulative effects that are reasonably foreseeable when preparing a NEPA analysis and (2) that reasonably foreseeable cumulative effects would also be considered under section 7 of the ESA for listed species, as appropriate. Accordingly, NMFS has adopted an EIS written by BOEM and reviewed by NMFS as part of inter-agency coordination. This EIS addresses cumulative impacts related to the Project and substantially similar activities in similar locations. Cumulative impacts regarding the promulgation of the regulations and issuance of a LOA for construction activities, such as those planned by Avangrid, have been adequately addressed under NEPA in the adopted EIS that supports NMFS' determination that this action has been appropriately analyzed under NEPA. Separately, the cumulative effects of the Project on ESA-listed species, including North Atlantic right whales, was analyzed under section 7 of the ESA when NMFS engaged in formal inter-agency

consultation with GARFO. The BiOp for the Project determined that NMFS' promulgation of the rulemaking and issuance of a LOA for construction activities associated with leasing, individually and cumulatively, are likely to adversely affect, but not jeopardize, listed marine mammals.

Comment 15: Commenter(s) claimed the request for an ITA should be denied alleging the specified activities kill marine mammals and some commenters suggested that the ongoing whale UMEs, including the whale deaths occurring in the winter of 2022–2023, are linked with ongoing offshore wind survey work (*i.e.,* HRG surveys). One commenter claimed the burden of proof is on NMFS to prove, with evidence, that there is no association between HRG surveys and whale injuries, including ''rectified diffusion'', deaths or otherwise assume that offshore wind activity has contributed to these deaths. A commenter also asserted that the activities covered by the ITR and associated LOA are reasonably likely to result in Level A take of North Atlantic right whales that are not covered by the authorization's terms.

Response: Neither the proposed rule or this final rule allow mortality or serious injury of marine mammals to be authorized. The best available science indicates that the anticipated impacts from the specified activities potentially include avoidance, cessation of foraging or communication, TTS and PTS, stress, masking, *etc.* (as described in the Effects of the Specified Activities on Marine Mammals and their Habitat section in the proposed rule). NMFS emphasizes that there is no evidence that noise resulting from offshore wind development-related specified activities would cause marine mammal strandings, and there is no evidence linking recent large whale mortalities and currently ongoing offshore wind activities. The commenters offer no such evidence or other scientific information to substantiate their claim. This point has been well supported by other agencies, including BOEM and the Marine Mammal Commission (Marine Mammal Commission Newsletter, Spring 2023).

There is an ongoing UME for humpback whales along the Atlantic coast from Maine to Florida, which includes animals stranded since 2016, and we provide further information on the humpback UME in the humpback whale subsection in the Description of Marine Mammals in the Specified Geographical Region section of this final rule. Partial or full necropsy examinations were conducted on approximately half of the whales that recently stranded along the U.S. east coast. Necropsies were not conducted on other carcasses because they were too decomposed, not brought to land, or stranded on protected lands (*e.g.,* national and state parks) with limited or no access. Of the whales examined (roughly 90), about 40 percent had evidence of human interaction, either ship strike or entanglement. Vessel strikes and entanglement in fishing gear are the greatest human threats to large whales. The remaining 50 necropsied whales either had an undetermined cause of death (due to a limited examination or decomposition of the carcass) or had other causes of death including parasite-caused organ damage and starvation. The best available science indicates that only Level B harassment, or disruption of behavioral patterns (*e.g.,* avoidance), may occur as a result of the Project's HRG surveys. NMFS emphasizes that there is no credible scientific evidence available suggesting that mortality and/or serious injury is a potential outcome of the planned survey activity.

The proposed rule and this final rule state that no take of North Atlantic right whales by Level A harassment, mortality, or serious injury was requested or proposed for authorization (see the Estimated Take and Negligible Impact Analysis and Determination sections), and they are not expected based on the best available science.

One commenter cited literature as evidence that seismic surveys in the mid to low frequency range can injure whales, can cause decompression sickness (the bends) and can cause rectified diffusion. The Fernandez (2005) paper cited refers to pathology results from necropsies conducted on beaked whales involved in a mass stranding event in the Canary Islands following high intensity military training exercises involving numerous surface warships and several submarines and mid-frequency tactical sonar activities. NMFS acknowledges the effects of these activities described by the commenter are known; however, the activities in that paper are not analogous to HRG surveys that would be conducted by Avangrid to construct the Project, and the information presented by the commenter is not applicable due to many factors (*e.g.,* pile driving is stationary, versus the sound sources cited, and HRG surveys utilize a much lower source level).

Comment 16: Commenter(s) recommended NMFS consider the impacts of structure presence and operations, including those from operational turbine noise on marine mammals as well as ocean mixing and vibrations on phytoplankton, zooplankton, and the food chain. Commenter(s) suggested that NMFS did not evaluate the long-term operational and maintenance impacts of the project on marine mammals and ignored the best available science demonstrating behavioral impacts to marine mammals from operational turbines; therefore, NMFS' small numbers and negligible impact findings are arbitrary and capricious.

Response: In the proposed rule, NMFS considered the impacts to marine mammals from operational noise and to their habitat, including prey, from the presence of structures and operations based on the best available science. In this final rule, NMFS has supplemented that analysis with new scientific information that has become available regarding these issues since publishing the proposed rule. This new information does not change our findings. The commenter did not provide scientific evidence that suggests the analysis within the proposed rule was unsupported. NMFS has fully evaluated the potential impacts of both issuing this final rule on marine mammals over the five year effective period of this rulemaking and the potential impacts from long-term operations via the BiOp. We refer the reader to the Effects of the Specified Activities on Marine Mammals and Their Habitat section and the Negligible Impact Determination section in the proposed and this final rule for further details.

Other

Comment 17: Commenter(s) requested that NMFS consideration of LOAs for offshore wind developers be applied equitably across industries (*e.g.,* fishing industry) and that there be a clear threshold for OSW-related takes regionally and across project phases. In addition, the OSW-industry must be held accountable for incidental takes from construction and operations separately from the take authorizations for managed commercial fish stocks. Commenters) also asserted the OSW industry must be held accountable for their impacts on marine mammals as other industries are (*e.g.,* seasonal closures on fisheries, marine mammal entanglements).

Response: NMFS considers all ITA requests equally, all takes and regulatory measures are project-specific. NMFS carefully reviews models and take estimate methodology to authorize a number of takes, by species and manner of take that is a likely outcome of the Project. There are several conservative assumptions built into the models to ensure the number of takes

authorized is sufficient based on the description of the Project. Therefore, takes authorized, being specific to a project, are managed separately than takes associated with any other project or industry. Avangrid would be accountable to the measures described in their ITA that were set to achieve ''the least practicable impact on such species or stock and its habitat''. These include mitigation, monitoring, and reporting measures (*e.g.,* seasonal closures, gear-specific mitigation measures to avoid entanglements, *etc.*).

Avangrid would be required to submit frequent reports which would identify the number of takes applied to the Project. In the unexpected event that Avangrid exceeds the number of takes authorized for a given species, the MMPA and its implementing regulations state that NMFS shall withdraw or suspend the LOA issued under these regulations, after notice and opportunity for public comment, if it finds the methods of taking or the mitigation, monitoring, or reporting measures are not being substantially complied with, or the taking allowed is having, or may have, more than a negligible impact on the species or stock concerned (16 U.S.C. 1371(a)(5)(B); 50 CFR 216.206(e)). Additionally, failure to comply with the requirements of the LOA may result in civil monetary penalties and knowing violations may result in criminal penalties (16 U.S.C. 1375; 50 CFR 216.206(g)).

Moreover, as noted previously, fishing impacts, and NMFS assessment of them, generally center on entanglement in fishing gear, which is a very acute, visible, and severe impact (*i.e.,* mortality or serious injury). In contrast, the impacts incidental to the specified activities are primarily acoustic in nature and limited to Level A harassment and Level B harassment, there is no anticipated or authorized serious injury or mortality that the fishing industry could theoretically be held accountable for. Any take resulting from the specified activities would not be associated with take authorizations related to commercial fisheries. Neither the MMPA nor our implementing regulations require NMFS to analyze impacts to other industries (*e.g.,* fisheries) from issuance of an ITA pursuant to section 101(a)(5)(A). We note that the New England Wind Final EIS assesses the impacts of both BOEM and NMFS' actions (approving Avangrid's activities and authorizing the associated take of marine mammals, respectively) on the human environment, including to fisheries, and NMFS considered the analysis, as appropriate, in the final decisions under the MMPA. The impacts of commercial fisheries on marine mammals and incidental take for said fishing activities are managed separately from those of non-commercial fishing activities such as offshore wind site characterization surveys, under MMPA section 118.

Comment 18: Commenter(s) questioned what will happen if incidental take is exceeded, and the implications of it.

Response: In the unlikely scenario that Avangrid exceeds their authorized take levels, any further take would be unauthorized and therefore, prohibited under the MMPA. Avangrid could request additional incidental take of marine mammals from their specified activities. This would require NMFS to reanalyze its small numbers and negligible impact determinations and may require reinitiation of the BiOp and supplemental NEPA analysis depending on the specific facts.

Comment 19: Commenter(s) expressed concern about NMFS' ability to conduct marine mammal assessment aerial surveys would be detrimentally impacted as a result of offshore wind structures, thus impacting NMFS' ability to continue using current methods to fulfill its mission of precisely and accurately assessing and managing protected species.

Response: NMFS and BOEM have collaborated to establish the ''Federal Survey Mitigation Strategy for the Northeast U.S. Region'' (Hare *et al.,* 2022). This interagency effort is intended to guide the development and implementation of a program to mitigate impacts of wind energy development on fisheries surveys. For more information on this effort, please see *https://repository.library.noaa.gov/view/noaa/47925.*

Changes From the Proposed to Final Rule

Since the publication of the proposed rule in the **Federal Register** (88 FR 37606, June 8, 2023), NMFS has made changes, where appropriate, in response to public comments and new information provided by Avangrid that are reflected in the regulatory text and preamble text of this final rule. Specifically, as described above, Avangrid refined and updated their acoustic modeling for foundation installation activities since the proposed rule which resulted in changes to the exposure estimates and requested take. These changes are briefly identified below, with more information included in the indicated sections of this final rule:

Changes in Information Provided in the Preamble

The information found in the preamble of the proposed rule was based on the best available information at the time of publication. Since publication of the Proposed Rule, new information has become available, which has been incorporated into this final rule as discussed below.

The following change was made throughout the final rule:

At the request of Park City Wind and consent of Avangrid, references to Park City Wind were replaced with Avangrid and lease number OCS–A 0561 was added, where appropriate, since lease area OCS–A–0534 was segregated.

The following changes were made to the Purpose and Need for Regulatory Action section of the preamble to this final rule:

We have added regulatory definitions under Legal Authority for the Final Action for ease of reference.

The following changes were made to the Summary, Summary of Request and Description of the Specified Activity sections of the preamble to this final rule:

We have included OCS–A 0561 as Avangrid segregated the OCS–A 0534 lease area in to two parts: OCS–A 0534 encompasses phase 1 and 0561 encompasses phase 2.

The following changes are reflected in the Description of Marine Mammals in the Specified Geographical Region section of the preamble to this final rule:

NMFS clarified the boundaries of the specified geographical region such that the Mid-Atlantic Bight is defined as from Cape Hatteras, North Carolina to Cape Cod, Massachusetts and extending into the western Atlantic to the 100-m isobath.

Given the release of NMFS' draft 2023 stock assessment reports (SARs; 89 FR 5495, January 29, 2024), we have updated the population estimate used in the proposed rule (Hayes *et al.,* 2023) for the North Atlantic right whale (*Eubalaena glacialis*) from 338 to 340 and the total mortality/serious injury (M/SI) amount from 8.1 to 27.2. This increase is due to the inclusion of undetected M/SI (whereas 8.1 accounted only for detected M/SI). As stated in the 2023 draft SARs, the use of the refined methods of Pace *et al.* (2021), the estimated annual rate of total mortality of adults and juveniles for the period 2016–2020 was 27.2, which is over 3 times larger than the 8.1 total derived from reported mortality and serious injury for the same period.

We have also made updates to the UME summaries for North Atlantic right

whales, humpback whales, minke whales, and phocid seals (pinnipeds).

The following changes are reflected in the Estimated Take, Mitigation, and Monitoring and Reporting sections the preamble to this final rule:

NMFS received a number of modeling and density updates from the applicant since the proposed rule, which resulted in associated changes in the size of harassment zones, take numbers, and mitigation zones. As a result of the updated and refined modeling, we have updated the methods by which distances to NMFS harassment thresholds were estimated, the distances to NMFS harassment thresholds, the exposure estimates based on the updated acoustic modeling, and requested and allowable take amounts (which, generally speaking, went down as a result of these modeling refinements). NMFS notes that there were no changes to the number of foundations, construction schedule, or the assumption of 10 dB of noise attenuation as described in the proposed rule. The modeling and density changes are briefly listed here and described in more detail below:

- Upgraded, more refined take estimation modeling of vibratory pile driving, to reflect that which was presented in the proposed rule for impact pile driving (with animats). The revised modeling for vibratory setting of piles (followed by impact pile driving) replaced the practical spreading loss approach with acoustic modeling; and exposures for impact pile driving and vibratory setting were updated using animal movement modeling. This resulted in a notable reduction in exposure ranges and takes by Level B harassment.
- Upgraded sound source propagation modeling of the impact pile driving source, which resulted in little change in take or mitigation zones. The acoustic modeling was upgraded for impact piling as the previous energy-based parabolic equation model used to compute the near-field equivalent source before long range propagation was revised after the proposed rule using JASCO's Full-Wave PE RAM model (FWRAM) to compute the near-field equivalent source before the long-range propagation was computed (also using FWRAM).
- Upgraded sound source propagation modeling of the drilling activity (in lieu of 15 logR spreading), which resulted in some minor reductions in take. The acoustic updated modeling completed for drilling replaced the previous practical spreading loss approach; exposures were calculated by multiplying the zone of influence (ensonified area) by density.
- Improvements to the apportionment of species takes within species guilds (pilot whales, seals). Updates were made by the applicant to guilded species densities for vibratory setting followed by impact pile driving, impact pile driving alone, and drilling.
- An update to the model assumptions for high frequency species (harbor porpoise). This change reduced the exposure ranges and, subsequently, amount of takes by harassment.

Following the proposed rule, new modeling was performed for vibratory pile driving which replaced the previous practical spreading loss approach that defined the distance to Level B harassment as 50 kilometer (km). For the final rule, acoustic modeling was completed for vibratory setting of piles followed by impact driving, and exposures were modeled using animal movement modeling (animat), mirroring the method described in the proposed rule for impact pile driving. In general, the animat modeling resulted in the exposure distance to Level B harassment per species decreasing (most species' distance to the Level B harassment threshold were around 25 km) and, as marine mammals densities were applied depending on the exposure range using the 95th percentile exposure range ($ER_{95\%}$), exposure estimates and takes decreased. Instead of using a broad 50-km distance for estimating exposure and marine mammal density, such as was done in the proposed rule, the exposure estimates and take applied the marine mammal densities at 10 km, 25 km, or 50 km, using the using the next highest density match to the exposure range. For example, if the $ER_{95\%}$ was 8.5 km, the 10 km perimeter would be used. These revisions to the more refined modeling methods of estimating take for vibratory pile driving resulted in notable reductions in the Level B take estimates. The primary model refinement that resulted in the majority of the reduction in exposures and take in this final rule was from this change in vibratory pile driving modeling.

Following the proposed rule, the modeling methodology for impact pile driving was refined. In the prior modeling for impact pile driving, an energy-based parabolic equation (PE) model (JASCO's MONM) was used to compute the near-field equivalent source before long range propagation. For the final rule, JASCO's Full-Wave PE RAM model (FWRAM) was used to compute the near-field equivalent source before the long-range propagation was computed (also using FWRAM). FWRAM is an improvement because it calculates full synthetic pressure waveforms (in the time domain), as opposed to summed energy independent of time. Like MONM, FWRAM is range dependent for range-varying marine acoustic environments and takes environmental inputs (bathymetry, water sound speed profile, and seabed geoacoustic profile) into account. FWRAM computes pressure waveforms via Fourier synthesis of the modeled acoustic transfer function in closely spaced frequency bands, and employs the array starter method to accurately model sound propagation from a spatially distributed source (MacGillivray and Chapman 2012). Ultimately, little difference was observed between the prior sound fields with near-field equivalents computed using MONM versus the current modeling with FWRAM, though FWRAM is expected to be a more accurate model.

As part of the above modeling updates to impact pile driving and vibratory pile driving followed by impact pile driving (MONM to FWRAM modeling), changes resulted in the exposure ranges for high-frequency cetaceans (harbor porpoise). PE based models such as MONM and FWRAM are particularly well suited for modeling the propagation of low frequency sounds, such as impact pile driving, but are limited in terms of the total and upper frequency range they can accurately and efficiently model (Etter, 2012). For this reason, propagation must be modeled to some upper cut-off frequency. Beyond this frequency, a linear extrapolation (or roll-off) can be assumed in order to extend the results to higher frequencies. The slope of this roll-off is based on measured pile driving data and chosen to be conservative. Selection of a proper upper cut-off frequency depends on available computational resources, as well as the specific implementation of the PE method of a particular model (Laws, 2013). Because of this, and inherent differences of the two modeling methodologies, the cut-off used in the original modeling for the proposed rule was 300 Hz, while the cut-off in the revised model is 1,000 Hz. Therefore, the new modeling represents a more accurate methodology for frequencies between 300 and 1,000 Hz, as full propagation modeling is performed in this frequency range, rather than an approximate extrapolation (or roll-off). Both modeling approaches produce the same results at low frequencies where pile driving sound is dominant, but since the conservatively chosen roll-off started at

300 Hz, there is more higher frequency energy in the original model than in the revised model. For this reason, the two approaches produce similar results for low-frequency cetaceans, but the revised modeling results in substantially different exposure ranges for high-frequency cetaceans. Following the proposed rule, new modeling was performed for drilling which replaced the previous practical spreading loss approach that defined the distance to Level B harassment as 16.6 km. For the final rule, acoustic modeling was completed for drilling and exposures were calculated by multiplying the zone of influence (ensonified area) by density. Rather than using practical spreading, sound propagation is modeled using a combination of an energy-based parabolic equation (PE) model (JASCO's MONM) at frequencies up to 1 kHz, and the BELLHOP ray tracing model (Porter and Liu 1994) from 1 to 25 kHz. BELLHOP is a widely used Gaussian beam ray-trace propagation model, which incorporates bathymetry, sound speed profiles, and a simplified representation of the sea bottom; as sub-bottom layers have a negligible influence on the propagation of acoustic waves with frequencies above 1 kHz. Sound attenuation due to seawater absorption was included, which can be important for frequencies greater than 5 kHz. The drill was approximated as a point source located at mid-water depth. Further details regarding MONM are provided below, in the context of pile driving. The density perimeter was determined using the longest 10-dB attenuated 95th percentile acoustic range to the behavioral threshold ($R_{95\%}$) for all locations, rounded up to the nearest 5 km, and then applied around the entire lease area (*i.e.,* 7.1 km rounded up to 10 km). This new approach is expected to more accurately capture the spatial extent of the sound fields, as it includes an updated source level (191.6 dB) as well as more sophisticated propagation modeling which accounts for bathymetry, sound speed profiles, interaction with the seabed, and seawater absorption. This refinement in the drilling model also resulted in some minor reductions in exposure and take. Further details can be found in the *Modeling and Take Estimates* section.

In order to better reflect available species data specific to the area, we have also updated the methodology for estimating take for species combined into one guild in the Roberts *et al.* density models (harbor seals, grays seals, long-finned pilot whales, and short-finned pilot whales), by using local abundance data to define how the takes within a guild should be apportioned by species or stock as opposed to using SAR abundance data to define how takes should be apportioned with a guild, and subsequently, updated take by Level B harassment authorized for these species.

As a result of the updated modeling, NMFS has changed (some increases, some decreases) the minimum visibility zone, clearance zones, and shutdown zones for all species during foundation installation activities. The clearance and shutdown zones sizes for each foundation type (*i.e.,* monopile, jacket) are now based on the largest distance to Level A harassment threshold of all the foundation installation methods (*i.e.,* impact pile driving, vibratory pile driving, drilling), with a 20 percent increase to the clearance zone. Avangrid requested, and NMFS has carried forward, zone sizes by the largest foundation type (*i.e.,* monopile, jacket) and hammer size. Lastly, Avangrid did not request different zone sizes based on the 12-m monopile versus the 13-m monopile in their January 2024 Application Update as they did prior to the proposed rule. Instead, Avangrid proposed zone sizes based on the 13-m monopile at 6,000 kJ, though this foundation installation scenario remains unlikely though possible. NMFS has therefore set the zone sizes as the largest across all foundation and hammer sizes for each foundation type (monopile, jacket), regardless if Avangrid choses to install a smaller pile or use a smaller hammer during real-world foundation installation. However, Avangrid may request modifications through adaptive management should sound field verification (SFV) demonstrate noise levels are lower than expected.

As a result of the new modeling, the monopile visual (PSO) and acoustic (PAM) clearance zone sizes for other baleen whales and sperm whale has decreased from 4,700 m for all pile driving and drilling to 3,300 m (all installation methods); the pile driving and drilling shutdown zones has similarly decreased from 4,700 m (12-m) and 5,500 m (13-m) to 2,700 m (all installation methods). The refined modeling for harbor porpoise decreased the zone sizes from 2,300 m (monopile pile driving and drilling) to 250 m, as the maximum injury ($ER_{95\%}$) for harbor porpoise is 240 m. The zone sizes for seals decreased from 1,100 m (monopile impact pile driving) and 1,400 m (monopile vibratory pile driving or drilling) to 200 m (all monopiles and installation methods) as the maximum injury ($ER_{95\%}$) for seals was 0 m. The clearance and shutdown zones for small whales and dolphins remain unchanged (200 m) as the maximum injury ($ER_{95\%}$) is 0 m. For those species that modeling resulted in less than 200 m Level A harassment distance to threshold, NMFS has set the minimum clearance and shutdown zone size as 200 m to ensure the zones are outside the monopile's noise attenuation system (NAS). This was also the approach in the proposed rule.

Based on the model changes above, the updated jacket (all pin piles) visual (PSO) and acoustic (PAM) clearance zone sizes for other baleen whales and sperm whale has increased from 4,500 m for impact pile driving and 4,700 m for vibratory pile driving and drilling to 4,900 m (all installation methods); the pile driving and drilling shutdown zones has decreased from 4,500 m for impact pile driving and 4,700 m for vibratory pile driving and drilling to 4,100 m (all installation methods). The refined modeling for harbor porpoise decreased the zone sizes from 1,800 m (impact pile driving) and 2,300 m (vibratory pile driving and drilling) to 250 m as the maximum injury ($ER_{95\%}$) for harbor porpoise is 230 m. The zone sizes for seals decreased from 1,400 m (all pile driving and drilling) to 1,000 m (clearance) and 800 m (shutdown) for all installation methods as the maximum injury ($ER_{95\%}$) for seals was 790 m. The clearance and shutdown zones for small whales and dolphins remain unchanged (50 m) as the maximum injury ($ER_{95\%}$) was 0 m. For those species that modeling resulted in less than 50 m Level A harassment distance to threshold, NMFS has set the minimum clearance and shutdown zone size as 50 m to ensure the zones are outside the jacket's noise attenuation system (NAS). This was also the approach in the proposed rule.

NMFS has not changed the North Atlantic right whale shutdown and clearance zones for visual observations (*i.e.,* any distance), NMFS has set the acoustic clearance and shutdown zones during foundation activities for North Atlantic right whale to any acoustic detection within a 12-km acoustic monitoring zone which were previously set to 5,600 m (monopile impact pile driving), 4,500 m (monopile vibratory pile driving and drilling), and 4,500 m (jacket pile driving and drilling). This final rule also clarifies that PAM must be conducted before, during, and after foundation installation and UXO/MEC detonation for North Atlantic right whales but the PAM system should be designed to detect all other marine mammals to the maximum extent practicable.

We updated the minimum visibility zone based on the new modeling from Avangrid (largest $ER_{95\%}$ distance to Level A harassment for low-frequency cetacean, not including fin whale), for all species during each foundation installation type then rounded for PSO clarity. As a result of the new modeling, the final rule sets the minimum visibility zone for monopiles at 2,100 m (humpback whale, 2,070 m), 3,400 m for jacket installation (humpback whale, 3,320 m), and 500 m for HRG (unchanged from the proposed rule). As described in the preamble of the proposed rule (page 405), NMFS originally set the minimum visibility zone size based on the North Atlantic right whale $ER_{95\%}$ distance to the Level A harassment threshold, assuming 10 dB. NMFS recognizes that a footnote in table 35 of the proposed rule used incorrect terminology stating that the minimum visibility zone for North Atlantic right whale would be ''any distance'' which contradicted the earlier stated methodology for setting the minimum visibility zone and would not be practicable. As a result of the updated modeling, the minimum visibility zone in this final rule decreased, however, it is still larger than the updated North Atlantic right whale $ER_{95\%}$ distance to the Level A harassment threshold, assuming 10 dB. To align with the BiOp, NMFS has used the largest $ER_{95\%}$ distance to Level A harassment for low-frequency cetacean, not including fin whale, which uses the distance to Level A harassment for humpback whale which is greater than the $ER_{95\%}$ distance to Level A harassment for North Atlantic right whale (monopile 2,070 m vs 1,620 m; jacket 3,320 m vs 2,350 m).

We have reduced takes by Level B harassment for Northern bottlenose whale from 12 to 8 as a result of a typo correction submitted by the applicant in the January 2024 Application Update. The applicant had previously not adjusted the total take request for this rare species by assuming encounters every other year but instead had unintentionally summed all annual takes at the time of the proposed rule. The takes by Level B harassment for Northern bottlenose whale in this final rule have been corrected based on encounters every other year.

NMFS has re-organized and simplified the monitoring and reporting section to avoid repeating entirely the requirements provided in the regulatory text. NMFS has renamed the North Atlantic Right Whale Vessel Strike Avoidance Plan to the Marine Mammal Vessel Strike Avoidance Plan to more accurately reflect that the plan does not solely apply to North Atlantic right whales.

In response to commenters' concerns regarding noise attenuation, we have added a general requirement that Avangrid must lower noise levels should they exceed those modeled assuming 10 dB of attenuation. Based on multiple commenters' concerns regarding noise attenuation, and as informed by preliminary sound measurements from South Fork Wind, NMFS has added a requirement that two functional noise attenuation devices that reduce noise levels to the modeled harassment isopleths, assuming a 10–dB attenuation, must be used during foundation pile driving. A single bubble curtain alone will not be allowed for use in mitigation.

In response to commenters' concerns on vessel activity relating to the Project, all project vessels must utilize AIS device and must report all MMSI numbers to NMFS Office of Protected Resources;

This final rule clarifies that the mitigation measure restricting Project vessels from traveling over 10 kn (5.14 m/s) in the transit corridor, unless Avangrid conducts real-time acoustic monitoring to detect large whales (including North Atlantic right whales), applies only when other speed restrictions are not in place.

For foundation installation, NMFS notes that it is difficult to specify a reduction in energy for any given hammer because of variation across drivers and installation conditions. Because other industry operators have identified that specific soft-start procedures, such as those included in the proposed rule, may raise concerns regarding engineering feasibility and practicability, we have removed the specifics related to the soft-start procedure identified in the proposed rule (but not the requirement to conduct a soft-start), allowing for flexibility should the need for adjustments to the specific procedures arise. However, any alternative protocol would be as protective as the generic coastal construction soft-start specifications provided in the proposed rule. The final soft-start methodology will be developed by Avangrid, in consultation with NMFS, considering final design details including site-specific soil properties and other considerations.

To align with the BiOp, NMFS has updated the UXO/MEC detonation zones to be specific to charge weight. The clearance zones, which are visually and acoustically monitored, were derived based on an approximate proportion of the size of the Level B harassment (TTS) isopleth then rounded for PSO clarity. The modeled distances to NMFS harassment thresholds have not changed from the UXO/MEC Acoustic Analysis Report in the application. The clearance zone sizes are contingent on Avangrid being able to demonstrate that they can identify charge weights in the field; if they cannot identify the charge weight sizes in the field then would need to assume the E12 charge weight size for all detonations and must implement the E12 clearance zone. No minimum visibility zone is required for UXO/MEC detonation as the entire visual clearance zone must be clear given the potential for lung and gastrointestinal tract injury.

We updated the process for obtaining NMFS approval for PSO and PAM Operators and have clarified education, training, and experience necessary to obtain NMFS' approval.

To align with the BiOp, we have added a requirement to have at least three active PSOs on the foundation installation platform (*e.g.,* pile driving/drilling vessel) and any dedicated PSO vessel (or equivalent coverage) rather than two PSOs, as was originally described in the proposed rule. Addition of this requirement is based on NMFS' evaluation of PSO coverage abilities for similar projects in the area (*e.g.,* Sunrise Wind) and has found that three PSOs (each covering 120 degrees) will improve the reliability of detection from the PSO platforms (*e.g.,* pile driving/drilling vessel, PSO-dedicated vessel, *etc.*). Previously at least four on-duty PSOs were required to actively observe for marine mammals before, during, and after installation of foundation piles (*i.e.,* monopiles and pin piles), at least two of those PSOs must be stationed and observing on the pile driving vessel and at least two PSOs must be stationed on a secondary, PSO-dedicated vessel. NMFS is now requiring Avangrid to deploy three on-duty PSOs per platform and vessel instead of two. Alternatively, Avangrid may propose an alternative method other than three PSOs per platform that provides equal or greater visual monitoring effectiveness. Similarly, NMFS is now requiring that Avangrid must deploy at least three on-duty PSOs, instead of two on-duty PSOs, on each observation platform for all detonations. To align with the BiOp, NMFS is also requiring the use of two PSO-dedicated vessels in addition to the PSOs on the foundation installation platform.

NMFS added a requirement that a double big bubble curtain must be placed at a distance that would avoid damage to the nozzle holes during all UXO/MEC detonations. NMFS also

added a requirement that a pressure transducer must be used during all UXO/MEC detonations.

Consistent with the BiOp, NMFS added additional details regarding thorough SFV requirements and added a requirement for Abbreviated SFV (consisting of a single recorder with a bottom and mid-water column hydrophone). We have also added requirements that Thorough SFV must be conducted on every pile until measured noise levels are at or below the modeled noise levels, assuming 10 dB; the minimum number of foundations previously required to have SFV has increased and now includes requirements for each construction year; and we have added a requirement that Avangrid must deploy at least eight hydrophones at four locations (one bottom and one mid-water column at each location) along an azimuth that is likely to see lowest propagation loss and two hydrophones (one bottom and one mid-water) at 750 m, 90 degrees from the primary azimuth during installation of all piles where Thorough SFV monitoring is required. Lastly, we have clarified that during Thorough SFV, installation of the next foundation (of the same type/foundation method) may not proceed until Avangrid has reviewed the initial results from the Thorough SFV and determined that there were no exceedances of any distances to the identified thresholds based on modeling assuming 10 dB of attenuation.

We have removed the requirements for reviewing data on an annual and biennial basis for adaptive management and instead will make adaptive management decisions as frequently as new information warrants it.

Changes in the Regulatory Text

As described above regarding changes made to the preamble, we have made the following corresponding and additional changes to the regulatory text in response to new information provided by Avangrid and public comments.

For clarity and consistency, we revised three paragraphs in § 217.320, ''Specified activity and specified geographical region,'' of the regulatory text to fully describe the specified activity, specified geographical region, and requirements imposed on the LOA Holder (Avangrid) and to clarify that the regulations apply to Avangrid Renewables LLC, as well as its successors or assigns, and those persons it authorizes or funds to conduct activities on its behalf. NMFS has also included the addition of OCS–A 0561 as a result of the OCS–A 0534 lease segregation.

For clarity, we have specified that any measures in §§ 217.324 and 217.325 required during jacket foundation installation are also required for bottom-frame foundations that utilize pile foundations.

In §§ 217.320, 217.322, 217.323, 217.324, 217.325, 217.326, and 217.327, NMFS has made minor changes to formatting and wording to more clearly state the requirements.

In § 217.324(a), NMFS has clarified that any visual observation of marine mammals, as opposed to only ESA-listed marine mammals, must be communicated to PSOs and vessel captains.

NMFS has clarified language in § 217.324(a) on what public sources Avangrid and its personnel must check and how often to stay informed on North Atlantic right whales detections in the area.

NMFS has added additional clarification on the authority of PSOs and PAM operators in § 217.324(a) to ensure compliance and proper implementation of the regulations.

NMFS has specified that any visual or acoustic detection of a North Atlantic right whale within clearance zones must trigger a delay in commencement of pile driving, drilling, UXO/MEC detonation, and HRG surveys. NMFS has also updated the requirement § 217.324(c)(8)(i) by expanding the terminology of ''piles installed'' to foundation installation activities, correcting the November 1–December 30 date range to November 1–December 31, and increasing the monitoring zone from 10 to 12 km.

NMFS has added a requirement that all project vessels must utilize AIS and must report all MMSI numbers to NMFS Office of Protected Resources.

NMFS has included a requirement for Avangrid to consent to on-site observations and inspections by Federal personnel during project activities.

NMFS has added a prohibition to interfering with PSO or PAM operator responsibilities.

NMFS has added a requirement for any large whale sighting to be communicated to all project-associated vessels, and for a large whale sighting log sheet to be retained for the vessel captain's review each day.

In § 217.324(b), NMFS has clarified the minimum separation zone for vessels when encountering a North Atlantic right whale.

In § 217.324(d), NMFS has added a requirement that Avangrid must notify NMFS 48 hours before any planned UXO/MEC detonation event unless this 48-hour notification would create delays to the detonation that would result in imminent risk to human life or safety. NMFS has also added a requirement that Avangrid may detonate a maximum of 10 UXO/MECs, of varying sizes but no larger than 1,000 pounds (lbs; 454 kilograms (kg)) charge weight (*i.e.,* E12), over the effective period of this rulemaking and LOA(s). NMFS has added a requirement that a pressure transducer must be used to monitor pressure levels during all UXO/MEC detonations.

NMFS has clarified the requirement in § 217.324(b) to specify that this measure applies to vessels traveling in the specified geographical region. NMFS has also renamed the North Atlantic Right Whale Vessel Strike Avoidance Plan requirement to the Marine Mammal Vessel Strike Avoidance Plan to more accurately reflect that the plan does not solely apply to North Atlantic right whales.

In consideration of commenters' concerns regarding strengthening mitigation measures to avoid vessel strike, NMFS has removed the requirement in § 217.324(b)(14) from the proposed rule for any underway vessel to avoid speed over 10 kn (18.5 km/hour) or abrupt changes in course direction until an animal is on a path away from the separation distance. The current requirement in § 217.324(b) requires vessels to steer a course away from, reduce speed and shift engine to neutral if an animal is within the separation distance.

NMFS has clarified the requirement in § 217.324(b)(7) from the proposed rule that a North Atlantic right whale detection triggers a speed restriction for all transiting vessels within 10 km for a 24-hour period (previously 12-hour period). This was previously specific to Slow Zones (*i.e.,* Dynamic Management Areas (DMAs) or acoustically-triggered slow zone), and Seasonal Management Areas (SMAs). NMFS has also added a requirement that vessels must not travel over 10 kn from November 1 through April 30, annually, within the specified geographical region. This measures also now includes a sub-measure that states: if vessel(s) are traveling at speeds greater than 10 kn (11.5 mph) (*i.e.,* no speed restrictions are enacted) in the transit corridor (defined as from a port to the Lease Area or return), in addition to the required dedicated visual observer, LOA Holder must monitor the transit corridor in real-time with PAM prior to and during transits. If a North Atlantic right whale is detected via visual observation or PAM detection within or approaching the transit corridor, all vessels in the transit

corridor must travel at 10 kn (11.5 mph) or less for 24 hours following the detection. Each subsequent detection must trigger a 24-hour reset. A slowdown in the transit corridor expires when there has been no further visual or acoustic detection in the transit corridor in the past 24 hours. The transit corridor must be defined in the Marine Mammal Vessel Strike Avoidance Plan.

NMFS has clarified PAM boundaries for detections of North Atlantic right whales that trigger a delay in the commencement of foundation installation and UXO/MEC detonation.

In response to comments and to align with the BiOp, NMFS has added a requirement that two functional noise attenuation devices that reduce noise levels to the modeled harassment isopleths assuming a 10–dB attenuation, must be used during foundation installation (impact and vibratory pile driving, drilling) and UXO/MEC detonation.

NMFS has clarified requirements for PAM systems, including a requirement for the PAM system to be able to detect a vocalization of North Atlantic right whales up to 12 km away in § 217.324(c). In §§ 217.324 and 217.325, NMFS has removed NMFS-approved PAM systems(s) terminology as NMFS approves PAM plans and not PAM systems.

To align with the BiOp, NMFS has increased the number of on-duty PSOs on the foundation installation platform and the number of PSO-dedicated vessels to improve the reliability of marine mammal detection from the platform in § 217.324(c). The minimum number of PSOs per platform during UXO/MEC detonation has been increased to three in § 217.324(d).

NMFS added requirements related to conducting and reporting on Thorough and Abbreviated SFV to align with the BiOp in § 217.324(c)–(d).

NMFS has clarified requirements for clearance zones, shutdown zones, deactivating acoustic sources when not in use, PSO activity and communication requirements, and vessel operator communication requirements, applying to HRG surveys operating sub-bottom profilers (SBPs) in § 217.324(e) to ensure compliance and proper implementation of the regulations.

NMFS has added a requirement for acoustic source ramp-ups to be scheduled in order to minimize the time spent with the source activated.

For fishery monitoring surveys in § 217.324(f), NMFS has clarified language on emptying survey gear, gear deployment timing, trawl tow times and speed, and visual monitoring efforts.

The following changes are reflected in § 217.325, ''Requirements for monitoring and reporting,'' and the associated Monitoring and Reporting section of the preamble to this final rule:

NMFS has added a requirement for confirmation of all required training to be documented on a training course log sheet and reported to NMFS before initiating project activities. A description of the training program must be provided to NMFS at least 60 days prior to the initial training before in-water activities begin. NMFS has added a requirement that the marine mammal monitoring team must monitor available sources of information on North Atlantic right whale presence in or near the Project no less than every 4 hours.

NMFS has clarified PAM operator qualifications as well as PSO and PAM training requirements in § 217.235 to ensure compliance and proper implementation of regulations. This additional clarification includes detailed requirements for prior experience, being independent observers, ability for PAM operators to review and classify acoustic detections in real-time, PSO marine mammal identification and behavior training to focus on species specific to the North Western Atlantic Ocean, and PSO and PAM training to have been completed within the past 5 years and have included a certificate of course completion. NMFS has specified that Avangrid must submit the names of PSOs and PAM operators previously approved by NMFS at least 30 days prior to commencement of the specified activities and 15 days prior to when new PSO/PAM operators are required after activities have commenced.

NMFS has specified the following additional details in § 217.325(b) to clarify PSO and PAM operator requirements in order to ensure compliance and proper implementation of regulations: PSOs must monitor for marine mammals prior to, during, and following impact pile driving, vibratory pile driving, drilling, UXO/MEC detonation and HRG surveys that use sub-bottom profilers and monitoring must be done while free from distractions; all on-duty PSOs and on-duty PAM operator(s) are to remain in real-time contact with the on-duty construction personnel responsible for implementing mitigations; and the PAM operator must inform the Lead PSO(s) on duty of animal detections approaching or within applicable ranges of interest to the activity occurring via the data collection software system.

NMFS added requirements related to conducting and reporting on SFV (Thorough and Abbreviated) to align with the BiOp in § 217.325(c), (d), and (f).

NMFS added a requirement to § 217.325(c) for a Nighttime Monitoring Plan if Avangrid intends to request nighttime foundation installation. No nighttime foundation installation can occur until NMFS reviews and approves the plan.

NMFS clarified requirements for the PAM Plan and Marine Mammal Monitoring Plan to align with the BiOp in § 217.325(d).

NMFS has clarified the reporting requirements, such as, the format of dates must be in the MM/DD/YYYY format, location information must be provided in Decimal Degrees and with the coordinate system information, and which email addresses a report must be submitted to.

In consideration of public comments with concerns for underestimating takes by Level A harassment and Level B harassment, NMFS has added a requirement that if at any time during the Project Avangrid becomes aware of any issue or issues which may (to any reasonable subject-matter expert, including the persons performing the measurements and analysis) call into question the validity of any measured Level A harassment or Level B harassment isopleths to a significant degree, Avangrid must inform NMFS Office of Protected Resources within one business day of becoming aware of this issue or before the next pile is driven, whichever comes first.

NMFS has added specific regional contact information for reporting North Atlantic right whale sightings and stranded, entangled, injured, or dead marine mammals.

NMFS had added a requirement to report observations of any large whale (other than North Atlantic right whales) to the WhaleAlert app.

Recognizing the extensive, frequent, and situational monitoring data and report requirements, NMFS clarified the language describing the annual or biennial review of data to inform adaptive management decisions to indicate that adaptive management decisions may be made at any time, as new information warrants it.

Description of Marine Mammals in the Geographic Area

As noted in the *Changes from the Proposed to Final Rule* section, updates have been made to the abundance estimate for North Atlantic right whales and to the UME summaries of multiple species. These changes are described in detail in the sections below and, otherwise, the marine mammal

information has not changed since the proposed rule.

Thirty-eight marine mammal species under NMFS' jurisdiction have geographic ranges within the western North Atlantic OCS (Hayes *et al.,* 2023). Sections 3 and 4 of Park City Wind's (now Avangrid's) ITA application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species (Park City Wind, 2022). Additional information regarding population trends and threats may be found in NMFS's SARs (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments*) and more general information about these species (*e.g.,* physical and behavioral descriptions) may be found on NMFS's website (*https://www.fisheries.noaa.gov/find-species*).

Table 2 lists all species and stocks for which take is expected and may be authorized for this action, and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA, and provides the potential biological removal (PBR), where known. PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (16 U.S.C. 1362(20)). While no mortality is anticipated or may be authorized, 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. All values presented in table 2 are the most recent available at the time of publication and are available in NMFS' 2023 draft SARs available online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports.*

TABLE 2—MARINE MAMMAL SPECIES THAT MAY OCCUR IN THE PROJECT AREA AND BE TAKEN BY HARASSMENT

Common name	Scientific name [1]	Stock	ESA /MMPA status; strategic (Y/N) [2]	Stock abundance (*CV, N_{min},* most recent abundance survey) [3]	PBR	Total annual M/SI [4]
Order Artiodactyla—Cetacea—Superfamily Mysticeti (baleen whales)						
Family Balaenidae:						
North Atlantic right whale [5]	*Eubalaena glacialis*	Western Atlantic	E, D, Y	340 (0, 337, 2021); 356 (346–363, 2022).	0.7	27.2
Family Balaenopteridae (rorquals):						
Blue whale	*Balaenoptera musculus*	Western North Atlantic	E, D, Y	UNK (UNK; 402; 1980–2008).	0.8	0
Fin whale	*Balaenoptera physalus*	Western North Atlantic	E, D, Y	6,802 (0.24; 5,573; 2021)	11	2.05
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine	-, -, Y	1,396 (0; 1,380; 2016)	22	12.15
Minke whale	*Balaenoptera acutorostrata*	Canadian Eastern Coastal	-, -, N	21,968 (0.31; 17,002; 2021).	170	9.4
Sei whale	*Balaenoptera borealis*	Nova Scotia	E, D, Y	6,292 (1.02; 3,098; 2021)	6.2	0.6
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Physeteridae:						
Sperm whale	*Physeter macrocephalus*	North Atlantic	E, D, Y	5,895 (0.29; 4,639; 2021)	9.28	0.2
Family Kogiidae:						
Dwarf sperm whale	*Kogia sima*	Western North Atlantic	-, -, N	9,474 (0.36, 7,080, 2021)	57	UNK
Pygmy sperm whale	*Kogia breviceps*	Western North Atlantic	-, -, N	9,474 (0.36, 7,080, 2021)	57	UNK
Family Ziphiidae:						
Cuvier's beaked whale	*Ziphius cavirostris*	Western North Atlantic	-, -, N	4,670 (0.24, 3,817, 2021)	38	0.2
Blainville's beaked whale	*Mesoplodon densirostris*	Western North Atlantic	-, -, N	2,936 (0.26, 2,374, 2021)	24	0.2
Gervais' beaked whale	*Mesoplodon europaeus*	Western North Atlantic	-, -, N	8,595 (0.24, 7,022, 2021)	70	0
Sowerby's beaked whale	*Mesoplodon bidens*	Western North Atlantic	-, -, N	492 (0.50, 340, 2021)	3.4	0
True's beaked whale	*Mesoplodon mirus*	Western North Atlantic	-,-,N	4,480 (0.34, 3,391, 2021)	34	0.2
Northern bottlenose whale [6]	*Hyperoodon ampullatus*	Western North Atlantic	-, -, N	UNK (UNK, UNK, 2016)	UNK	0
Family Delphinidae:						
Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic	-, -, N	31,506 (0.28, 25,042, 2021).	250	0
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Western North Atlantic	-, -, N	93,233 (0.71, 54,443, 2021).	544	28
Common bottlenose dolphin [7].	*Tursiops truncatus*	Western North Atlantic Offshore	-, -, N	64,587 (0.24, 52,801, 2021).	507	28
Clymene dolphin	*Stenella clymene*	Western North Atlantic	-, -, N	21,778 (0.72, 12,622, 2021).	126	0
Common dolphin	*Delphinus delphis*	Western North Atlantic	-, -, N	93,100 (0.56; 59,897; 2021) [8].	1,452	414
Long-finned pilot whales	*Globicephala melas*	Western North Atlantic	-, -, N	39,215 (0.30; 30,627; 2021).	306	5.7
Short-finned pilot whale [8]	*Globicephala macrorhynchus*	Western North Atlantic	-, -, Y	18,726 (0.33, 14,292, 2021).	143	218
Risso's dolphin	*Grampus griseus*	Western North Atlantic	-, -, N	44,067 (0.19, 30,662, 2021).	307	18
False killer whale	*Pseudorca crassidens*	Western North Atlantic	-, -, N	1,298 (0.72, 775, 2021)	7.6	0
Fraser's dolphin [9]	*Lagenodelphis hosei*	Western North Atlantic	-, -, N	UNK (UNK, UNK, 2021)	UNK	0

TABLE 2—MARINE MAMMAL SPECIES THAT MAY OCCUR IN THE PROJECT AREA AND BE TAKEN BY HARASSMENT—Continued

Common name	Scientific name [1]	Stock	ESA /MMPA status; strategic (Y/N) [2]	Stock abundance (*CV*, N_{min}, most recent abundance survey) [3]	PBR	Total annual M/SI [4]
Killer whale[10]	*Orcinus orca*	Western North Atlantic	-, -, N	UNK (UNK, UNK, 2016)	UNK	0
Melon-headed whale[11]	*Peponocephala electra*	Western North Atlantic	-, -, N	UNK (UNK, UNK, 2021)	UNK	0
Pantropical spotted dolphin	*Stenella attenuata*	Western North Atlantic	-, D, N	2,757 (0.50, 1,856, 2021)	19	0
Pygmy killer whale [12]	*Feresa attenuata*	Western North Atlantic	-, -, N	UNK (UNK, UNK, 2021)	UNK	0
Rough-toothed dolphin [13]	*Steno bredanensis*	Western North Atlantic	-, -, N	UNK (UNK, UNK, 2021)	undet	0
Spinner dolphin	*Stenella longirostris*	Western North Atlantic	-, D, N	3,181 (0.65, 1,930, 2021)	19	0
Striped dolphin	*Stenella coeruleoalba*	Western North Atlantic	-, -, N	48,274 (0.29, 38,040, 2021).	529	0
White-beaked dolphin	*Lagenorhynchus albirostris*	Western North Atlantic	-, -, N	536,016 (0.31, 415,344, 2016).	4,153	0
Family Phocoenidae (porpoises):						
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy	-, -, N	85,765 (0.53, 56,420, 2021).	649	145
Order Carnivora—Superfamily Pinnipedia						
Family Phocidae (earless seals):						
Gray seal [14]	*Halichoerus grypus*	Western North Atlantic	-, -, N	27,911 (0.20, 23,624, 2021).	1,512	4,570
Harbor seal	*Phoca vitulina*	Western North Atlantic	-, -, N	61,336 (0.08, 57,637, 2018).	1,729	339
Harp seal	*Pagophilus grownlandicus*	Western North Atlantic	-, -, N	7.6M (UNK, 7.1M, 2019)	426,000	178,573
Hooded seal [15]	*Cystophora cristata*	Western North Atlantic	-, -, N	UNK (UNK, UNK, n/a)	UNK	1680

[1] Information on the classification of marine mammal species can be found on the web page for The Society for Marine Mammalogy's Committee on Taxonomy (*https://marinemammalscience.org/science-and-publications/list-marine-mammal-species-subspecies;* Committee on Taxonomy, 2023)).

[2] 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.

[3] NMFS' marine mammal stock assessment reports can be found online at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessments. CV* is the coefficient of variation; N_{min} is the minimum estimate of stock abundance.

[4] These values, found in NMFS' SARs, represent annual levels of human-caused mortality plus serious injury from all sources combined (*e.g.,* commercial fisheries, vessel strike).

[5] In the proposed rule (87 FR 79072, December 23, 2022), a population estimate of 368 was used which represented the best available science at the time of publication. However, since the publication of the proposed rule, a new estimate (n=340) was released in NMFS' draft 2023 SARs and has been incorporated into this final rule. The current draft SAR includes an estimated population (N_{best} 340) based on sighting history through December 2021 (89 FR 5495, January 29, 2024). In October 2023, NMFS released a technical report identifying that the North Atlantic right whale population size based on sighting history through 2022 was 356 whales, with a 95 percent credible interval ranging from 346 to 363 (Linden, 2023); Total annual average observed North Atlantic right whale mortality during the period 2017–2021 was 7.1 animals and annual average observed fishery mortality was 4.6 animals. Numbers presented in this table (27.2 total mortality and 17.6 fishery mortality) are 2016–2020 estimated annual means, accounting for undetected mortality and serious injury.

[6] The total number of northern bottlenose whales off the eastern U.S. coast is unknown. Present data are insufficient to calculate a minimum population estimate for this species (89 FR 5495, January 29, 2024).

[7] As noted in the draft 2023 SAR (89 FR 5495, January 29, 2024), abundance estimates may include sightings of the coastal form.

[8] A key uncertainty exists in the population size estimate for this species based upon the assumption that the logistic regression model accurately represents the relative distribution of short-finned vs. long-finned pilot whales (89 FR 5495, January 29, 2024).

[9] The total number of Fraser's dolphins off the eastern U.S coast is unknown. Present data are insufficient to calculate a minimum population estimate for this stock (89 FR 5495, January 29, 2024).

[10] The total number of killer whales off the eastern U.S coast is unknown. Present data are insufficient to calculate a minimum population estimate for this species (89 FR 5495, January 29, 2024).

[11] The population size of this species is unknown as this species was rarely sighted during surveys. Present data are insufficient to calculate a minimum population estimate for this stock (89 FR 5495, January 29, 2024).

[12] The total number of pygmy killer whales off the eastern U.S coast is unknown. Present data are insufficient to calculate a minimum population estimate for this stock (89 FR 5495, January 29, 2024).

[13] The abundance estimate for this species is based upon the average of the 2011 and 2016 abundance estimates. However, uncertainties in the abundance estimate exist due to the low number of sightings (n=1 in 2011; n=0 in 2016), variance in encounter rates, and uncertainty in estimation of detection probability (89 FR 5495, January 29, 2024).

[14] NMFS' stock abundance estimate (and associated PBR value) applies to the U.S. population only. Total stock abundance (including animals in Canada) is approximately 394,311. The annual M/SI value given is for the total stock (89 FR 5495, January 29, 2024).

[15] There is uncertainty in available population estimates due to limited surveys, limited reproductive data, and uncertainty in stock relationships and harvest statistics (89 FR 5495, January 29, 2024).

In addition to the species listed in table 2, the Florida manatees (*Trichechus manatus;* a sub-species of the West Indian manatee) has been previously documented as an occasional visitor to the Northeast region during summer months (U.S. Fish and Wildlife Service (USFWS), 2019). However, manatees are managed by the USFWS and are not considered further in this document.

As described in the proposed rule, the applicant also requested take for beluga whales (*Delphinapterus leucas*), however, there is no beluga whale stock designated under the MMPA along the U.S. Eastern Seaboard as it is a more northerly species; therefore, they are not considered further in this document. A detailed description of the species likely to be affected by the Project, including brief introductions to the species and relevant stocks, information regarding population trends and threats, and information regarding local occurrence, were provided in the application and the proposed rule (88 FR 37606, June 8, 2023). Other than adjustments to population statistics (*e.g.,* North Atlantic right whale population abundance) and UME updates, we are not aware of any changes in the status of the species and stocks listed in table 2; therefore, detailed descriptions are not provided here. Please refer to the proposed rule for these descriptions (88 FR 37606, June 8, 2023). Please also refer to NMFS' website (*https://www.fisheries.noaa.gov/find-species*) for generalized species accounts.

Since the publication of the proposed rule, the following updates have occurred to the below species in regards to general information or their active UMEs.

North Atlantic Right Whale

In January 2024, NMFS released its draft 2023 SARs which updated the population estimate (N_{best}) of North Atlantic right whales to 340 individuals (a decrease from the population estimate in the proposed rule (*n*=368) but an increase from the final 2022 SARs (*n*=338); the annual M/SI value dropped from the final 2022 SAR of 31.2 to 27.2 in the draft 2023 SAR. Beginning in the 2022 SARs, the M/SI for North Atlantic right whale included the addition of estimated undetected mortality and serious injury, which had not been previously included in the SAR. The current population estimate is equal to the North Atlantic Right Whale Consortium's 2022 Annual Report Card, which identifies the population estimate as 340 individuals (Pettis *et al.,* 2023).

As described in the proposed rule, elevated North Atlantic right whale mortalities have occurred since June 7, 2017, along the U.S. and Canadian coast, with the leading category for the cause of death for this UME determined to be ''human interaction,'' specifically from entanglements or vessel strikes. Since publication of the proposed rule, the number of animals considered part of the UME has increased. As of April 12, 2024, there have been 39 confirmed mortalities (dead, stranded, or floaters), 1 pending mortalities, and 34 seriously injured free-swimming whales for a total of 74 whales. The UME also considers animals with sublethal injury or illness (called ''morbidity''; *n*=52) bringing the total number of whales in the UME from 74 to 126. More information about the North Atlantic right whale UME is available online at: *https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events.*

Humpback Whale

Since January 2016, elevated humpback whale mortalities have occurred along the Atlantic coast from Maine to Florida. This event was declared a UME in April 2017. Partial or full necropsy examinations have been conducted on approximately half of the 221 known cases (as of May 3, 2024). There has been no update to this UME since the proposed rule. More information is available at: *https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events.*

Since December 1, 2022, the number of humpback strandings along the mid-Atlantic coast, from North Carolina to New York, has been elevated. In some cases, the cause of death is not yet known; in others, vessel strike has been deemed the cause of death. As the humpback whale population has grown, they are seen more often in the Mid-Atlantic. These whales may be following their prey (small fish) which were reportedly close to shore in the 2022–2023 winter. Changing distributions of prey impact larger marine species that depend on them, and result in changing distribution of whales and other marine life. These prey also attract fish that are targeted by recreational and commercial fishermen, which increases the number of boats and amount of fishing gear in these areas. This nearshore movement increases the potential for anthropogenic interactions, particularly as the increased presence of whales in areas traveled by boats of all sizes increases the risk of vessel strikes.

Minke Whale

Since January 2017, a UME has been declared based on elevated minke whale mortalities detected along the Atlantic coast from Maine through South Carolina. As of May 3, 2024, a total of 168 minke whales have stranded during this UME. Full or partial necropsy examinations were conducted on more than 60 percent of the whales. Preliminary findings have shown evidence of human interactions or infectious disease in several of the whales, but these findings are not consistent across all of the whales examined, so more research is needed. More information is available at: *https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events.*

Phocid Seals

Since June 2022, elevated numbers of harbor seal and gray seal mortalities have occurred across the southern and central coast of Maine. This event was declared a UME in July 2022 but closed after the proposed rule. The UME Investigative Team reviewed necropsy, histopathology, and diagnostic findings. They determined the UME was attributed to spillover events of the highly pathogenic avian influenza H5N1 virus from infected wild birds to harbor and gray seals. An ongoing HPAI H5N1 global outbreak in domestic and wild birds and wild mammals began in 2021. Live seals showed signs of respiratory and neurological disease including nasal and ocular discharge, coughing, unresponsiveness, and seizures. Eighteen percent of the stranded seals (33 out of 180) were tested for avian influenza via polymerase-chain-reaction. A subset of seals were positive for HPAI H5N1 with preliminary findings confirmed by the United States Department of Agriculture's National Veterinary Services Laboratories. Of the 33 seals tested during the UME period 19 (58 percent) were positive for H5N1 (17 harbor seals; 2 gray seals) and 14 (42 percent) tested negative. Twelve H5N1 positive seals had histopathology conducted; 11 of those seals had lesions (primarily respiratory and/or neurologic) suspected or consistent with avian influenza infection. Sequencing of the H5N1 virus detected in seals suggests the seals were infected from spillover events from infected wild birds to these seals. While the UME was not occurring in the area of the Project, the populations affected by the UME were the same as those potentially affected by the Project. Information on this UME is available online at: *https://www.fisheries.noaa.gov/national/marine-life-distress/active-and-closed-unusual-mortality-events.*

Marine Mammal Hearing

Hearing is the most important sensory modality for marine mammals underwater, and exposure to anthropogenic sound can have deleterious effects. To appropriately assess the potential effects of exposure to sound, it is necessary to understand the frequency ranges marine mammals are able to hear. Current data indicate that not all marine mammal species

have equal hearing capabilities (*e.g.,* Richardson *et al.,* 1995; Wartzok and Ketten, 1999; Au and Hastings, 2008). To reflect this, Southall *et al.* (2007) recommended that marine mammals be divided into functional hearing groups based on directly measured or estimated hearing ranges on the basis of available behavioral response data, audiograms derived using auditory evoked potential techniques, anatomical modeling, and other data. Note that no direct measurements of hearing ability have been successfully completed for mysticetes (*i.e.,* low-frequency cetaceans). Subsequently, NMFS (2018) described generalized hearing ranges for these marine mammal hearing groups. Generalized hearing ranges were chosen based on the approximately 65–dB threshold from the normalized composite audiograms, with the exception for lower limits for low-frequency cetaceans where the lower bound was deemed to be biologically implausible and the lower bound from Southall *et al.* (2007) retained. Marine mammal hearing groups and their associated hearing ranges are provided in table 3.

TABLE 3—MARINE MAMMAL HEARING GROUPS

[NMFS, 2018]

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

NMFS notes that in 2019a, Southall *et al.* recommended new names for hearing groups that are widely recognized. However, this new hearing group classification does not change the weighting functions or acoustic thresholds (*i.e.,* the weighting functions and thresholds in Southall *et al.* (2019a) are identical to NMFS 2018 Revised Technical Guidance). When NMFS updates our Technical Guidance, we will be adopting the updated Southall *et al.* (2019a) hearing group classification.

Potential Effects of Specified Activities on Marine Mammals and Their Habitat

Exposure to underwater noise and explosive detonations from the Project's specified activities have the potential to result in Level A harassment or Level B harassment of marine mammals in the specified geographical region, but no serious injury or mortality. The proposed rule (88 FR 37606, June 8, 2023) included a discussion of the effects of anthropogenic noise on marine mammals and the potential effects of underwater noise and explosive detonations from the Project's specified activities on marine mammals and their habitat. While some new literature regarding marine mammal distribution and habitat use has been published since publication of the proposed rule (*e.g.,* Holdman *et al.,* 2023; Meyer-Gutbrod *et al.,* 2023; Van Parijs *et al.,* 2023; Westwell *et al.,* 2024), there is no new information that NMFS is aware of that changes the analysis in the proposed rule. We provide a summary of these papers below.

Holdamn *et al.* (2023) studied harbor porpoise habitats in the Gulf of Maine (GOM) and Southern New England waters providing baseline data on the occurrence and foraging activity of porpoises from 2020 to 2022. Harbor porpoises were present year-round in the GOM with peak detections in the summer and fall. The observed seasonal pattern of harbor porpoise occurrence in this study is consistent with prior information on the general distribution of the GOM/Bay of Fundy stock (Wingfield *et al.,* 2017; NMFS, 2021). In line with previously reported distribution patterns, harbor porpoise occurrence in Southern New England was high in fall, winter and spring, but porpoises were largely absent in the summer. Results from generalized additive models suggest that time of year, hour of day, lunar illumination, and temperature are significant contributors to harbor porpoise presence (detection mainly through echolocation clicks) and/or foraging effort.

Meyer-Gutbrod *et al.* (2023) studied North Atlantic right whale sightings from 1990–2018 to examine patterns in monthly habitat use in 12 high-use areas to broadly characterize new seasonal habitat-use patterns across the core North Atlantic right whale range. As North Atlantic right whale foraging habitat selection is driven by complex spatial and temporal patterns (*e.g.,* prey abundance), abundances of *Calanus finmarchicus* (a species of copepod and a component of the zooplankton found in the northern Atlantic Ocean) and *Calanus hyperboreus* (species of copepod found in the Arctic Ocean and northern Atlantic Ocean) were also analyzed for decadal variations in the North Atlantic right whale foraging habitats. The research found that in comparison to the 2000s, the 1990s and the 2010s were similar in that North Atlantic right whale sightings (*i.e.,* Sightings Per Unit Effort (SPUE)) declined in the foraging habitats of the Gulf of Maine and Scotian Shelf during the seasons when abundance of *C. finmarchicus* was relatively low (spring, summer, fall). The drop in sightings is associated with extended duration of habitat use by North Atlantic right whales in Cape Cod Bay into the late spring and increased use of Southern New England waters and the Gulf of St. Lawrence in the spring and summer in the 2010s. Summertime declines in the 2010s for copepod abundances in the traditional foraging habitat (*e.g.,* Gulf of Maine) indicate that the increased use of the Gulf of St. Lawrence in more recent years is driven by a decline in prey in traditional foraging habitats rather than by an increase in prey in the new foraging habitat. Overall, while some patterns in seasonal habitat use remained consistent across all three decades, including the winter migration to the Southeast US calving ground and early spring foraging in Cape Cod Bay,

there were notable differences in the seasonality and persistence of North Atlantic right whales in some foraging habitats across the study period which indicate that the North Atlantic right whale distribution patterns are shifting.

Van Parijs *et al.* (2023), provides 2 years of baseline data on cetacean species' presence, vessel activity, and ambient sound levels in the southern New England wind energy area. With eight species/families present in the area for at least 9 months of the year, this area represents an important habitat for cetaceans. Most species showed seasonality, with peak daily presence in winter (harbour porpoise, North Atlantic right, fin, and humpback whales), summer (sperm whales), spring (sei whales), or spring and fall/autumn (minke whales). Delphinids were continuously present and blue whales present only in January. The North Atlantic right whale was present year round with high presence in October through April.

Westell *et al.* (2024) collected baseline data from 2020 to 2022, with six passive acoustic recorders deployed in the vicinity of Nantucket Shoals and Cox's Ledge. Data were analyzed for sperm whale presence, and demographic composition was assessed using interclick intervals. Presence varied by site, season, and year. Sperm whales were detected year-round but the majority (78 percent) of days with acoustic occurrences were between May and August. Sound propagation tests were conducted at two sites and predicted detection ranges within 20–40 km indicate that sperm whales were likely in proximity to the WEA. These results provide a baseline for ongoing sperm whale presence, especially that of social groups which may be more sensitive to disturbance.

Moreover, new data also supports our inclusion of certain mitigation measures in the proposed and this final rule. For example, Crowe *et al.* (2023) discussed the use and importance of real-time data for detecting North Atlantic right whale. The shift in North Atlantic right whale habitat use motivated the integration of additional ways to detect the presence of North Atlantic right whales and passive acoustic detections of right whale vocalizations reported in near real-time became an increasingly important tool to supplement visual sightings. The proposed rule did include real-time and daily awareness measures and sighting communication protocols, NMFS evaluated these measures and added details for clarity or updated the reporting mechanisms, such as in the case of sighting an injured North Atlantic right whale. Davis *et al.* (2023) analyzed North Atlantic right whale individual upcalls from 2 years of acoustic recordings in southern New England which showed that North Atlantic right whale were detected at least 1 day every week throughout both years, with highest North Atlantic right whale presence from October to April. Within SNE, on average, 95 percent of the time North Atlantic right whales persisted for 10 days, and recurred again within 11 days. An evaluation of the time period over which it is most effective to monitor prior to commencing pile driving activities showed that with 1 h of pre-construction monitoring there was only 4 percent likelihood of hearing a North Atlantic right whale, compared to 74 percent at 18 h. Therefore, monitoring for at least 24 h prior to activity will increase the likelihood of detecting an up-calling North Atlantic right whale.

Since issuance of the proposed rule, a non-peer reviewed report on HRG survey noise has also been released (Rand *et al.,* 2023). The measured data presented in Rand *et al.* (2023) are consistent with our evaluation of sound levels produced by HRG surveys (*i.e.,* received sound levels at the ranges measured) and vessels and do not change our assessments of potential impacts. The analysis of those data in the Rand *et al.* (2023) report, however, includes methodological issues and therefore does not support all of their conclusions.

Since the publication of the proposed rule, new scientific information has become available that provides additional insight into the sound fields produced by turbine operation (HDR, Inc., 2023; Holme *et al.,* 2023). Recently, Holme *et al.* (2023) stated that Tougaard *et al.* (2020) and Stöber and Thomsen (2021) extrapolated levels for larger turbines and should be interpreted with caution since both studies relied on data from smaller turbines (0.45 to 6.15 MW) collected over a variety of environmental conditions. They demonstrated that the model presented in Tougaard *et al.* (2020) tends to overestimate levels (up to approximately 8 dB) measured to those in the field, especially with measurements closer to the turbine for larger turbines. Holme *et al.* (2023) measured operational noise from larger turbines (6.3 and 8.3 MW) associated with three wind farms in Europe and found no relationship between turbine activity (*i.e.,* power production, which is proportional to the blade's revolutions per minute) and noise level. However, it was noted that this missing relationship may have been masked by the area's relatively high ambient noise sound levels. Sound levels (*i.e.,* root-mean-square (RMS)) of a 6.3 MW direct-drive turbine were measured to be 117.3 dB at a distance of 70 m. However, measurements from 8.3 MW turbines were inconclusive as turbine noise was deemed to have been largely masked by ambient noise.

In addition, operational turbine measurements from the Coastal Virginia Offshore Wind pilot pile project indicated that noise levels from two, 7.8 m monopiles WTGs were higher when compared to Block Island wind farm, likely due to vibrations associated with the monopiles structure (HDR, Inc., 2023). We note that this updated information does not change our assessment for impacts of turbine operational sound on marine mammals. As described in the proposed rule, NMFS will require Avangrid to measure operational noise levels, however, is not authorizing take incidental to operational noise from WTGs.

In addition, recently, a National Academy of Sciences, Engineering, and Medicine (NASEM) panel of independent experts concluded that the impacts of offshore wind operations on North Atlantic right whales and their habitat in the Nantucket Shoals region (a key winter foraging habitat tens of kilometers to the east of the Project area) are uncertain due to the limited data available at this time and recognized what data is available is largely based on models from the North Sea that have not been validated by observations (National Academy of Sciences, 2023). The report also identifies that major oceanographic changes have occurred to the Nantucket Shoals region over the past 25 years and it will be difficult to isolate from the much larger variability introduced by natural and other anthropogenic sources (including climate change). This report is specific to the Nantucket Shoals region which is unlikely to be influenced by any long-term operational effects of the Project; however, the findings in the report align with those presented in the proposed rule. More recently, NMFS concluded ESA consultation on Federal actions associated with the Project, including NMFS's proposal to issue a 5-year rule to Avangrid and BOEM's approval of the Construction and Operation Plan (COP) which covers the 30 years of the Project's operation and subsequent decommissioning.

Similar to the discussion presented in the proposed rule, the BiOp stated the Project will produce a wind wake from operation of the turbines and that the foundations themselves will lead to disruptions in local conditions; the scale of these effects is expected to

range from hundreds of meters and up to 1 km from each foundation and the changes in conditions may alter the distribution of nutrients, primary production, and plankton. The BiOp concluded it is not expected that the impacts to oceanic conditions resulting from the Project will affect the oceanographic forces transporting plankton into the area from the south and east; however, there may be effects on the distribution of plankton more locally. The construction and operation of the Project is not expected to alter this broad current pattern, and thus NMFS expects any alteration of the biomass of plankton in the region, and therefore, the total food supply, to be so small that adverse effects on ESA-listed species are not reasonably certain to occur.

Overall, there is no new scientific information regarding the general anticipated effects of OSW construction on marine mammals and their habitat that was not discussed in the proposed rule. The information and analysis regarding the potential effects on marine mammals and their habitat is incorporated by reference and included in the proposed rule is referenced and used for this final rule and is not repeated here; please refer to the proposed rule (88 FR 37606, June 8, 2023).

Estimated Take

As noted in the Changes from the Proposed to Final Rule section, changes to the estimated and allowable take (*i.e.,* take that may be authorized) for several species have been made since publication of the proposed rule based on new information from Avangrid, recommendations received during the public comment period, and the best available science. This section provides an estimate of the number of incidental takes that may be authorized through this rule, which will inform both NMFS' consideration of ''small numbers'' and the negligible impact determination. The analysis related to take incidental to HRG surveys, UXO/MEC detonation, and rare species is unchanged since the proposed rule. However, as described above in the Changes from the Proposed section, Avangrid re-evaluated the sound fields generated during foundation installation and corresponding exposure estimates which is further described in the foundation installation take section below. Takes allowed under this rule would primarily be by Level B harassment, as use of the acoustic sources (*i.e.,* impact and vibratory pile driving, drilling, UXO/MEC detonation, site characterization surveys) are expected to result in disruption of marine mammal behavioral patterns due to exposure to elevated noise levels. Impacts such as masking and TTS can contribute to behavioral disturbances. There is also some potential for auditory injury constituting Level A harassment to occur in select marine mammal species incidental to the specified activities (*i.e.,* impact pile driving and UXO/MEC detonation). For this action, this potential is largely limited to, though not exclusive to, mysticetes due to their hearing sensitivities and the nature of the activities. As described below, the larger distances to the PTS thresholds, when considering marine mammal weighting functions, demonstrate this potential. For mid-frequency hearing sensitivities, when thresholds and weighting and the associated PTS zone sizes are considered, the likelihood for PTS from the noise produced by the Project is less than that for mysticetes. The required mitigation and monitoring measures are expected to minimize the severity of the taking to the extent practicable. As described previously, no serious injury or mortality is anticipated or may be authorized incidental to the Project. Below, we describe how the take was estimated.

Generally speaking, we estimate take by considering: (1) acoustic thresholds above which NMFS believes the best available science indicates marine mammals will be behaviorally harassed or incur some degree of permanent hearing impairment (as well as impulse metric (Pascal-second) and peak sound pressure level thresholds above which marine mammals may incur non-auditory injury from underwater explosive detonations); (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. Below, we describe the factors considered here in more detail and present the take estimates.

Marine Mammal Acoustic Thresholds

NMFS recommends the use of acoustic thresholds that identify the received level of underwater sound above which exposed marine mammals are likely to be behaviorally harassed (equated to Level B harassment) or to incur PTS of some degree (equated to Level A harassment). Thresholds have also been developed identifying the received level of in-air sound above which exposed pinnipeds would likely be behaviorally harassed. A summary of all NMFS' thresholds can be found at (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance*).

Level B harassment—Though significantly driven by received level, the onset of behavioral isturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source or exposure context (*e.g.,* frequency, predictability, duty cycle, duration of the exposure, signal-to-noise ratio, distance to the source), the environment (*e.g.,* other noises in the area) and the state of the receiving animals (*e.g.,* hearing, motivation, experience, demography, life stage, depth), and can be difficult to predict (*e.g.,* Southall *et al.,* 2007, 2021; Ellison *et al.,* 2012). Based on what the available science indicates and the practical need to use a threshold based on a metric that is both predictable and measurable for most activities, NMFS typically uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS generally predicts that marine mammals are likely to be behaviorally harassed in a manner considered to be Level B harassment when exposed to underwater anthropogenic noise above RMS pressure received levels (SPL) of 120 dB (re 1 µPa) for continuous (*e.g.,* vibratory pile driving, drilling) and above RMS SPL 160 dB re 1 µPa for non-explosive impulsive (*e.g.,* seismic airguns) or intermittent (*e.g.,* scientific sonar) sources (table 4). Generally speaking, Level B harassment take estimates based on these behavioral harassment thresholds are expected to include any likely takes by TTS as, in most cases, the likelihood of TTS occurs at distances from the source less than those at which behavioral harassment is likely. TTS of a sufficient degree can manifest as behavioral harassment, as reduced hearing sensitivity and the potential reduced opportunities to detect important signals (*e.g.,* conspecific communication, predators, prey) may result in changes in behavior patterns that would not otherwise occur.

Avangrid's construction activities include the use of continuous (*e.g.,* vibratory pile driving, drilling) and intermittent (*e.g.,* impact pile driving and HRG acoustic sources) sources; therefore, the 120 and 160 dB re 1 µPa (RMS) thresholds are applicable.

Level A harassment—NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0; Technical Guidance, 2018) identifies dual criteria to assess auditory injury constituting 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 (*i.e.,* impulsive or non-impulsive sources). As dual metrics, NMFS considers onset of PTS constituting Level A harassment to have occurred when either one of the two metrics is exceeded (*i.e.,* metric resulting in the largest isopleth). The Project includes the use of impulsive and non-impulsive sources.

These thresholds are provided in table 4 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS' 2018 Technical Guidance, which may be accessed at: *https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-acoustic-technical-guidance.*

TABLE 4—ONSET OF PTS

[NMFS, 2018]

Hearing group	PTS onset thresholds* (Received Level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	*Cell 1:* $L_{p0\text{-}pk,flat}$*:* 219 dB; $L_{E,p,\ LF,24h}$*:* 183 dB	*Cell 2:* $L_{E,p,\ LF,24h}$*:* 199 dB.
Mid-Frequency (MF) Cetaceans	*Cell 3:* $L_{p,0\text{-}pk,flat}$*:* 230 dB; $L_{E,p,\ MF,24h}$*:* 185 dB	*Cell 4:* $L_{E,p,\ MF,24h}$*:* 198 dB.
High-Frequency (HF) Cetaceans	*Cell 5:* $L_{p,0\text{-}pk,flat}$*:* 202 dB; $L_{E,p,HF,24h}$*:* 155 dB	*Cell 6:* $L_{E,p,\ HF,24h}$*:* 173 dB.
Phocid Pinnipeds (PW) (Underwater)	*Cell 7:* $L_{p,0\text{-}pk.flat}$*:* 218 dB; $L_{E,p,PW,24h}$*:* 185 dB	*Cell 8:* $L_{E,p,PW,24h}$*:* 201 dB.
Otariid Pinnipeds (OW) (Underwater)	*Cell 9:* $L_{p,0\text{-}pk,flat}$*:* 232 dB; $L_{E,p,OW,24h}$*:* 203 dB	*Cell 10:* $L_{E,p,OW,24h}$*:* 219 dB.

* Dual metric 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 are recommended for consideration.

Note: Peak sound pressure level ($L_{p,0\text{-}pk}$) has a reference value of 1 µPa, and weighted cumulative sound exposure level ($L_{E,p}$) has a reference value of 1µPa^{2}s. In this table, thresholds are abbreviated to be more reflective of International Organization for Standardization standards (ISO, 2017). The subscript ''flat'' is being included to indicate peak sound pressure are flat weighted or unweighted within the generalized hearing range of marine mammals (*i.e.,* 7 Hz to 160 kHz). 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 weighted 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 thresholds will be exceeded.

Explosives Source Thresholds

Based on the best scientific information available, NMFS uses the acoustic and pressure thresholds indicated in table 5 to predict the onset of PTS and TTS during UXO/MEC detonation. For a single detonation (within a 24-hour period), NMFS relies on the TTS onset threshold to assess the likelihood for Level B harassment. The final rule is conditioned such that Avangrid would limit detonations to one per day and would be limited to daylight hours only.

TABLE 5—PTS ONSET, TTS ONSET, FOR UNDERWATER EXPLOSIVES

[NMFS, 2018]

Hearing group	PTS impulsive thresholds	TTS impulsive thresholds
Low-Frequency (LF) Cetaceans	*Cell 1:* $L_{pk,flat}$*:* 219 dB; $L_{E,LF,24h}$*:* 183 dB	*Cell 2:* $L_{pk,flat}$*:* 213 dB; $L_{E,LF,24h}$*:* 168 dB.
Mid-Frequency (MF) Cetaceans	*Cell 4:* $L_{pk,flat}$*:* 230 dB; $L_{E,MF,24h}$*:* 185 dB	*Cell 5:* $L_{pk,flat}$*:* 224 dB; $L_{E,MF,24h}$*:* 170 dB.
High-Frequency (HF) Cetaceans	*Cell 7:* $L_{pk,flat}$*:* 202 dB; $L_{E,HF,24h}$*:* 155 dB	*Cell 8:* $L_{pk,flat}$*:* 196 dB; $L_{E,HF,24h}$*:* 140 dB.
Phocid Pinnipeds (PW) (Underwater)	*Cell 10:* $L_{pk,flat}$*:* 218 dB; $L_{E,PW,24h}$*:* 185 dB	*Cell 11:* $L_{pk,flat}$*:* 212 dB; $L_{E,PW,24h}$*:* 170 dB.

* Dual metric acoustic thresholds for impulsive sounds: Use whichever results in the largest isopleth for calculating PTS/TTS onset.

Note: Peak sound pressure (L_{pk}) has a reference value of 1 µPa, and cumulative sound exposure level (L_E) has a reference value of 1µPa^{2}s. In this table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI, 2013). However, ANSI defines peak sound pressure 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 overall marine mammal 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 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.

Additional thresholds for non-auditory injury to lung and gastrointestinal (GI) tracts from the blast shock wave and/or onset of high peak pressures are also relevant (at relatively close ranges) as UXO/MEC detonations, in general, have potential to result in mortality and non-auditory injury (table 6). Marine mammal lung injury criteria have been developed by the U.S. Navy (DoN (U.S. Department of the Navy), 2017), and adopted by NMFS, and are based on the mass of the animal and the depth at which it is present in the water column due to blast pressure. This means that specific decibel levels for each hearing group are not provided and instead, the criteria are presented as equations that allow for incorporation of specific mass and depth values. The GI tract injury threshold is based on peak pressure. The modified Goertner equations below represent the potential onset of lung injury and GI tract injury (table 6).

TABLE 6—LUNG AND G.I. TRACT INJURY THRESHOLDS

[DoN, 2017]

Hearing group	Mortality (severe lung injury) *	Slight lung injury *	G.I. tract injury
All Marine Mammals	*Cell 1:* Modified Goertner model; Equation 1.	*Cell 2:* Modified Goertner model; Equation 2.	*Cell 3:* $L_{pk,flat}$: 237 dB.

* Lung injury (severe and slight) thresholds are dependent on animal mass (Recommendation: table C.9 from DoN (2017) based on adult and/or calf/pup mass by species).

Note: Peak sound pressure (L_{pk}) has a reference value of 1 μPa. In this table, thresholds are abbreviated to reflect American National Standards Institute standards (ANSI, 2013). However, ANSI defines peak sound pressure 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 overall marine mammal generalized hearing range.

Modified Goertner Equations for severe and slight lung injury (Pascal-second)

Equation 1: $103M^{1/3}(1 + D/10.1)^{1/6}$ Pa-s

Equation 2: $47.5M^{1/3}(1 + D/10.1)^{1/6}$ Pa-s

M = animal (adult and/or calf/pup) mass (kg) (table C.9 in DoN, 2017)

D = animal depth (m)

Below, we discuss the marine mammal density information, acoustic modeling, and take estimation for each of Avangrid's specified activities. NMFS has carefully considered all information and analysis presented by the applicant as well as all other applicable information and, based on the best available science, concurs that the applicant's estimates of the types and amounts of take for each species and stock are complete and accurate.

Marine Mammal Density and Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. Depending on the species and as described in the take estimation section for each activity, take estimates may be based on the Roberts *et al.* (2023) density estimates, marine mammal monitoring results from HRG surveys, or average group sizes.

Habitat-based density models produced by the Duke University Marine Geospatial Ecology Laboratory and the Marine-life Data and Analysis Team, based on the best available marine mammal data from 1992 to 2022 obtained in a collaboration between Duke University, the Northeast Regional Planning Body, the University of North Carolina Wilmington, the Virginia Aquarium and Marine Science Center, and NOAA (Roberts *et al.,* 2016a, 2016b, 2017, 2018, 2020, 2021a, 2021b, 2023), represent the best available science regarding marine mammal densities in the Project Area. More recently, these data have been updated with new modeling results and include density estimates for pinnipeds (Roberts *et al.,* 2016b, 2017, 2018, 2023). Density data are subdivided into five separate raster data layers for each species, including: Abundance (density); 95 percent Confidence Interval of Abundance; 5 percent Confidence Interval of Abundance; Standard Error of Abundance; and Coefficient of Variation of Abundance.

The methods for calculating monthly, seasonal and annual densities have not changed since the proposed rule. For foundation installation, the width of the perimeter around the activity area used to select density data from the Roberts *et al.,* 2022 models was based on the largest 10-dB attenuated exposure range ($ER_{95\%}$; the Level B harassment range) applicable to that activity. The applicant calculated monthly densities for each species using grid cells within the lease area and a perimeter around the lease area that represented the $ER_{95\%}$ ensonified area for each sound-producing activity. The mean density for each month was determined by calculating the unweighted mean of all 5×5 km grid cells partially or fully within the analysis polygon. Densities were computed monthly for the May–December period to coincide with proposed foundation pile driving activities. In cases where monthly densities were unavailable, annual mean densities were used instead. For cases with vibratory setting of piles followed by impact pile driving, and impact pile driving alone (*i.e.,* all pile driving scenarios), densities were calculated within buffered polygons of various ranges around the Lease Area perimeter. The following ranges were pre-selected: 10, 25, and 50 km. For each species, foundation type, and attenuation level, the most appropriate density perimeter was selected from this list. The range was selected using the 95th percentile exposure range ($ER_{95\%}$) for each case, using the next highest range. For example, if the $ER_{95\%}$ was 8.5 km, the 10 km perimeter would be used. In cases where the $ER_{95\%}$ was larger than 50 km, the 50-km perimeter was used. The 50 km limit is derived from studies of mysticetes that demonstrate received levels, distance from the source, and behavioral context are known to influence the probability of behavioral response (Dunlop *et al.,* 2017).

For drilling, it was assumed that the activity would occur in three areas of interest: J1, M1, and M2 (*i.e.,* three modeled locations). The density perimeter was determined using the longest 10-dB attenuated 95th percentile acoustic range to the behavioral threshold ($R_{95\%}$) for all locations, rounded up to the nearest 5 km, and then applied around the entire lease area (*i.e.,* 7.1 km rounded up to 10 km). Monthly densities were calculated for each species as the average of the densities from all Roberts *et al.,* 2022 model grid cells that overlap partially or completely with the area of interest. Cells entirely on land were not included, but cells that overlap only partially with land were included.

As described in the proposed rule, for UXO/MEC detonations, the applicant commissioned a UXO/MEC desktop study in which a comprehensive historic analysis of all activities which may have contributed to potential UXO/MEC presence in the project area. The applicant evaluated the risk of encountering the potential UXO/MECs and identified areas of moderate risk of UXO/MEC presence then commissioned an acoustic modeling study, as described in the proposed rule. As a result of this process, the largest SEL-based TTS-onset acoustic ranges across all hearing groups was applied it to the moderate UXO/MEC risk areas, resulting in a 14.1-km perimeter for the shallow water segment of the OECC and a 13.8-km density perimeter for the deep water segment of the OECC as well as the SWDA.

For HRG surveys, the applicant applied all grid cells within the survey corridor. No buffer was applied given the small distance to Level B

harassment (<200 m) during surveys compared to the grid cell size in the Roberts *et al.,* 2022 density models (5 × 5 km). To estimate densities for the HRG surveys occurring both within the Lease Area and within the export cable routes, the applicant mapped density data from Roberts *et al.* (2023) within the boundary of the Project Area using geographic information systems. The applicant then averaged maximum monthly densities (as reported by Roberts *et al.,* 2023) by season over the survey duration (for winter (December through February), spring (March through May), summer (June through August), and fall (September through November)) within the HRG survey area. The maximum average seasonal density, for each species, was then carried forward in the take calculations (table 6).

For several marine mammal species, Roberts *et al.* (2023) does not differentiate by species and instead combines them into guilds. This is true for long-finned and short-finned pilot whales (pilot whale spp.), beaked whales, and harbor, harp, hooded, and gray seals (seals), where a pooled density by guild is the only value available from the data that is not partitioned by stock.

Below, we describe observational data from monitoring reports and average group size information, both of which are appropriate to inform take estimates for certain activities or species in lieu of density estimates.

For previous modeling efforts' marine mammal densities, for long- and short-finned pilot whales, the guild density from Roberts *et al.* (2016a, 2022b) was scaled by the relative stock sizes based on the best available abundance estimate from the 2023 SARs (Hayes *et al.,* 2022). Similarly, densities were provided for seals as a guild consisting primarily of harbor and gray seals (Roberts *et al.,* 2016a, 2022b), gray and harbor seal densities were scaled by relative 2023 SARs (Hayes *et al.,* 2022) abundance. For the recently updated modeling efforts—vibratory setting followed by impact pile driving, impact pile driving alone, drilling, UXO/MEC detonations, and HRG when calculating exposures for individual pilot whale and seal species, the guild densities provided by Roberts *et al.* (2016a, 2022b) were scaled by the relative abundances of the species in each guild, using the best available estimates of local abundance, to get species-specific density estimates surrounding the Lease Area. In estimating local abundances, all distribution data from the two pilot whale species and three seal species were downloaded from the Ocean Biodiversity Information System (OBIS) data repository (available at *https://obis.org/*). After reviewing the available datasets, it was deemed that data available in OBIS in Rhode Island and Massachusetts waters are the best available for the three seal species because of their overlap with the Lease Area.

For seals, OBIS reported 86 observations of gray seals, 129 observations of harbor seals, and 93 observations of harp seals. Therefore, the proportions of 0.28 (86/308), 0.42 (129/308), and 0.30 (93/308) were used to scale the seals' guild densities for the three seal species, respectively. The best data available for pilot whales came from AMAPPS data in Rhode Island and Massachusetts waters. The proportions of 0.80 for long-finned and 0.20 for short-finned pilot whales were used (Palka *et al.,* 2021).

For uncommon species, the predicted densities from the Roberts *et al.,* 2022 models are very low and the resulting density-based exposure estimate is less than a single animal or a typical group size for the species. In such cases, densities were not used but the take request is based on the species' average group size (tables 10 and 11). When this occurred, the mean group sizes used to correct Level B harassment take estimates, as shown in tables 10 and 11, for modeled cetacean species were derived from AMAPPS data from 2010–2019 NE shipboard distance sampling surveys (Palka *et al.,* 2021) or informed by data from 2018–2021 HRG surveys conducted near the project area (Vineyard Wind, 2018, 2020a, 2020c, 2021a). Mean group size was calculated as the number of individuals divided by the number of groups from table 6–5 of Palka *et al.* (2021), which summarizes the 2010–2019 AMAPPS NE shipboard distance surveys. Summer sightings (June 1 to August 31) were chosen for these calculations because many species were not observed during fall surveys, and surveys were not conducted during spring or winter. When site assessment survey data showed a larger mean group size than was shown by the AMAPPS data, the site assessment survey group size was applied to take calculations.

In cases where the exposure estimate was less than the mean group size, we predict that if one group member were to be exposed within the Level B harassment threshold, then it is reasonable to expect that all animals in the same group could be. Therefore, for species for which the annual number of predicted exposures above threshold was less than the mean group size, the annual number of expected takes was increased to one mean group size rounded up to the nearest integer. Correcting for group size for these species is used as a conservative measure to ensure that in the event of a close encounter with the species, a reasonably expected number of individuals (*i.e.,* average group size) is accounted for in the take request.

As described previously, density-based exposure calculations were not conducted for species considered rare in the project area. There are few to zero sightings of these species in the sources used above to calculate group size for the modeled species, so an alternative method had to be developed. Group size calculations for rare species used sighting data from the Ocean Biodiversity Information System database (OBIS, 2021). All records for each of the rare species were extracted from the OBIS database and then filtered to include only the area from approximately Cape Hatteras to the Gulf of Maine (35° N to 43° N) and from the coast (76° W) out to the continental shelf edge (66° W) to provide a more precise estimate of potential group size in the SWDA than would be expected using all OBIS records. The OBIS data were further filtered to remove stranding data, because the group size of stranded animals does not necessarily reflect the group size of free-ranging animals. The one exception to this was the hooded seal—all records of this species in this area from the OBIS database were of single, stranded individuals, and thus a group size of one was used. This number is likely reflective of any free-swimming hooded seal that would occur in the area because this is an Arctic species and only single vagrant animals would be expected. Finally, data from digital aerial surveys were filtered out of this larger dataset because, although useful in determining presence/absence, these data provide no information on group size. The ''individualCount'' variable in the OBIS data was used to calculate minimum, maximum, and average group sizes for these rare species (table 16 in the ITA application).

For many of these rare species, in particular the delphinids, maximum group sizes in OBIS can be in the hundreds or even up to thousands of animals. However, because these animals are rare in the project area, as it is not their preferred habitat, we think that they would be unlikely to form such large aggregations in this area and, further, it is unlikely that any such large aggregations would all swim with the small HRG Level B harassment zone. Thus, like with uncommon species, the average group size (rounded up to a whole number) based on the previously

described observer data was used in the take calculations for these species instead of the OBIS data to refine the group sizes to what had been previously observed in similar surveys. Group sizes relevant to the project area can be informed by PSO sightings during site characterization surveys (tables 10 and 11). For example, white-beaked dolphins were recorded in both 2019 and 2020 during HRG surveys in this area (Vineyard Wind, 2019, 2020) with the sighting of white-beaked dolphins in 2019 consisting of 30 animals. Other rare species encountered in the survey area during previous HRG surveys include false killer whales in 2019 (5 individuals) and 2021 (1 individual) (Vineyard Wind, 2020c, 2020b) and killer whales in 2022 (2 individuals; data not yet submitted). For these species the take estimates use the average observed group size from PSO sightings.

Additional detail regarding the density and occurrence as well as the assumptions and methodology used to estimate take for specific activities is included in the activity-specific subsections below and in Section 6.1 of the ITA application. Average group sizes used in take estimates, where applicable, for all activities are provided in tables 10 and 11.

Tables 7, 8, and 9, below demonstrate all of the densities used in the exposure and take analyses. Densities differed depending on the types of piles installed and manner of take being assessed given the large spatial extent differences between $ER_{95\%}$ for Level A harassment and Level B harassment. Tables 10 and 11 show the average marine mammal group sizes calculated based on the methods described above.

TABLE 7—MEAN MONTHLY MARINE MAMMAL DENSITY ESTIMATES (ANIMALS/100 km²) FOR FOUNDATION INSTALLATION IMPACT PILE DRIVING, VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING, AND DRILLING (LEVEL B) CONSIDERING A 10-km BUFFER AROUND THE LEASE AREA [a]

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual mean	May–Dec mean
North Atlantic right whale [b]	0.387	0.461	0.456	0.478	0.295	0.050	0.022	0.018	0.028	0.052	0.068	0.197	0.209	0.091
Fin whale [b]	0.215	0.166	0.107	0.164	0.272	0.256	0.438	0.366	0.227	0.057	0.051	0.141	0.205	0.226
Humpback whale	0.031	0.023	0.043	0.149	0.294	0.307	0.172	0.120	0.167	0.236	0.190	0.030	0.147	0.189
Minke whale	0.113	0.137	0.136	0.806	1.728	1.637	0.700	0.471	0.516	0.465	0.052	0.077	0.570	0.706
Sei whale [b]	0.039	0.021	0.044	0.112	0.192	0.052	0.013	0.011	0.019	0.036	0.079	0.065	0.057	0.058
Sperm whale [b]	0.031	0.011	0.013	0.003	0.014	0.028	0.038	0.107	0.070	0.057	0.031	0.020	0.035	0.046
Atlantic spotted dolphin	0.001	0.000	0.001	0.003	0.018	0.025	0.031	0.054	0.273	0.431	0.179	0.018	0.086	0.128
Atlantic white-sided dolphin	2.049	1.230	0.850	1.313	3.322	3.003	1.392	0.730	1.654	2.431	1.791	2.440	1.850	2.095
Bottlenose dolphin, offshore	0.495	0.111	0.059	0.156	0.814	1.358	1.479	1.659	1.483	1.337	1.255	1.101	0.942	1.311
Common dolphin	7.130	2.455	1.884	3.258	6.254	13.905	10.533	14.446	25.703	22.676	11.103	10.774	10.844	14.424
Long-finned pilot whale [c]	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189	0.189
Short-finned pilot whale [c]	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
Risso's dolphin	0.043	0.004	0.002	0.018	0.096	0.048	0.068	0.128	0.158	0.087	0.120	0.179	0.079	0.111
Harbor porpoise	10.007	10.784	10.277	8.914	6.741	0.960	0.880	0.848	0.988	1.271	1.418	5.812	4.908	2.365
Gray seal [d]	5.395	5.603	4.176	3.203	4.716	0.806	0.088	0.094	0.226	0.500	1.768	4.534	2.592	1.591
Harbor seal [d]	8.093	8.404	6.265	4.804	7.074	1.209	0.132	0.140	0.339	0.750	2.652	6.802	3.889	2.387
Harp seal [d]	5.781	6.003	4.475	3.432	5.053	0.864	0.094	0.100	0.242	0.535	1.894	4.858	2.778	1.705

Note: All densities used for impact pile driving and drilling used the 10-km density table. For vibratory pile driving, for each species, foundation type, and attenuation level, the most appropriate density perimeter was used (10 km, 25 km, 50 km) based on the 95th percentile exposure range ($ER_{95\%}$). Therefore, vibratory pile driving exposure estimates used 10-km for Level A harassment and a mixture of the 25 and 50-km tables for Level B harassment.

[a] Density estimates are calculated from the 2022 Duke Habitat-Based Marine Mammal Density Models (Roberts *et al.,* 2016; Roberts *et al.,* 2022).

[b] Listed as Endangered under the ESA.

[c] Density adjusted by relative local abundance.

[d] Gray and harbor seal densities are the seals guild density scaled by their relative local abundances; gray seals are used as a surrogate for harp seals.

TABLE 8—MEAN MONTHLY MARINE MAMMAL DENSITY ESTIMATES (ANIMALS/100 km²) FOR VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING (LEVEL B HARASSMENT [a]) CONSIDERING A 25-km PERIMETER AROUND THE LEASE AREA

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual mean	May–Dec mean
North Atlantic right whale [b]	0.443	0.523	0.493	0.471	0.279	0.052	0.026	0.019	0.029	0.050	0.084	0.257	0.227	0.100
Fin whale [b]	0.213	0.161	0.118	0.165	0.272	0.247	0.391	0.316	0.221	0.068	0.056	0.146	0.198	0.214
Humpback whale	0.034	0.026	0.044	0.146	0.271	0.284	0.156	0.107	0.147	0.202	0.174	0.035	0.135	0.172
Minke whale	0.119	0.138	0.143	0.790	1.617	1.468	0.622	0.397	0.436	0.436	0.054	0.084	0.525	0.639
Sei whale [b]	0.036	0.022	0.045	0.115	0.186	0.053	0.013	0.010	0.017	0.035	0.080	0.066	0.056	0.058
Sperm whale [b]	0.030	0.012	0.012	0.003	0.013	0.028	0.038	0.115	0.059	0.042	0.029	0.021	0.034	0.043
Atlantic spotted dolphin	0.001	<0.001	<0.001	0.003	0.027	0.042	0.034	0.055	0.282	0.577	0.181	0.020	0.102	0.152
Atlantic white-sided dolphin	2.062	1.314	0.913	1.383	3.179	2.994	1.368	0.644	1.532	2.246	1.741	2.357	1.811	2.008
Bottlenose dolphin, offshore	0.476	0.118	0.066	0.174	0.835	1.390	1.491	1.624	1.528	1.414	1.324	1.077	0.960	1.335
Common dolphin	7.388	2.799	2.212	3.612	6.556	13.827	10.602	13.820	23.538	24.395	12.882	11.716	11.112	14.667
Long-finned pilot whale [c]	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188
Short-finned pilot whale [c]	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047	0.047
Risso's dolphin	0.051	0.006	0.003	0.021	0.112	0.070	0.092	0.170	0.223	0.122	0.128	0.174	0.098	0.136
Harbor porpoise	9.007	9.787	9.321	8.194	5.913	1.172	1.147	1.030	1.003	1.222	1.421	5.478	4.558	2.298
Gray seal [d]	5.553	5.401	3.946	3.485	5.109	1.750	0.315	0.296	0.497	0.881	2.108	4.485	2.819	1.930

TABLE 8—MEAN MONTHLY MARINE MAMMAL DENSITY ESTIMATES (ANIMALS/100 km^2) FOR VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING (LEVEL B HARASSMENT [a]) CONSIDERING A 25-km PERIMETER AROUND THE LEASE AREA—Continued

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual mean	May–Dec mean
Harbor seal [d]	8.329	8.101	5.919	5.227	7.664	2.625	0.473	0.443	0.745	1.322	3.161	6.728	4.228	2.895
Harp seal [d]	5.949	5.786	4.228	3.733	5.474	1.875	0.338	0.317	0.532	0.944	2.258	4.806	3.020	2.068

[a] The Level B harassment exposure ranges ($ER_{95\%}$) for vibratory pile driving informed which density estimates were used. For species whose exposure range was more than 10 km and up to 25 km, this table's densities were used. For those more than 25 km, the 50 km densities were used.
Density estimates are calculated from the 2022 Duke Habitat-Based Marine Mammal Density Models (Roberts *et al.,* 2016; Roberts *et al.,* 2022).
[b] Listed as Endangered under the ESA.
[c] Density adjusted by relative local abundance.
[d] Gray and harbor seal densities are the seals guild density scaled by their relative local abundances; gray seals are used as a surrogate for harp seals.

TABLE 9—MEAN MONTHLY MARINE MAMMAL DENSITY ESTIMATES (ANIMALS/100 km^2) FOR VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING CONSIDERING A 50-km PERIMETER AROUND THE LEASE AREA [a]

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Annual mean	May–Dec mean
North Atlantic right whale [b]	0.565	0.674	0.580	0.511	0.321	0.084	0.055	0.033	0.045	0.055	0.119	0.361	0.284	0.134
Fin whale [b]	0.194	0.158	0.142	0.169	0.256	0.246	0.383	0.316	0.244	0.093	0.060	0.128	0.199	0.216
Humpback whale	0.037	0.030	0.044	0.167	0.270	0.300	0.158	0.096	0.124	0.177	0.164	0.041	0.134	0.166
Minke whale	0.106	0.121	0.138	0.652	1.298	1.163	0.504	0.302	0.338	0.387	0.051	0.080	0.428	0.515
Sei whale [b]	0.030	0.024	0.045	0.123	0.181	0.059	0.016	0.009	0.014	0.034	0.076	0.058	0.056	0.056
Sperm whale [b]	0.031	0.018	0.018	0.005	0.014	0.029	0.039	0.111	0.053	0.035	0.028	0.028	0.034	0.042
Atlantic spotted dolphin	0.002	<0.001	<0.001	0.006	0.073	0.182	0.052	0.084	0.449	1.025	0.238	0.027	0.178	0.266
Atlantic white-sided dolphin	2.430	1.744	1.187	1.652	3.170	3.373	1.468	0.508	1.265	2.153	1.732	2.428	1.926	2.012
Bottlenose dolphin, offshore	0.691	0.222	0.130	0.293	1.119	1.863	1.924	1.935	2.001	1.972	1.905	1.455	1.293	1.772
Common dolphin	10.202	5.127	4.047	5.422	8.950	18.237	13.103	14.754	22.465	30.637	18.664	15.127	13.895	17.742
Long-finned pilot whale [c]	0.231	0.231	0.231	0.231	0.231	0.231	0.231	0.231	0.231	0.231	0.231	0.231	0.231	0.231
Short-finned pilot whale [c]	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058	0.058
Risso's dolphin	0.110	0.023	0.009	0.040	0.230	0.227	0.299	0.488	0.642	0.322	0.190	0.218	0.233	0.327
Harbor porpoise	6.731	7.481	7.192	6.632	4.590	1.481	1.388	1.038	0.852	1.130	1.383	4.273	3.681	2.017
Gray seal [d]	5.346	4.893	4.081	4.674	6.820	5.412	1.595	1.318	1.519	2.863	3.322	4.748	3.882	3.450
Harbor seal [d]	8.019	7.339	6.121	7.011	10.229	8.118	2.392	1.977	2.279	4.295	4.982	7.122	5.824	5.174
Harp seal [d]	5.728	5.242	4.372	5.008	7.307	5.798	1.709	1.412	1.628	3.068	3.559	5.087	4.160	3.696

[a] Density estimates are calculated from the 2022 Duke Habitat-Based Marine Mammal Density Models (Roberts *et al.,* 2016; Roberts *et al.,* 2022). Species with exposure ranges greater than 25 km used the densities in this table.
[b] Listed as Endangered under the ESA.
[c] Density adjusted by relative local abundance.
[d] Gray and harbor seal densities are the seals guild density scaled by their relative local abundances; gray seals are used as a surrogate for harp seals.

TABLE 10—AVERAGE MARINE MAMMAL SPECIES GROUP SIZES

Species	Number of groups (AMAPPS data) [a]	Number of animals (AMAPPS data) [a]	Mean group size (AMAPPS data) [a]	Mean group size (PSO data) [b]	Group size applied to take request [c]
North Atlantic right whale [d]	2	4	2.0	1.5	2
Fin whale [d]	345	533	1.5	1.6	2
Humpback whale	157	370	2.4	1.5	3
Minke whale	32	32	1.0	1.1	2
Sei whale [d]	20	28	1.4	1.0	2
Sperm whale [d]	298	491	1.6	1.3	2
Atlantic spotted dolphin	60	1,760	29.3	Not observed	30
Atlantic white-sided dolphin	3	61	20.3	27.5	28
Bottlenose dolphin, offshore	345	3,865	11.2	17.9	18
Common dolphin	444	19,802	44.6	14.0	45
Long-finned pilot whale	41	666	16.2	5.6	17
Short-finned pilot whale	230	2,050	8.9	Not observed	9
Risso's dolphin	486	3,131	6.4	Not observed	7
Harbor porpoise	4	6	1.5	1.3	2
Gray seal	145	202	1.4	1.2	2
Harbor seal	145	202	1.4	2.0	2
Harp seal	145	202	1.4	Not observed	2

[a] Mean group size for cetaceans from 2010–2019 AMAPPS NE shipboard distance sampling surveys (table 6–5 of Palka *et al.* (2021)), and for seals from 2010–2013 AMAPPS NE aerial surveys for all seals because most were not identified to species (table 19.1 of Palka *et al.* (2017)).
[b] Mean group size from 2018–2021 PSO sightings data from 2018–2021 HRG surveys conducted by the Proponent (Vineyard Wind, 2018, 2020a, 2020c, 2021a).
[c] Group size used for takes by Level B harassment correction is higher of AMAPPS data and PSO data rounded up to an integer.
[d] Listed as Endangered under the ESA.

TABLE 11—AVERAGE MARINE MAMMAL GROUP SIZES USED FOR RARE SPECIES IN TAKE ESTIMATE CALCULATIONS

Species	Minimum group size (OBIS)	Maximum group size (OBIS)	Mean group size (OBIS)	Mean group size (PSO reports)	Group size used In take estimates
Blue whale [a]	1	2	1.0	NA	1
Dwarf sperm whale	1	5	1.7	NA	2
Pygmy sperm whale	1	3	1.3	NA	2
Cuvier's beaked whale	1	10	2.8	NA	3
Blainville's beaked whale	3	4	3.3	NA	4
Gervais' beaked whale	1	12	3.5	NA	4
Sowerby's beaked whale	1	10	3.5	NA	4
True's beaked whale	2	5	2.9	NA	3
Northern bottlenose whale	2	7	3.7	NA	4
Clymene dolphin	2	1,000	166.8	NA	167
False killer whale [b]	1	30	6.3	5	5
Fraser's dolphin	75	250	191.7	NA	192
Killer whale [b]	1	40	7.3	2	2
Melon-headed whale	20	210	108.8	NA	109
Pan-tropical spotted dolphin	3	300	59.3	NA	60
Pygmy killer whale	2	10	4.5	NA	5
Rough-toothed dolphin	3	45	13.1	NA	14
Spinner dolphin	1	170	50.4	NA	51
Striped dolphin	1	500	63.8	NA	64
White-beaked dolphin [b]	1	200	13.5	30	30
Hooded seal [c]	1	1	1.0	NA	1

[a] Listed as Endangered under the ESA.
[b] Mean group size for these species from 2018–2021 PSO sightings data from 2018–2021 HRG surveys conducted by Park City Wind (Vineyard Wind, 2018, 2020a, 2020c, 2021a).
[c] All records of hooded seals in the OBIS database for this region were strandings of single animals.

Modeling and Take Estimation

Avangrid estimated take using both sophisticated sound and animal movement modeling to account for the movement and behavior of marine mammals and their exposure to the underwater sound fields produced during foundation impact and vibratory pile driving, as described below. Avangrid estimated the potential for harassment from drilling, HRG, and UXO/MEC detonations using a simplified ''static'' method wherein the take estimates are the product of density, ensonified area above the NMFS defined threshold (*e.g.,* unweighted 160 dB SPLrms) levels, and number of days of installation. Animal movement modeling was not conducted for drilling, HRG, and UXO/MEC detonations.

In some cases, the exposure estimates based on either the animal movement modeling or static methods described above directly informed the amount of take requested; in other cases, adjustments were made based on previously collected monitoring data or average group size as described above. In all cases, Avangrid requested, and NMFS may authorize, take based on the highest amount of exposures estimated from any given method.

Below we present the take estimate methodologies associated with each activity.

WTG and ESP Foundation Installation

WTG and ESP installation activities have the likelihood to result in harassment of marine mammals from pile driving and drilling.

Since the proposed rule, the applicant refined the modeling methodology for impact pile driving and vibratory pile setting (section 1.7 in the January 2024 Application Update). In the original modeling (impact pile driving for the July 2022 LOA application), JASCO modeled impact pile driving source characteristics using an energy-based parabolic equation (PE) model (JASCO's Marine Operations Noise Model (MONM)) to compute the near-field equivalent source before long range propagation. In this update, JASCO's Full-Wave PE RAM model (FWRAM) was used to compute the near-field equivalent source before the long-range propagation was computed (also using FWRAM). Using FWRAM over MONM is an improvement because it calculates full synthetic pressure waveforms (in the time domain), as opposed to summed energy independent of time. Like MONM, FWRAM is range dependent for range-varying marine acoustic environments and takes environmental inputs (bathymetry, water sound speed profile, and seabed geoacoustic profile) into account. FWRAM computes pressure waveforms via Fourier synthesis of the modeled acoustic transfer function in closely spaced frequency bands, and employs the array starter method to accurately model sound propagation from a spatially distributed source (MacGillivray and Chapman, 2012). Ultimately, little difference was observed between the prior sound fields with near-field equivalents computed using MONM versus the current modeling with FWRAM but FWRAM is a more accurate model as it allows direct calculation of peak and RMS sound pressure levels. Both models use a wide-angle parabolic equation solution to the acoustic wave equation (Collins, 1993), based on a version of the US Naval Research Laboratory's Range-dependent Acoustic Model (RAM), which has been modified to account for a solid seabed (Collins, 1993; Zhang and Tindle 1995).

The practical spreading loss approach described for vibratory pile driving in the proposed rule has been replaced with acoustic modeling, similar to the refined impact pile driving methodology. A quantitative acoustic assessment was conducted by Avangrid of the potential impacts to marine mammals from vibratory pile setting followed by impact pile driving activity during installation. As vibratory pile driving will be used on the same foundations subject to impact pile driving (sequentially not concurrently), acoustic modeling was completed for vibratory setting of piles followed by impact pile driving, and exposures were modeled using animal movement

modeling as described in the impact pile driving model. One second long vibratory forcing functions were computed for the 12 and 13 m monopile and the 4-m jacket foundations, using GRL's Wave Equation Analysis (GRLWEAP, 2010; GRLWEAP Pile Dynamics, 2010). Non-linearities were introduced to the vibratory forcing functions based on the decay rate observed in data measured during vibratory pile driving of smaller diameter piles (Quijano *et al.,* 2017). The resulting forcing functions serve as inputs to JASCO's pile driving source model (PDSM) used to estimate an equivalent acoustic source represented by a linear array of monopoles evenly distributed along the pile. Acoustic propagation modeling used FWRAM that combine the outputs of the source model with the spatial and temporal environmental context (*e.g.,* location, oceanographic conditions, and seabed type) to estimate sound fields. Unchanged from the proposed rule, NMFS notes that no hammer parameters were available for either a 5,000 or 6,000 kJ hammer for use in GRLWEAP 2010; Avangrid modeled energies of the 5,500 kJ hammer were scaled using their stroke length to represent the effect of the forcing functions for the two different hammers approximated.

TABLE 12—KEY PILING ASSUMPTIONS USED IN THE SOURCE MODELING

Foundation type	Modeled maximum impact hammer energy (kJ)	Pile length (m)	Pile wall thickness (mm)	Expected penetration (m)	Max number of piles per day
12-m Monopile	5,000	95	200	40	2
12-m Monopile	6,000	95	200	40	2
13-m Monopile	5,000	95	200	40	2
4-m Pin Pile (Jacket)	3,500	100	100	50	4

Avangrid also updated source and propagation modeling approaches associated with estimating impacts from drilling. The proposed rule assumed an unattenuated source level of 193.3 dB re 1 µPa (as estimated by Austin *et al.* (2018) and therefore, assuming 10 dB of attenuation as sound attenuation measures were proposed to be required, applied a 183.3 dB SPL source level to the analysis. Avangrid had applied a practical spreading loss model (15logR) to that source level, resulting in a 16.6-km distance to NMFS 120 dB SPL Level B harassment threshold. For this final rule, Avangrid modeled drilling noise at the source and conducted more sophisticated propagation modeling. To model drilling, the three representative source levels estimated by Austin *et al.* (2018) for the 10–32,000 Hz band were averaged with an average broadband level of 191.6 dB re 1 µPa2·s m2. These modeling locations were selected as they represent the range of water depths in the Lease Area. MONM was used to predict SEL and SPL sound fields up to 1 kHz at a representative location near the proposed drilling sites considering the influence of bathymetry, seabed, water sound speed, and water attenuation. From 1 to 25 kHz, the BELLHOP ray tracing model (Porter and Liu, 1994) was used to predict sound fields at the same representative location using from 2512 to 5012 geometric beams, increasing the beam coverage with frequency. The total sound energy transmission loss was computed at the center frequencies of decidecade bands as a function of range and depth from the source. MONM–BELLHOP accounts for sound attenuation due to energy absorption through ion relaxation and viscosity of water in addition to acoustic attenuation due to reflection at the medium boundaries and internal layers (Fisher and Simmons 1977). The former type of sound attenuation is important for frequencies higher than 5 kHz and cannot be neglected without noticeably affecting the model results. The drill was represented as a point source in the mid-water column at each site. The mid-water depth is a conservative representation of the noise source across the drill bit. The acoustic field in three dimensions was generated by modeling two-dimensional (2–D) vertical planes radially spaced at 2.5° in a 360° swath around the source ($N \times$ 2–D). Composite broadband received SEL were computed by summing the received decidecade band levels across frequency and taking the maximum-over-depth. Overall, the average source levels per decidecade band center frequency were used in MONM to predict SEL and SPL sound fields up to 1 kHz, and a BELLHOP ray tracing model (Porter and Liu 1994) was used from 1–32 kHz, at a representative location near the proposed drilling sites considering the influence of bathymetry, seabed, water sound speed, and water attenuation. The modeled unweighted SPL levels at 750 m were 135.25–136.33 dB re 1 µPa during the summer. The corresponding unweighted cumulative SEL levels at 750 m are 185.07–185.24 dB re 1 $\mu Pa^2 \cdot s$ during the summer.

Similar to the proposed rule, modeling assumed that drilling activity could occur for a full 24 hours during any given day although it is not expected that drilling would be required up to 24 hours, More details on the drilling modeling methods and assumptions can be found in more detail in the January 2024 Drilling Technical Memo on our website (*https://www.fisheries.noaa.gov/action/incidental-take-authorization-park-city-wind-llc-construction-new-england-wind-offshore-wind*).

JASCO conducted exposure modeling for impact driving in the same manner as described in the proposed rule for impact driving. For this final rule, exposure modeling was also conducted for vibratory pile driving (versus the static method applied in the proposed rule). JASCO's Animal Simulation Model Including Noise Exposure (JASMINE) was used to estimate the closest approach ranges within which 95 percent of simulated animals (animats) were exposed above the relevant regulatory-defined thresholds for injury and behavioral response for marine species that may be near, or in the vicinity of, the proposed foundation piling operations (impact and vibratory). Therefore, JASMINE was used to estimate the probability of exposure of animals to sound arising from impact and vibratory pile driving operations during construction of the Project. Sound exposure models such as JASMINE use simulated animals (animats) to sample the predicted 3–D sound fields with movement rules derived from animal observations. The parameters used for forecasting realistic behaviors (*e.g.,* diving, foraging, aversion, and surface times) are determined and interpreted from marine species studies (*e.g.,* tagging studies) where available, or reasonably

extrapolated from related species (appendix G.2, Hydroacoustic Report January 2024).

The predicted sound fields were sampled by the model receiver in a way that real animals are expected to by programming animats to behave like marine species that may be present near the Project. The output of the simulation is the exposure history for each animat within the simulation. An individual animat's sound exposure level is summed over a specified duration, (*i.e.,* 24 hours (appendix H Hydroacoustic Report January 2024)), to determine its total received acoustic energy (SEL) and maximum received PK and SPL. Received levels are then compared to the threshold criteria described in Section 2.4 (Hydroacoustic Report January 2024) within each analysis period. Appendix H of the Hydroacoustic Report January 2024 provides a fuller description of animal movement modeling and the parameters used in the JASMINE simulations. Due to shifts in animal density and seasonal sound propagation effects, the number of animals predicted to be impacted by the pile driving operations is sensitive to the number of foundations installed during each month.

The animal movement modeling assumed 60 minutes of vibratory setting of piles for all pile types and installation schedules. For piling of monopile foundations, the model assumed 15 minutes between vibratory and impact pile driving to switch equipment. A strike rate of 30 strikes per minute for the 5,000 kJ hammer scenarios, 27.6 strikes per minute for the 6,000 kJ hammer 13 m monopile scenarios, and 25 strikes per minute for the 6,000 kJ hammer 12 m monopile scenarios was used. The model assumed 30 minutes between foundation installation when more than one foundation was installed per day.

For jacket foundations, the number of strikes required to drive each pile as provided by Avangrid is a conservative estimate, in that it is likely to be an overestimate of the actual number of strikes required. The animal movement modeling is based on exposure levels in a 24 hour period to capture 24-hour cumulative metrics (*i.e.,* SEL), so pile installation is constrained to fit within 24 hours. To accommodate the high number of strikes for jacket foundations within a 24-hour period, a strike rate of 30 per minute was used to model cases where 4 pin piles were installed in one day. Additionally, the time between pile installation each day was 15 minutes between vibratory and impact pile driving to switch equipment and 15 minutes between foundation installations.

When evaluating the potential for injury, the total received acoustic energy (SEL) over a given time period (24 hour) is needed. Vibratory setting of piles followed by impact pile driving may occur for the installation of both monopile and jacket foundations. Although the potential to induce hearing loss is low during vibratory driving, it does introduce sound into the water and must be considered as part of the total received acoustic energy. For this reason, the combined sound energy from vibratory and impact pile driving was computed in the 2024 January Application Update from Avangrid. The PTS onset SEL thresholds are lower for impact piling than for vibratory piling (section 2.4 Hydroacoustic Report January 2024), so when estimating animats exposed to potentially injurious sound levels, the lower thresholds were applied to the total received sound energy level from both sources. Full details on the acoustic model can be found on our website in the Hydroacoustic Report January 2024 at *https://www.fisheries.noaa.gov/action/incidental-take-authorization-park-city-wind-llc-construction-new-england-wind-offshore-wind*.

As previously described, JASCO integrated the results from acoustic source and propagation modeling into an animal movement model to calculate exposure ranges for 17 marine mammal species considered common in the project area. The resulting ranges represent the distances at which marine mammals may incur Level A harassment (*i.e.,* PTS). The exposure ranges also influence the development of mitigation and harassment zone sizes. The first year of Schedule A includes the potential installation of 13-m monopiles using a 6,000 kJ hammer. In the proposed rule and unchanged in this final rule, this specific configuration was not modeled beyond acoustic source modeling because initial source modeling showed minimal difference between the 12-m and 13-m monopiles (see table 12 in the proposed rule (88 FR 37606, June 8, 2023)). Therefore, Avangrid modeled the 12-m monopile with 6,000 kJ hammer energy which was assumed to be a reasonable replacement for the 13-m. Avangrid assumed that all phase 2 foundations are jackets as their modeling results found that jacket foundations are the most impactful in terms of the Level A cumulative sound exposure metric. Thus, the assumption of all jacket foundations provide an envelope for an up to 13-m monopile installed with a 5,000 or 6,000 kJ hammer. Tables 13 and 14 provide exposure ranges for impact pile driving 12-m and 13-m monopiles and 4-m pin piles (jacket foundations), assuming 10 dB of attenuation. Table 15 provides Level A harassment exposure ranges for vibratory pile driving followed by impact pile driving of 12-m and 13-m monopiles, assuming 10 dB of attenuation. Table 16 provides Level B harassment exposure ranges for vibratory pile driving followed by impact pile driving of 12-m and 13-m monopiles, assuming 10 dB of attenuation. Table 17 provides exposure ranges for vibratory pile driving followed by impact pile driving of 4-m pin piles (jacket foundations), assuming 10 dB of attenuation.

Animat exposure modeling was not conducted for drilling. Instead, exposures were calculated for one day of drilling, modeled at three site locations. Exposures were calculated for each of these locations individually and for the maximum potential exposures using the maximum ensonified area for each threshold. Exposures were estimated using the monthly animal densities from May to December.

TABLE 13—EXPOSURE RANGES ($ER_{95\%}$, km) TO MARINE MAMMAL LEVEL A HARASSMENT (SEL) AND LEVEL B HARASSMENT THRESHOLDS DURING IMPACT PILE DRIVING 12-m AND 13-m MONOPILES, ASSUMING 10 dB ATTENUATION [1]

Marine mammal species	Level A harassment								Level B harassment							
	12-m Monopile				13-m Monopile				12-m Monopile				13-m Monopile			
	5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)	
	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day
North Atlantic right whale ..	1.19	1.41	1.19	1.34	1.19	1.37	1.56	1.62	4.50	4.39	4.91	4.83	4.73	4.51	5.28	5.18
Fin whale	2.00	2.13	2.05	2.16	2.04	2.30	2.14	2.58	4.88	4.92	5.28	5.29	5.08	4.99	5.56	5.40
Humpback whale	1.71	1.78	1.72	1.97	1.87	1.99	1.96	1.99	4.86	4.65	5.26	5.12	5.02	4.93	5.27	5.40
Minke whale	0.82	0.96	0.91	1.12	0.96	1.02	1.22	1.19	4.61	4.32	4.95	4.87	4.44	4.67	5.05	5.05
Sei whale	0.94	1.14	1.36	1.27	1.17	1.30	1.32	1.31	4.72	4.60	5.19	5.17	4.96	4.90	5.44	5.34
Sperm whale	0	0	0	0	0	0	0	0	4.68	4.51	5.22	5.16	4.80	4.84	5.33	5.27
Atlantic spotted dolphin	0	0	0	0	0	0	0	0	4.48	4.18	5.02	4.51	4.74	4.58	4.88	4.84
Atlantic white-sided dolphin	0	0	0	0	0	0	0	0	4.26	4.31	4.87	4.83	4.50	4.47	5.01	4.98
Bottlenose dolphin, offshore	0	0	0	0	0	0	0	0	3.98	3.79	4.45	4.18	4.09	4.12	4.70	4.65
Common dolphin	0	0	0	0	0	0	0	0	4.47	4.34	4.99	4.88	4.63	4.55	5.28	5.10
Long-finned pilot whale	0	0	0	0	0	0	0	0	4.20	4.09	4.75	4.72	4.39	4.38	4.95	4.76
Short-finned pilot whale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Risso's dolphin	0	0	0	0	0	0	0	0	4.30	4.20	4.72	4.74	4.55	4.50	4.93	5.05
Harbor porpoise	0	0	0	0	0	0	0	0	4.23	3.94	4.46	4.44	4.49	4.41	4.74	4.75
Gray seal	0	0	0	0	0	0	0	0	5.10	5.13	5.58	5.53	5.42	5.34	5.85	5.77
Harbor seal	0	0	0	0	0	0	0	0	3.80	4.06	4.45	4.41	4.33	4.18	4.43	4.56
Harp seal	0	0	0	0	0	0	0	0	4.86	4.84	5.26	5.31	5.02	4.96	5.50	5.45

[1] The exposure ranges presented here represent the assumption that the pile would be fully installed with an impact hammer.

TABLE 14—EXPOSURE RANGES ($ER_{95\%}$, km) TO MARINE MAMMAL LEVEL A HARASSMENT (SEL) AND LEVEL B HARASSMENT THRESHOLDS DURING IMPACT PILE DRIVING FOUR 4-m PIN PILES PER DAY USING A 3,500 kJ HAMMER, ASSUMING 10 dB ATTENUATION [1]

Marine mammal species	Level A harassment	Level B harassment
North Atlantic right whale	2.35	4.54
Fin whale	3.73	4.66
Humpback whale	2.94	4.65
Minke whale	1.76	4.24
Sei whale	2.10	4.52
Sperm whale	0	4.52
Atlantic spotted dolphin	0	4.47
Atlantic white-sided dolphin	0	4.40
Bottlenose dolphin, offshore	0	4.02
Common dolphin	0	4.48
Long-finned pilot whale	0	4.11
Short-finned pilot whale	0	0
Risso's dolphin	0	4.31
Harbor porpoise	0	4.20
Gray seal	0.79	4.97
Harbor seal	0.02	4.09
Harp seal	0.11	4.65

[1] The exposure ranges presented here represent the assumption that the pile would be fully installed with an impact hammer.

TABLE 15—EXPOSURE RANGES ($ER_{95\%}$, km) TO MARINE MAMMAL LEVEL A HARASSMENT (SEL) THRESHOLDS DURING VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING FOR 12-m AND 13-m MONOPILES, ASSUMING 10 dB ATTENUATION [1]

Marine mammal species	Vibratory + impact pile driving								Vibratory only [2]							
	12-m Monopile				13-m Monopile				12-m Monopile				13-m Monopile			
	5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)	
	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day
North Atlantic right whale ..	1.15	0	1.39	1.44	1.29	1.40	1.54	1.59	0	0	0	0	0	0	0	0
Fin whale	2.02	0.02	2.14	2.24	2.10	2.61	2.16	2.69	0.02	0	0.02	0	0	0	0	0
Humpback whale	1.72	0	1.88	1.98	1.90	2.05	1.94	2.07	0	0	0	0	0	0	0	0
Minke whale	0.81	0	1.02	1.21	0.95	0.99	1.20	1.18	0	0	0	0	0	0	0	0
Sei whale	1.15	0	1.64	1.26	1.23	1.30	1.27	1.33	0	0	0	0	0	0	0	0

TABLE 15—EXPOSURE RANGES ($ER_{95\%}$, km) TO MARINE MAMMAL LEVEL A HARASSMENT (SEL) THRESHOLDS DURING VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING FOR 12-m AND 13-m MONOPILES, ASSUMING 10 dB ATTENUATION [1]—Continued

Marine mammal species	Vibratory + impact pile driving								Vibratory only [2]							
	12-m Monopile				13-m Monopile				12-m Monopile				13-m Monopile			
	5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)	
	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day
Sperm whale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic spotted dolphin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atlantic white-sided dolphin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bottlenose dolphin, offshore	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Common dolphin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Risso's dolphin	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Long-finned pilot whale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Short-finned pilot whale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harbor porpoise	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray seal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harbor seal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harp seal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] The exposure ranges presented here represent the assumption that the pile would be partially installed using vibratory pile driving before the remainder is installed with an impact hammer.

[2] Vibratory only is included to show that the distance to injury is small, however, no pile will be installed using only vibratory pile driving. Due to Avangrid's updated model approach, the combination of vibratory and impact pile driving within the model obscures the true distance to Level A harassment during vibratory pile driving when combined with impact. Therefore, the Level A harassment column of vibratory + impact pile driving is primarily a result of impact pile driving in the new model approach.

TABLE 16—EXPOSURE RANGES ($ER_{95\%}$, km) TO MARINE MAMMAL LEVEL B HARASSMENT THRESHOLDS DURING VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING FOR 12 AND 13-m MONOPILES, ASSUMING 10-dB ATTENUATION [1]

Marine mammal species	Impact pile driving								Vibratory only [2]							
	12-m Monopile				13-m Monopile				12-m Monopile				13-m Monopile			
	5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)		5,000 kJ hammer (km)		6,000 kJ hammer (km)	
	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day	one pile/ day	two piles/ day
North Atlantic right whale	4.49	4.38	4.91	4.83	4.58	4.52	5.08	5.11	20.96	21.10	20.96	21.10	28.07	27.45	28.07	27.45
Fin whale	4.97	4.89	5.30	5.31	5.12	4.97	5.59	5.49	22.22	22.14	22.22	22.14	29.40	29.41	29.40	29.41
Humpback whale	4.83	4.73	5.35	5.18	5.09	4.95	5.42	5.43	22.26	22.28	22.26	22.28	29.27	29.03	29.27	29.03
Minke whale	4.49	4.43	5.01	4.92	4.62	4.75	5.19	5.21	22.06	21.93	22.06	21.93	28.66	28.38	28.66	28.38
Sei whale	4.60	4.63	5.21	5.24	4.85	5.02	5.38	5.43	22.30	22.08	22.30	22.08	29.29	29.02	29.29	29.02
Sperm whale	4.68	4.59	5.17	5.11	4.87	4.86	5.40	5.28	21.97	21.95	21.97	21.95	29.15	28.87	29.15	28.87
Atlantic spotted dolphin	4.80	4.22	5.17	4.71	4.66	4.68	5.05	4.90	23.35	23.10	23.35	23.10	29.75	30.12	29.75	30.12
Atlantic white-sided dolphin	4.32	4.40	5.08	4.97	4.50	4.57	5.04	5.03	22.07	21.72	22.07	21.72	28.30	28.64	28.30	28.64
Bottlenose dolphin, offshore	4.03	3.71	4.29	4.41	4.15	4.12	4.61	4.76	21.21	20.81	21.21	20.81	27.88	27.42	27.88	27.42
Common dolphin	4.44	4.34	5.02	4.90	4.61	4.64	5.28	5.19	21.97	21.89	21.97	21.89	29.10	28.53	29.10	28.53
Long-finned pilot whale	4.21	4.20	4.86	4.76	4.50	4.48	4.84	4.83	21.72	21.59	21.72	21.59	27.77	27.45	27.77	27.45
Short-finned pilot whale	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Risso's dolphin	4.42	4.27	4.78	4.71	4.60	4.59	4.99	5.08	21.05	20.79	21.05	20.79	27.16	27.41	27.16	27.41
Harbor porpoise	4.29	3.99	4.56	4.38	4.41	4.37	4.82	4.84	19.32	19.03	19.32	19.03	23.33	23.20	23.33	23.20
Gray seal	5.16	5.13	5.67	5.53	5.42	5.34	5.83	5.78	22.32	22.29	22.32	22.29	29.51	29.53	29.51	29.53
Harbor seal	3.81	4.03	4.35	4.42	4.33	4.15	4.56	4.69	19.80	19.89	19.80	19.89	24.96	24.58	24.96	24.58
Harp seal	5.03	4.90	5.25	5.24	5.11	4.98	5.49	5.48	22.45	22.43	22.45	22.43	29.45	29.44	29.45	29.44

[1] The exposure ranges presented here represent the assumption that the pile would be partially installed using vibratory pile driving before the remainder is installed with an impact hammer.

[2] No pile will be installed using only vibratory pile driving. Due to Avangrid's updated model approach, the combination of vibratory and impact pile driving within the model results in similar values for impact pile driving during vibratory as compared to impact only piles.

TABLE 17—EXPOSURE RANGES ($ER_{95\%}$, km) TO MARINE MAMMAL LEVEL A HARASSMENT (SEL) AND LEVEL B HARASSMENT THRESHOLDS DURING VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING FOR FOUR 4-m PIN PILES PER DAY USING A 3,500 kJ HAMMER, ASSUMING 10 dB ATTENUATION [1]

Marine mammal species	Level A harassment		Level B harassment	
	Vibratory + impact	Vibratory only	Impact	Vibratory only
North Atlantic right whale	2.44	0	4.47	25.66

TABLE 17—EXPOSURE RANGES ($ER_{95\%}$, km) TO MARINE MAMMAL LEVEL A HARASSMENT (SEL) AND LEVEL B HARASSMENT THRESHOLDS DURING VIBRATORY PILE SETTING FOLLOWED BY IMPACT PILE DRIVING FOR FOUR 4-m PIN PILES PER DAY USING A 3,500 kJ HAMMER, ASSUMING 10 dB ATTENUATION [1]—Continued

Marine mammal species	Level A harassment		Level B harassment	
	Vibratory + impact	Vibratory only	Impact	Vibratory only
Fin whale	4.02	0.04	4.63	27.74
Humpback whale	3.32	0	4.70	27.43
Minke whale	1.94	0	4.22	26.94
Sei whale	2.16	0	4.56	28.05
Sperm whale	0	0	4.54	27.11
Atlantic spotted dolphin	0	0	4.50	29.06
Atlantic white-sided dolphin	0	0	4.41	27.16
Bottlenose dolphin, offshore	0	0	4.09	25.85
Common dolphin	0	0	4.46	27.04
Long-finned pilot whale	0	0	4.18	26.89
Short-finned pilot whale	0	0	0	0
Risso's dolphin	0	0	4.30	26.51
Harbor porpoise	0	0	4.21	23.26
Gray seal	0.79	0	4.98	27.41
Harbor seal	0.07	0	4.11	23.55
Harp seal	0.12	0	4.64	27.65

[1] The exposure ranges presented here represent the assumption that the pile would be partially installed using vibratory pile driving before the remainder is installed with an impact hammer.

JASCO also calculated acoustic ranges which represent distances to NMFS's harassment isopleths independent of movement of a receiver. Acoustic ranges are a better representation of distances to NMFS's instantaneous harassment thresholds (*i.e.,* PTS dB peak, and Level B harassment) and can also be used for PTS dB SEL when animal movement modeling is not conducted. As described previously, the distances to the PTS dB SEL threshold are likely an overestimate as it assumes an animal remains at the distance for the entire duration of pile driving. Presented below are the distances to the PTS (dB peak) threshold and Level B harassment (SPL) thresholds for drilling.

Acoustic modeling assumed that drilling activity could occur for a full 24 hours during any given day. Although drilling is not expected to be required for 24 hours, all modeling assumed 24 hours of drilling to provide the most conservative estimate. Exposures were calculated for one day of drilling. Drilling was modeled at each of the three model site locations (J1, M1, M2). Exposures were calculated for each of these locations individually and also for the maximum potential exposures using the maximum ensonified area for each threshold. Exposures were estimated using the monthly animal densities from May to December. Maximum predicted injury exposures were <0.01 for modeled marine mammals (see appendix K of the Hydroacoustic Report January 2024), where ranges to injurious thresholds are <200 m for all species.

Acoustic ranges to the Level A harassment threshold and Level B harassment thresholds are in tables 18 and 19, respectively. Mean monthly density estimates for pile driving and drilling, in consideration of the applicable perimeter for each type, are provided in tables 7, 8, and 9.

TABLE 18—ACOUSTIC RANGES ($R_{95\%}$), IN km, TO LEVEL A HARASSMENT THRESHOLDS DURING PILE DRIVING AND DRILLING, ASSUMING 10 dB ATTENUATION

Pile installed	Install method	Hammer energy (kJ)	Activity duration (minutes)	Low-frequency cetacean		Mid-frequency cetacean		High-frequency cetaceans		Phocids	
				Lpk	SEL	Lpk	SEL	Lpk	SEL	Lpk	SEL
Drilling	Drilling	N/A	1,440 (24 hours)		0.065		0.0154		.057		0.1059
12-m	Impact	5,000	N/A		3.5			0.20			0.40
12-m	Impact	6,000	N/A		3.546			0.24	0.02		0.40
13-m	Impact	5,000	N/A		4.0			0.25	0.09		0.44
13-m	Impact	6,000	N/A		4.041			0.28	0.108		0.451
4-m	Impact	3,500	N/A		6.822			0.17	0.428		1.605
12-m	Impact + Vibratory	5,000	N/A		3.67						0.42
12-m	Impact + Vibratory	6,000	N/A		4.08				0.4		0.49
13-m	Impact + Vibratory	5,000	N/A		4.12				0.09		0.45
13-m	Impact + Vibratory	6,000	N/A		4.58				0.11		0.53
4-m	Impact + Vibratory	3,500	N/A		7.41				0.44		1.74
12-m	Vibratory	N/A	60		0.20						
13-m	Vibratory	N/A	60		0.15						
4-m	Vibratory	N/A	60		1.13						

Note: Values are from the Hydroacoustic Report January 2024.

TABLE 19—ACOUSTIC RANGES ($R_{95\%}$), IN METERS, TO LEVEL B HARASSMENT THRESHOLDS DURING PILE DRIVING AND DRILLING, ASSUMING 10 dB ATTENUATION

Pile installed	Install method	Distance to Level B harassment (km)
Drilling	Drilling	7.054
12-m (5,000 kJ)	Impact	5.07
12-m (6,000 kJ)	Impact	5.456
13-m (5,000 kJ)	Impact	5.39
13-m (6,000 kJ)	Impact	5.716
4-m (3,500 kJ)	Impact	5.016
12-m	Vibratory	22.521
13-m	Vibratory	28.900
4-m	Vibratory	27.896

Unchanged from the proposed rule, to estimate take from foundation installation activities, Avangrid used two pile installation construction schedules (tables 20 and 21). Overall, Construction Schedule A (Schedule A) assumes 52 days of foundation installation activities would occur between May and December in 2026 (year 2) to install 89 monopiles and 2 jacket foundations and 35 days of foundation installation activities would occur in 2027 (year 3) to install 18 monopiles and 24 jacket foundations. As previously described, Park City accounted for 133 piles to be installed in its modeling despite a maximum of 132 foundations actually being installed. In total, based on Schedule A, 87 days of foundation installation activities would occur over 2 years to complete the Project. Construction Schedule B (Schedule B) assumes 38 days of foundation installation activities would occur between May and December in 2026 (year 2) to install 55 monopiles and 3 jacket foundations, 53 days of foundation installation activities would occur in 2027 (year 3) to install 53 jackets, and 22 days of foundation installation activities would occur in 2028 (year 4) to install 22 jackets. In total, based on Schedule B, 113 days of foundation installation activities would occur over 3 years to complete the Project.

Due to the extended duration of Schedule B, the total amount of Level B harassment from foundation installation activities is greater than Schedule A over the 5-year effective period of the final rule. The total 5-year take by Level B harassment in this final rule is therefore generated based on Schedule B. However, annual take estimates assume the yearly worst case scenario exposures for each species for each year from either Construction Schedule A or B. That is, annual take by Level B harassment due to foundation installation activities may use either Schedule A or B, whichever was more. As previously described, Park City accounted for 133 piles to be installed in its modeling despite a maximum of 132 foundations actually being installed to complete the Project.

Avangrid considered three foundation installation techniques when estimating take: impact pile driving, vibratory pile driving followed by impact pile driving, and drilling (to break up any obstacles should the pile encounter obstructions). Of these, Level A harassment (PTS) has the potential to occur from impact pile driving only. As shown in table 18, vibratory pile driving and drilling produce very small Level A harassment zone sizes that consider static receivers over the duration of the time period considered in the model. For vibratory pile driving, the duration considered was relatively short (60 minutes); however, this represents vibratory pile driving over two piles in which there are several hours in between events and the resulting distances are comparatively small (table 18). Moreover, the implementation of clearance and shut down zones would further reduce the potential for PTS from these activities. Therefore, Avangrid has concluded, and NMFS agrees, the potential for PTS to occur from vibratory pile driving or drilling is discountable. For this reason, Avangrid carried forward the PTS exposure estimates from impact pile driving and no take by Level A harassment was considered for vibratory pile driving or drilling. The maximum take by Level A harassment that may be authorized under this final rule from the foundation activities (*i.e.,* impact pile driving) is in table 24.

To estimate the amount of Level B (behavioral) harassment that may occur incidental to foundation installation, Avangrid considered all three installation methods. As described above, Avangrid conducted exposure modeling to estimate the number of exposures that may occur from pile driving. The results of the exposure modeling and amount of take Avangrid requested from this activity is provided in the January 2024 Application Update. Avangrid calculated take considering drilling for 48 foundations over 48 days for both Schedule A and Schedule B. In the proposed rule and unchanged in the final rule, Avangrid applied a more traditional approach to estimate take from drilling wherein:

$$Take = density \times area\ ensonified \times number\ of\ days\ of\ activity$$

The resulting monthly and annual take can be found in the January 2024 Application Update.

To avoid overestimating take, the amount of take derived when considering impact driving, vibratory driving, and drilling independently were not summed to produce the amount of annual take Avangrid requested. Instead, Avangrid appropriately deducted the take from drilling when vibratory pile driving and drilling would occur on the same day. This is because the area for vibratory pile driving is much larger than drilling (table 19) and the amount of take by Level B harassment estimated for vibratory pile driving adequately covers potential take from drilling activities. However, because take from pile driving was modeled based on the number of piles while drilling takes were based on the number of days of activity, Avangrid added the take estimates from pile driving all piles to the take estimates from vibratory drilling (with the appropriate discounting) to produce their annual and total take requests.

The amount of Level B harassment take that may be authorized by this final rule represents the amount of take from impact pile driving on days when only impact pile driving could occur plus the amount of take from vibratory pile driving or drilling on the days that either of those activities could occur to avoid double counting.

Table 24 provides the annual take by Level B harassment calculated from pile driving for both Schedule A and, separately, Schedule B. For ease of reference, the construction schedules have been included below in tables 20–21. Table 25 identifies the amount of take for drilling foundation installation activities after removing drilling takes when drilling would occur on the same day as vibratory pile driving (to avoid double counting). The annual take amounts represent the highest value between both Schedule A and Schedule B while the maximum 5-year take estimates represent the sum of take calculated for each year in Schedule B (as Schedule B has the highest amount of take associated). NMFS retained Avangrid's request for Level A harassment from all impact pile driving activities as no Level A harassment from vibratory pile driving or drilling is anticipated (table 24). Table 26 identifies the amount of take for all foundation installation activities combined that was carried forward in the take tables for this final rule.

TABLE 20—PILE INSTALLATION CONSTRUCTION SCHEDULE A YEAR 2 AND 3

Month	Year 2 (2026) [a]									Year 3 (2027)						
	12 m Monopile 5,000 kJ		13 m Monopile 5,000 kJ		4 m Pin pile 3,500 kJ	Total days of impact only piling	Total days with vibratory + impact piling [b]	Days with drilling [c]	Year 2 total days of foundation installation [c]	12 m Monopile 6,000 kJ		4 m Pin pile 3,500 kJ	Total days of impact only piling	Total days with vibratory + impact piling [b]	Days with drilling [c]	Year 3 total days of foundation installation [c]
	1 per day	2 per day	1 per day	2 per day	4 per day					1 per day	2 per day	1 per day				
May	4	0	0	0	0	4	0	2	4	4	0	0	4	0	1	4
June	2	5	0	0	0	5	2	4	7	0	3	0	1	2	2	3
July	0	9	0	0	0	5	4	7	9	0	4	0	0	4	2	4
August	0	9	0	0	0	3	6	7	9	0	0	8	0	8	4	8
September	0	1	1	6	2	6	4	8	10	0	0	7	1	6	2	7
October	0	0	0	6	0	3	3	3	6	0	0	6	2	4	2	6
November	0	0	0	3	0	2	1	2	3	0	0	2	1	1	2	2
December	0	0	4	0	0	4	0	0	4	0	0	1	1	0	0	1
Total	6	24	5	15	2	32	20	33	52	4	7	24	10	25	15	35
Total Annual Days	52 days									35 days						
Total Annual Foundations	89 monopiles and 2 jackets									18 monopiles and 24 jackets						
Total Annual Piles	89 monopiles and 8 pin piles									18 monopiles and 96 pin piles						
Total Schedule Days	87															
Total Schedule Foundations	113															
Total Schedule Piles	211															

[a] The request is for the 5-year period 2025–2029, during which pile installation is scheduled to begin in 2026. These dates reflect the currently projected construction start year and are subject to change because exact project start dates and construction schedules are not currently available. No concurrent/simultaneous pile driving of foundations is planned.

[b] The number of days with vibratory hammering or drilling is based on a percentage of the number of days of pile installation and includes installation of a mix of monopiles at a rate of both one per day and two per day as well as installation of jacket foundations at a rate of four pin piles per day. The number of takes by Level B harassment per day is unaffected by the number of piles or foundations installed on that day because the SPL 120 dB metric is not cumulative. Level B take was estimated using density-based calculations that assume all animals within the area ensonified to 120 dB are taken as soon as the activity begins and cannot be taken additional times within one day. Only Level B takes are being requested for drilling and vibratory hammering.

[c] Avangrid assumed that vibratory hammering and drilling would not occur on the same day, when possible. However, for months when the number of days with vibratory hammering plus the number of days with drilling exceeded the total number of impact piling days that month, and assumed the minimum number of days of overlap possible for these two activities. On the days with overlap between drilling and vibratory hammering, the estimated Level B takes resulting from drilling were not included to avoid double counting taken animals, because all animals within the larger vibratory hammering zone of influence were assumed to have already been taken by that activity. Level B takes for 8 days of drilling in year 2 (2026) and 9 days of drilling in year 3 (2027) shown in Schedule A were thus not included in the total take estimates.

TABLE 21—PILE INSTALLATION CONSTRUCTION SCHEDULE B YEAR 2, 3, AND 4

Month	Year 2 (2026) [a]							Year 3 (2027)					Year 4 (2028)				
	12 m Monopile 5,000 kJ		4 m Pin pile 3,500 kJ	Total days of impact only piling	Total days with vibratory + impact piling [b]	Days with drilling [c]	Year 2 total days of foundation installation [c]	4 m Pin pile 3,500 kJ	Total days of impact only piling	Total days with vibratory + impact piling [b]	Days with drilling [c]	Year 3 total days of foundation installation [c]	4 m Pin pile 3,500 kJ	Total days of impact only piling	Total days with vibratory + impact piling [b]	Days with drilling [c]	Year 4 total days of foundation installation [c]
	1 per day	2 per day	4 per day					4 per day					4 per day				
May	4	0	0	4	0	2	4	1	1	0	1	1	1	1	0	1	1
June	6	4	0	8	2	4	10	9	7	2	4	9	4	2	2	2	4
July	0	7	0	3	4	3	7	14	9	5	4	14	5	3	2	2	5

TABLE 21—PILE INSTALLATION CONSTRUCTION SCHEDULE B YEAR 2, 3, AND 4—Continued

Month	Year 2 (2026) [a]							Year 3 (2027)					Year 4 (2028)				
	12 m Monopile 5,000 kJ		4 m Pin pile 3,500 kJ	Total days of impact only piling	Total days with vibratory + impact piling [b]	Days with drilling [c]	Year 2 total days of foundation installation [c]	4 m Pin pile 3,500 kJ	Total days of impact only piling	Total days with vibratory + impact piling [b]	Days with drilling [c]	Year 3 total days of foundation installation [c]	4 m Pin pile 3,500 kJ	Total days of impact only piling	Total days with vibratory + impact piling [b]	Days with drilling [c]	Year 4 total days of foundation installation [c]
	1 per day	2 per day	4 per day					4 per day					4 per day				
August	1	5	1	1	6	4	7	14	6	8	4	14	5	3	2	1	5
September	0	3	1	0	4	4	4	8	3	5	4	8	5	4	1	1	5
October	1	1	1	0	3	2	3	4	0	4	1	4	1	0	1	1	1
November	2	0	0	1	1	1	2	2	1	1	1	2	1	0	1	1	1
December	1	0	0	1	0	0	1	1	1	0	0	1	0	0	0	0	0
Total	15	20	3	18	20	20	38	53	28	25	19	53	22	13	9	9	22
Total Annual Days	38 days							53 days					22 days				
Total Annual Foundations	55 monopiles and 3 jackets							53 jackets					22 jackets				
Total Annual Piles	55 monopiles and 12 pin piles							212 pin piles					88 pin piles				
Total Schedule Days	113																
Total Schedule Foundations	133																
Total Schedule Piles	367																

[a] This LOA request is for the 5-year period 2025–2029, during which pile installation is scheduled to begin in 2026. These dates reflect the currently projected construction start year and are subject to change because exact project start dates and construction schedules are not currently available. No concurrent/simultaneous pile driving of foundations is planned.

[b] The number of days with vibratory hammering or drilling is based on a percentage of the number of days of pile installation and includes installation of a mix of monopiles at a rate of both one per day and two per day as well as installation of jacket foundations at a rate of four pin piles per day. The number of takes by Level B harassment per day is unaffected by the number of piles or foundations installed on that day because the SPL 120 dB metric is not cumulative. Level B take was estimated using density-based calculations that assume all animals within the area ensonified to 120 dB are taken as soon as the activity begins and cannot be taken additional times within one day. Only Level B takes are being requested for drilling and vibratory hammering.

[c] As a conservative measure, it was assumed that vibratory hammering and drilling would not occur on the same day, when possible. However, for months when the number of days with vibratory hammering plus the number of days with drilling exceeded the total number of impact piling days that month, and assumed the minimum number of days of overlap possible for these two activities. On the days with overlap between drilling and vibratory hammering, the estimated Level B takes resulting from drilling were not included to avoid double counting taken animals, because all animals within the larger vibratory hammering zone of influence were assumed to have already been taken by that activity. Level B takes for 9 days of drilling in year 2 (2026), 2 days of drilling in year 3 (2027), and 2 days of drilling in year 4 (2028) shown in Schedule B were thus not included in the total take estimates.

TABLE 22—MARINE MAMMAL EXPOSURE ESTIMATES FOR CONSTRUCTION SCHEDULE A AND SCHEDULE B FOR IMPACT AND VIBRATORY PILE DRIVING, ASSUMING 10 dB NOISE ATTENUATION [a]

Species	Schedule A				Schedule B					
	Level A harassment		Level B harassment		Level A harassment			Level B harassment		
	Year 2	Year 3	Year 2	Year 3	Year 2	Year 3	Year 4	Year 2	Year 3	Year 4
North Atlantic right whale [c]	**0.98**	1.71	19.36	30.72	0.75	**2.88**	**1.32**	13.21	**40.53**	**18.14**
Fin whale [b]	**5.57**	7.75	108.46	152.41	4.24	**19.32**	**7.79**	91.43	**188.88**	**67.19**
Humpback whale	**5.58**	8.04	75.24	98.79	3.99	**16.51**	**7.10**	62.63	**127.85**	**55.43**
Minke whale (migrating) [b]	**16.88**	29.55	284.57	353.33	15.02	**85.85**	**37.91**	259.13	**517.67**	**230.59**
Sei whale (migrating) [b]	**0.54**	1.25	12.02	18.61	0.41	**2.36**	**1.14**	8.99	**26.18**	**13.57**
Sperm whale [c]	0	0	28.33	47.71	0	0	0	23.63	**54.21**	**17.44**
Atlantic spotted dolphin	0	0	81.79	135.51	0	0	0	45.03	**137.43**	**42.41**
Atlantic white sided dolphin	0	0	951.70	1287.99	0	0	0	754.22	**1838.83**	**832.54**
Bottlenose dolphin, offshore	0	0	897.08	1663.50	0	0	0	656.25	**2164.30**	**799.98**
Common dolphin	0	0	13739.47	23178.10	0	0	0	9842.10	**28373.15**	**10590.19**
Long-finned pilot whale	0	0	105.51	164.14	0	0	0	79.13	**210.13**	**78.75**
Short-finned pilot whale	0	0	0	0	0	0	0	0	0	0
Risso's dolphin	0	0	168.60	400.34	0	0	0	94.69	**458.24**	**143.19**
Harbor porpoise (sensitive) [b]	0	0	485.64	717.07	0	0	0	391.52	**863.37**	**337.33**
Gray seal	0.01	0.36	593.10	872.72	**0.02**	**0.67**	**0.32**	297.91	**1181.15**	**555.33**
Harbor seal	<0.01	0.07	333.67	461.08	<0.01	**0.13**	**0.06**	268.75	**529.17**	**272.98**
Harp seal	<0.01	0.33	715.48	1212.34	**0.03**	**0.57**	**0.28**	378.60	**1674.77**	**786.14**

Note: Each construction schedule includes a combination of pile sizes (4, 12, and 13 m), foundation types (monopiles or jackets), and installation methods (either vibratory setting of piles followed by impact pile driving or impact pile driving alone). Values in **bold** are changed from the proposed rule.

[a] Density estimates are calculated from the 2022 Duke Habitat-Based Marine Mammal Density Models (Roberts *et al.,* 2016; Roberts *et al.,* 2022).

[b] Listed as Endangered under the ESA.

TABLE 23—MARINE MAMMAL EXPOSURE ESTIMATES FOR DRILLING DURING CONSTRUCTION SCHEDULE A AND SCHEDULE B, ASSUMING 10 dB NOISE ATTENUATION [a]

Species	Schedule A		Schedule B		
	Year 2	Year 3	Year 2	Year 3	Year 4
North Atlantic right whale [c]	2.59	1.32	1.97	1.44	0.98
Fin whale [c]	15.13	6.18	8.83	9.01	3.85
Humpback whale	10.23	4.75	6.74	6.16	3.20
Minke whale (migrating) [b]	38.79	16.85	27.73	25.30	12.87
Sei whale [c] (migrating) [b]	1.92	1.03	1.47	1.12	0.76
Sperm whale [c]	3.17	1.45	1.80	1.75	0.67
Atlantic spotted dolphin	7.42	3.43	4.19	3.51	1.73
Atlantic white sided dolphin	93.80	43.60	63.53	56.43	30.47
Bottlenose dolphin, offshore	77.19	34.63	45.58	44.48	19.90
Common dolphin	877.24	377.50	515.72	485.77	210.11
Long-finned pilot whale	10.16	4.62	6.16	5.85	2.77
Short-finned pilot whale	2.54	1.15	1.54	1.46	0.69
Risso's dolphin	5.73	2.55	3.30	3.11	1.34
Harbor porpoise (sensitive) [b]	71.60	34.46	50.91	39.30	24.34
Gray seal	33.81	19.32	27.62	19.27	14.80
Harbor seal	50.72	28.97	41.43	28.91	22.20
Harp seal	36.23	20.70	29.59	20.65	15.86

Note: No Level A harassment is expected or may be authorized for drilling. Drilling exposure estimates are based on the assumption that 48 days under either Schedule A or Schedule B would require drilling. Estimated exposures are from the full drilling schedule; final take request does not include drilling exposures on days when both vibratory setting and drilling occur on the same day to avoid double counting because all animals within the larger vibratory hammering zone of influence were assumed to have already been taken by that activity. A total of 17 days (8 days in year 1, 9 days in year 2) of drilling exposures in Construction Schedule A were not included in the final take request. A total of 13 days (9 in year 1, 2 in year 2, and 2 in year 3) of drilling exposures in Construction Schedule B were not included in the final take request.

[a] Density estimates are calculated from the 2022 Duke Habitat-Based Marine Mammal Density Models (Roberts *et al.,* 2016; Roberts *et al.,* 2022).

[b] Listed as Endangered under the ESA.

TABLE 24—MAXIMUM ANNUAL AMOUNT OF TAKE THAT MAY BE AUTHORIZED BY LEVEL A AND LEVEL B HARASSMENTS FROM PILE DRIVING ASSOCIATED WITH WTG AND ESP TOTAL INSTALLATION EVENTS FOR CONSTRUCTION SCHEDULE A AND B, ASSUMING 10 dB OF NOISE ATTENUATION

Species	Year 2 (2026)		Year 3 (2027)		Year 4 (2028)	
	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment
North Atlantic right whale [a]	0	18	0	39	0	17
Fin whale	6	100	20	181	8	64
Humpback whale	6	67	17	120	8	52
Minke whale	17	233	86	443	38	193
Sei whale	1	10	3	23	2	12

TABLE 24—MAXIMUM ANNUAL AMOUNT OF TAKE THAT MAY BE AUTHORIZED BY LEVEL A AND LEVEL B HARASSMENTS FROM PILE DRIVING ASSOCIATED WITH WTG AND ESP TOTAL INSTALLATION EVENTS FOR CONSTRUCTION SCHEDULE A AND B, ASSUMING 10 dB OF NOISE ATTENUATION—Continued

Species	Year 2 (2026)		Year 3 (2027)		Year 4 (2028)	
	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment
Sperm whale	0	26	0	52	0	17
Atlantic spotted dolphin	0	78	0	136	0	42
Atlantic white sided dolphin	0	794	0	1635	0	736
Bottlenose dolphin, offshore	0	795	0	2007	0	738
Common dolphin	0	11613	0	25942	0	9664
Long-finned pilot whale	0	92	0	193	0	72
Short-finned pilot whale	0	9	0	9	0	9
Risso's dolphin	0	159	0	446	0	139
Harbor porpoise	2	423	11	787	5	295
Gray seal	1	574	1	1172	1	550
Harbor seal	1	304	1	497	1	253
Harp seal	1	685	1	1647	1	770

Note: Schedule A has the maximum amount of take reasonably likely to occur in Y2 and Y3 while Schedule B has the maximum for Y4. Double counting of take has been removed.

[a] While exposures were estimated, the level of mitigation required for North Atlantic right whales results in take by Level A harassment to be unlikely to occur, hence, no take by Level A harassment for North Atlantic right whales was requested nor would be authorized by NMFS.

TABLE 25—MAXIMUM ANNUAL AMOUNT OF TAKE THAT MAY BE AUTHORIZED BY LEVEL B HARASSMENT FROM DRILLING ASSOCIATED WITH WTG AND ESP TOTAL INSTALLATION EVENTS FOR CONSTRUCTION SCHEDULE A AND B, ASSUMING 10 dB OF NOISE ATTENUATION

Species	Year 2 (2026)		Year 3 (2027)		Year 4 (2028)	
	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment
North Atlantic right whale	0	3	0	2	0	1
Fin whale	0	11	0	9	0	4
Humpback whale	0	9	0	6	0	3
Minke whale	0	32	0	24	0	13
Sei whale	0	2	0	2	0	1
Sperm whale	0	3	0	2	0	1
Atlantic spotted dolphin	0	7	0	3	0	1
Atlantic white sided dolphin	0	80	0	50	0	24
Bottlenose dolphin, offshore	0	57	0	40	0	16
Common dolphin	0	666	0	408	0	156
Long-finned pilot whale	0	8	0	6	0	3
Short-finned pilot whale	0	2	0	2	0	1
Risso's dolphin	0	5	0	3	0	1
Harbor porpoise	0	60	0	36	0	20
Gray seal	0	33	0	19	0	12
Harbor seal	0	49	0	28	0	17
Harp seal	0	35	0	20	0	12

Note: Schedule A has the maximum amount of take reasonably likely to occur in Y2 and Y3 while Schedule B has the maximum for Y4. Take does not include level B harassment from drilling on days when both vibratory setting and drilling occur on the same day to avoid double counting.

TABLE 26—ANNUAL TAKE, BY LEVEL A AND LEVEL B HARASSMENTS, THAT MAY BE AUTHORIZED FOR ALL FOUNDATION INSTALLATION ACTIVITIES FOR CONSTRUCTION SCHEDULE B, ASSUMING 10 dB OF NOISE ATTENUATION [a]

Species	Impact and vibratory pile driving						Drilling		
	Year 2 (2026)		Year 3 (2027)		Year 4 (2028)		Year 2 (2026)	Year 3 (2027)	Year 4 (2028)
	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level B harassment	Level B harassment	Level B harassment
North Atlantic right whale	0	13	0	39	0	17	2	2	1
Fin whale	5	88	20	181	8	64	6	9	4
Humpback whale	4	59	17	120	8	52	5	6	3
Minke whale	16	232	86	443	38	193	21	24	13
Sei whale	1	9	3	23	2	12	2	2	1
Sperm whale	0	23	0	52	0	17	1	2	1
Atlantic spotted dolphin	0	45	0	136	0	42	1	3	1
Atlantic white sided dolphin	0	696	0	1635	0	736	42	50	24
Bottlenose dolphin, offshore	0	622	0	2007	0	738	24	40	16
Common dolphin	0	9332	0	25942	0	9664	204	408	156

TABLE 26—ANNUAL TAKE, BY LEVEL A AND LEVEL B HARASSMENTS, THAT MAY BE AUTHORIZED FOR ALL FOUNDATION INSTALLATION ACTIVITIES FOR CONSTRUCTION SCHEDULE B, ASSUMING 10 dB OF NOISE ATTENUATION [a]—Continued

Species	Impact and vibratory pile driving						Drilling		
	Year 2 (2026)		Year 3 (2027)		Year 4 (2028)		Year 2 (2026)	Year 3 (2027)	Year 4 (2028)
	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level B harassment	Level B harassment	Level B harassment
Long-finned pilot whale	0	75	0	193	0	72	4	6	3
Short-finned pilot whale	0	9	0	9	0	9	1	2	1
Rissos dolphin	0	92	0	446	0	139	2	3	1
Harbor porpoise	2	363	11	787	5	295	37	36	20
Gray seal	1	286	1	1172	1	550	25	19	12
Harbor seal	1	253	1	497	1	253	37	28	17
Harp seal	1	361	1	1647	1	770	26	20	12

[a] As construction Schedule B has the highest total take by harassment for foundation installation, this table represents the sum of the takes from Schedule B only and not the sum of the preceding columns within the previous tables. Schedule B has been used to set the total 5–Y take amounts that may be authorized for Level B harassment. Take does not include Level B harassment from drilling on days when both vibratory setting and drilling occur on the same day to avoid double counting.

UXO/MEC Detonations

Avangrid may detonate up to 10 UXO/MECs within the project area with no more than six in 2025 (year 1) and four in 2026 (year 2); no more than one detonation per 24-hour period would occur. Avangrid adopted the U.S. Navy's charge weight bins (E4, E6, E8, E10, and E12) to determine potential impacts to marine mammals from UXO/MEC detonation. As described in the proposed rule, Avangrid applied modeling results from the Revolution Wind project to its analysis. This modeling evaluated the effects thresholds for TTS, PTS, non-auditory injury, and mortality based on the appropriate metrics: (1) peak sound pressure level; (2) weighted cumulative SEL; and (3) acoustic impulse. Charge weights of 2.3 kg (5.1 pounds (lbs)), 9.1 kg (20.1 lbs), 45.5 kg (100.3 lbs), 227 kg (500 lbs), and 454 kg (1,000.9 lbs), which is the largest charge the Navy considers for the purposes of its analyses (see the Description of the Specified Activities section in the proposed rule), were modeled to determine the ranges to mortality, gastrointestinal injury, lung injury, PTS, and TTS thresholds. The exact type and net explosive weight of UXO/MECs that may be detonated are not known at this time. However, based on the results of a UXO/MECs desktop study (Mills, 2021), Avangrid does not expect that 10 of the largest charge weight (bin E12) UXO/MECs will be present, but a combination of different sizes. For the 10 UXO/MECs, the model estimated the E12 charge weight with 2 detonations at 12 m, 3 detonations at 20 m, 3 detonations at 30 m, and 2 detonations at 40 m.

Mortality and non-auditory injury to lung and gastrointestinal organs were considered in the modeling study (Hannay and Zykov, 2022). As described in the proposed rule, peak pressure and acoustic impulse levels and effects threshold exceedance zones depend only on charge weight, water depth, animal mass, and submersion depth. The maximum distance to gastrointestinal injury (1 percent of exposed animals) due to peak pressure for detonating an E12-size UXO/MEC at all sites assuming 10 dB of attenuation is 125 m (Hannay and Zykov, 2022). The maximum distance modeled to the onset of lung injury due to detonating an E12-size UXO/MEC assuming 10 dB of attenuation is 237 m for baleen whales, 330 m for pilot and minke whales, 448 m for beaked whales, 606 m for delphinids, *Kogia,* and pinnipeds, and 648 m for harbor porpoise (table 27). Assuming 10 dB of attenuation, the impulse-based maximum distance to the onset of mortality is 353 m (porpoises) (table 27).

TABLE 27—UXO/MEC IMPULSE EXCEEDANCE DISTANCES (METERS) FOR MARINE MAMMALS FOR THE DETONATION OF AN E12 UXO/MEC, FOR ONSET OF LUNG INJURY AND MORTALITY AT VARIOUS DEPTHS ASSUMING 10 dB ATTENUATION

Marine mammal group	12 m water depth		20 m water depth		30 m water depth		45 m water depth	
	Calf/pup	Adult	Calf/pup	Adult	Calf/pup	Adult	Calf/pup	Adult
Onset of Lung Injury (m)								
Baleen whales and Sperm whale	151	73	204	80	226	81	237	78
Pilot and Minke whales	192	103	272	126	310	131	330	132
Beaked whales	250	171	366	237	413	267	448	282
Dolphins, *Kogia,* and Pinnipeds	347	241	508	351	557	400	606	429
Porpoises	377	260	541	381	594	429	648	465
Onset of mortality (m)								
Baleen whales and Sperm whale	90	34	105	34	109	31	108	29
Pilot and Minke whales	120	56	150	58	157	57	162	50
Beaked whales	161	105	206	127	220	132	234	135
Dolphins, Kogia, and Pinnipeds	228	154	285	198	308	211	332	224
Porpoises	248	167	307	215	330	231	353	243

Avangrid will be required to conduct extensive monitoring using both PSOs and PAM operators and clear an area of marine mammals prior to detonating any UXO/MEC. Given that Avangrid will be employing multiple platforms to visually monitor marine mammals as well as conducting PAM and must only detonate UXO/MECs during daylight

hours, it is reasonable to conclude that marine mammals will be reliably detected within approximately 660 m of the UXO/MEC being detonated and mortality or non-auditory injury is not likely to occur. As described below, in consideration of the distances to the associated thresholds and the implementation of the required mitigation and monitoring measures, Avangrid did not request and NMFS does not anticipate and may not authorize take by mortality or non-auditory injury. All modeling results, including mortality and non-auditory injury, can be found in appendix A for Avangrid's ITA application (Hannay and Zykov, 2022), as found on NMFS' website (*https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable*).

Distances to PTS and TTS thresholds for all UXO/MEC charge weights were also calculated by Avangrid. In the proposed rule, we only described the distances to thresholds for the largest E12 charge weight. However, in the event that Avangrid will be able to identify and mitigate at the relevant distances for each specific charge weight, we have incorporated the maximum values for each charge weight size herein. It is not currently known how easily the size and charge weights of UXO/MECs can be identified in the field. Avangrid must demonstrate to NMFS that it is able to accurately identify charge weights in the field prior to detonation otherwise the largest charge weight, E12, will be assumed and the appropriate associated mitigation and monitoring measures implemented. Tables 28 and 29 contain the maximum ($ER_{95\%}$) modeled distances by Hannay and Zykov (2022) to PTS and TTS thresholds during UXO/MEC detonation for each charge weight bin.

TABLE 28—MAXIMUM SEL-BASED $R_{95\%}$ PTS-ONSET RANGES, IN METERS, FROM ALL SITE MODELED DURING UXO/MEC DETONATION BY CHARGE WEIGHT, ASSUMING 10-dB SOUND ATTENUATION

Marine mammal hearing group	2.3 kg (5.1 lbs)		9.1 kg (20.1 lbs)		45.5 kg (100.3 lbs)		227 kg (500 lbs)		454 kg (1,000.9 lbs)	
	R_{max} [a]	$R_{95\%}$ [b]	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$
LFC	632	552	1,230	982	2,010	1,730	3,370	2,970	4,270	3,780
MFC	<50	<50	79	75	175	156	419	337	535	461
HFC	2,100	1,820	3,020	2,590	4,400	3,900	6,130	5,400	6,960	6,200
PP	192	182	413	357	822	690	1,410	1,220	1,830	1,600

Note: LFC = low-frequency cetaceans; MFC = mid-frequency cetaceans; HFC = high-frequency cetaceans; PP = phocid pinnipeds.

[a] Represents the maximum distance in any direction that the threshold was exceeded. This metric is often overly conservative for take estimates because it reflects the influence of coherent constructive interference effects, produced by most propagation loss models, due to model approximations of highly uniform environments. In practice, these coherent effects are almost always disrupted by rough interfaces and ocean inhomogeneities.

[b] Represents the radius of a circle that encompasses 95 percent of the area predicted by the model to exceed the threshold. The circle radius is typically larger than the maximum distances in most directions, but it cuts off ''fingers'' of ensonification that protrude in a small number of directions. This metric is typically also conservative, but less so than the R_{max} distance.

TABLE 29—MAXIMUM SEL-BASED $R_{95\%}$ TTS-ONSET RANGES, IN METERS, FROM ALL SITE MODELED DURING UXO/MEC DETONATION BY CHARGE WEIGHT, ASSUMING 10-dB SOUND ATTENUATION

Marine mammal hearing group	2.3 kg (5.1 lbs)		9.1 kg (20.1 lbs)		45.5 kg (100.3 lbs)		227 kg (500 lbs)		454 kg (1,000.9 lbs)	
	R_{max} [a]	$R_{95\%}$ [b]	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$	R_{max}	$R_{95\%}$
LFC	3,140	2,820	5,230	4,680	8,160	7,490	11,700	10,500	13,500	11,900
MFC	535	453	910	773	1,520	1,240	2,400	2,120	2,930	2,550
HFC	6,920	6,160	8,970	8,000	11,300	10,300	14,600	12,900	15,600	14,100
PP	1,730	1,470	2,710	2,350	4,340	3,820	6,640	5,980	7,820	7,020

Note: LFC = low-frequency cetaceans; MFC = mid-frequency cetaceans; HFC = high-frequency cetaceans; PP = phocid pinnipeds.

[a] Represents the maximum distance in any direction that the threshold was exceeded. This metric is often overly conservative for take estimates because it reflects the influence of coherent constructive interference effects, produced by most propagation loss models, due to model approximations of highly uniform environments. In practice, these coherent effects are almost always disrupted by rough interfaces and ocean inhomogeneities.

[b] Represents the radius of a circle that encompasses 95 percent of the area predicted by the model to exceed the threshold. The circle radius is typically larger than the maximum distances in most directions, but it cuts off ''fingers'' of ensonification that protrude in a small number of directions. This metric is typically also conservative, but less so than the R_{max} distance.

To estimate the maximum ensonified zones that could result from UXO/MEC detonations, the area distances in Li and Koessler (2022) table J–5 were multiplied by the highest monthly species density in the deepwater OECC segment and the SWDA for the 20–45 m depths, and by the highest monthly species density in the shallow water OECC segment for the 12 m depth. The result of the areas multiplied by the densities were then multiplied by the number of UXO/MECs estimated at each of the depths to calculate total estimated exposures. To calculate potential marine mammal exposures, Avangrid assumed all charge weights belong in the largest E12 class; therefore, the largest acoustic range ($R_{95\%t}$; assuming 10 dB of attenuation) to PTS and TTS thresholds of a E12 UXO/MEC charge weight were used as radii to calculate the area of a circle ($pi \times r^2$; where r is the range to the threshold level) for each marine mammal hearing group. The ensonified area distances were multiplied by the highest monthly species density in the deepwater OECC segment and the lease area (SWDA) for the 20–45 m depths, and by the highest monthly species density in the shallow water OECC segment for the 12 m depth (using a 14.1-km buffer) and the combined deepwater segment of the OECC and SWDA (20 m–45 m depths; using a 13.8-km buffer).

As a conservative approach, the month with the highest density among the areas of interest for each species was carried forward to the exposure calculations (*i.e.,* assumed all UXO/MECs would be detonated in the month with the greatest average monthly density). In some cases where monthly densities were unavailable, annual densities were used instead for some species (*i.e.,* blue whales, pilot whale *spp.*). Additionally, the pilot whale guild, harbor seals, gray seals, and harp seals were scaled by relative abundance following the same approach previously described. The resulting maximum density was multiplied by the number of UXO/MECs estimated at each of the

depths to calculate total estimated exposures. Table 30 provides the maximum species-specific densities for the Project and resulting take calculations using the described approach. As described above, Avangrid based the amount of take requested for authorization on the number of exposures estimated assuming 10 dB of attenuation using a NAS, NAS would be required during all detonations.

The likelihood of marine mammal exposures above the PTS threshold is low, especially considering the instantaneous nature of the acoustic signal and that Avangrid would conduct extensive monitoring, delaying a detonation should a marine mammal be within the PTS distances. However, some species, such as harbor porpoise and seals are difficult to detect given the relatively large distances to the high-frequency cetacean Level A harassment (PTS, SEL_{cum}) isopleth applicable to harbor porpoises and the difficulty detecting this species at sea, Avangrid requested, and NMFS may authorize, takes by Level A harassment of harbor porpoise from UXO/MEC detonations. Similarly, seals are difficult to detect at longer ranges, and although the distance to the phocid hearing group SEL PTS threshold is not as large as those for high-frequency cetaceans, it may not be possible to detect all seals within the PTS threshold distances even with the required monitoring measures. Therefore, Avangrid requested and NMFS may authorize under this rulemaking take by Level A harassment of gray seals, harbor seals, and harp seals incidental to UXO/MEC detonation. Given the extensive monitoring, it is likely that all PTS of large whales would be avoided. However, in the unexpected circumstance that a large whale other than a North Atlantic right whale (*i.e.,* fin whale, humpback whale, minke whale, sei, and sperm whales) is missed during monitoring, Avangrid requested, and NMFS may authorize, a very small amount of Level A harassment incidental to UXO/MEC detonation. Due to the mitigation and monitoring measures required specifically for North Atlantic right whales (*e.g.,* clearance zone is ''any distance''; table 36), it is unlikely that North Atlantic right whales will be missed during monitoring. Therefore, take by Level A harassment is not expected to occur; Avangrid did not request and NMFS is not authorizing take by Level A harassment of North Atlantic right whales. Given that North Atlantic right whales are reported frequently, Avangrid would be required to monitoring the sighting network for this species, and conduct acoustic monitoring, it is not expected that a North Atlantic right whale would be missed during monitoring and therefore, Level A harassment of this species is not requested and NMFS may not authorize incidental to UXO/MEC detonation.

TABLE 30—MAXIMUM MONTHLY MARINE MAMMAL DENSITIES (INDIVIDUALS/100 km^2) WITHIN THE PROJECT AREA WITH UXO/MEC DETONATION ASSOCIATED LEVEL A HARASSMENT (PTS) AND LEVEL B HARASSMENT (TTS SEL) EXPOSURE ASSUMING 10 dB ATTENUATION, AND ESTIMATED TAKE

Species	Shallow OECC maximum monthly density (individual/ 100 km^2)	Deep OECC maximum monthly density (individual/ 100 km^2)	2025 Estimated take		2026 Estimated take	
			Level A harassment	Level B harassment	Level A harassment	Level B harassment
North Atlantic right whale [a] [b]	0.116	0.707	0	14	0	13
Fin whale [a]	0.007	0.425	1	7	1	7
Humpback whale	0.04	0.297	1	5	1	5
Minke whale	0.129	1.72	4	28	3	27
Sei whale [a]	0.034	0.191	1	4	1	3
Sperm whale [a]	0.002	0.112	1	1	1	1
Atlantic spotted dolphin	0.013	0.448	1	1	1	1
Atlantic white-sided dolphin	0.051	3.278	1	3	1	3
Bottlenose dolphin, offshore	0.158	1.631	1	2	1	2
Common dolphin	0.35	24.845	1	19	1	19
Long-finned pilot whale	0	0.135	1	1	1	1
Short-finned pilot whale	0	0.1	1	1	1	1
Risso's dolphin	0.01	0.176	1	1	1	1
Harbor porpoise	1.772	10.608	56	217	51	193
Gray seal	24.506	13.647	8	146	4	80
Harbor seal	55.059	30.662	17	328	8	179
Harp seal	24.506	13.647	8	146	4	80

[a] Denotes species listed under the ESA.

[b] Due to the extensive mitigation and monitoring measures specific to North Atlantic right whales for UXO/MEC detonations, it is not reasonable to expect that take by Level A harassment will occur, therefore, Avangrid did not request and NMFS may not authorize, take by Level A harassment of North Atlantic right whales.

HRG Surveys

Avangrid's planned HRG survey activity includes the use of impulsive sources (*i.e.,* boomers and sparkers) that have the potential to harass marine mammals. The acoustic sources expected to result in marine mammal harassment, as defined under the MMPA, are provided in table 3 of the proposed rule (88 FR 37606, June 8, 2023) and remain unchanged in this final rule. If authorized, takes will be by Level B harassment only in the form of disruption of behavioral patterns for individual marine mammals resulting from exposure to noise from certain HRG acoustic sources. Based primarily on the characteristics of the signals produced by the acoustic sources planned for use, Level A harassment is neither anticipated, even absent mitigation, nor planned to be authorized. Please see Avangrid's application for details of a quantitative exposure analysis (*i.e.,* calculated distances to Level A harassment isopleths and Level A harassment exposures). Further, there is no evidence to suggest that serious injury or mortality is a potential outcome of exposure to HRG survey sources, and none is anticipated.

Therefore, the potential for Level A harassment from HRG surveys is not evaluated further in this document. Avangrid did not request, and NMFS may not authorize, take by Level A harassment incidental to HRG surveys. No serious injury or mortality is anticipated to result from HRG survey activities.

Specific to HRG surveys, in order to better consider the narrower and directional beams of the sources, NMFS has developed a tool for determining the sound pressure level (SPL_{rms}) at the 160-dB isopleth for the purposes of estimating the extent of Level B harassment isopleths associated with HRG survey equipment (NMFS, 2020). This methodology incorporates frequency-dependent absorption and some directionality to refine estimated ensonified zones. Avangrid used NMFS' methodology with additional modifications to incorporate a seawater absorption formula and account for energy emitted outside of the primary beam of the source. For sources that operate with different beamwidths, the maximum beam width was used, and the lowest frequency of the source was used when calculating the frequency-dependent absorption coefficient.

The isopleth distances corresponding to the Level B harassment threshold for each type of HRG equipment with the potential to result in harassment of marine mammals were calculated per ''NOAA Fisheries' Interim Recommendation for Sound Source Level and Propagation Analysis for High Resolution Geophysical Sources.'' The distances to the 160-dB RMS re 1 µPa isopleth for Level B harassment are presented in table 31. Please refer to appendix I in Li and Koessler (2022) of the LOA application for a full description of the methodology and formulas used to calculate distances to the Level B harassment threshold.

TABLE 31—ISOPLETH DISTANCES IN METERS (m) CORRESPONDING TO LEVEL B HARASSMENT THRESHOLD FOR HRG EQUIPMENT

HRG survey equipment	Equipment type	Horizontal distance (m) to Level B harassment threshold	Ensonified area (km^2)
Applied Acoustics AA251 Boomer	SBP: Boomer	178	28.58
GeoMarine Geo Spark 2000 (400 tip)	SBP: Sparker	141	22.62

The survey activities that have the potential to result in Level B harassment (160 dB SPL) include the noise produced by Applied Acoustics AA251 Boomer or GeoMarine Geo Spark 2000 (400 tip) (table 31), of which the Applied Acoustics AA251 Boomer results in the greatest calculated distance to the Level B harassment criteria at 178 m (584 ft). Avangrid has applied the estimated distance of 178 m (584 ft) to the 160 dB_{RMS90} percent re 1 µPa Level B harassment criteria as the basis for determining potential take from all HRG sources. All noise-producing survey equipment is assumed to be operated concurrently. Three vessels are assumed to be operating concurrently.

The basis for the take estimate is the number of marine mammals that would be exposed to sound levels in excess of the Level B harassment threshold (160 dB). Typically, this is determined by estimating an ensonified area for the activity, by calculating the area associated with the isopleth distance corresponding to the Level B harassment threshold. This area is then multiplied by marine mammal density estimates in the Project Area and then corrected for seasonal use by marine mammals, seasonal duration of Project-specific noise-generating activities, and estimated duration of individual activities when the maximum noise-generating activities are intermittent or occasional.

The total area ensonified was estimated by considering the distance of the daily vessel track line (determined using the estimated average speed of the vessel and the 24-hour operational period within each of the corresponding survey segments) and the longest horizontal distance to the relevant acoustic threshold from an HRG sound source (full formula in section 6.6 of the ITA application). Using the larger distance of 178 m (164 ft)) to the 160 $dB_{RMS90\ percent}$ re 1 µPa Level B harassment isopleth (table 31), the estimated daily vessel track of approximately 80 km (49.7 mi) per vessel for 24-hour operations, inclusive of an additional circular area to account for radial distance at the start and end of a 24-hour cycle, estimates of the total area ensonified to the Level B harassment threshold per day of HRG surveys were calculated (table 31).

Exposure calculations assumed that there would be 25 days of HRG surveying per year over each of the 5 years. As described in the ITA application, density data were mapped within the boundary of the Project Area using geographic information systems, these data were updated based on the revised data from the Roberts *et al.* (2022) model. Because the exact dates of HRG surveys are unknown, the highest density month for each species was used and carried forward in the take calculations (table 32).

The calculated exposure estimates based on the exposure modeling methodology described above were compared with the best available information on marine mammal group sizes. Group sizes used for HRG take estimates were the same as those used for impact pile driving take estimation (section 6.1.2 in the ITA application). Avangrid also used data collected by PSOs on survey vessels operating during HRG surveys in 2020–2021 from their nearby Vineyard Wind project area. It was determined that the calculated number of potential takes by Level B harassment based on the exposure modeling methodology above may be underestimates for some species and therefore warranted adjustment using group size to ensure conservatism in the take numbers NMFS may authorize. Despite the relatively small modeled Level B harassment zone (178 m) for HRG survey activities, it was determined that adjustments to the requested numbers of take by Level B harassment for some dolphin species was warranted to be conservative (see below).

For certain species for which the density-based methodology described above may result in potential underestimates of take and Avangrid's PSO sightings data were relatively low, adjustments to the exposure estimates were made based on the best available information on marine mammal group sizes to ensure conservatism. For species with densities too low in the region to provide meaningful modeled

exposure estimates (*i.e.,* rare species), the take request is based on the average group size (table 11). For species not considered rare in the Project Area, but AMAPP data or Avangrid PSO data show a higher group size level than the Roberts *et al.* (2022) model, then the takes by Level B harassment requested for authorization were adjusted to one group size per day of HRG surveys (table 32).

For species considered rare but that still have the small potential for occurrence in the Project area, takes by Level B harassment during HRG surveys were requested by Avangrid. This occurred for white-beaked dolphin, killer whale, and false killer whale. Avangrid based their takes requested for authorization on these species by using one group size per year in 3 of 5 years for species. Group sizes used were based on PSO observations during previous HRG surveys.

TABLE 32—MARINE MAMMAL DENSITIES USED IN EXPOSURE ESTIMATES AND ESTIMATED TAKES BY LEVEL B HARASSMENT FROM HRG SURVEYS

Species	Maximum monthly density [a] (No./100 km^2)	Annual exposure using the boomer [f]	Annual exposure using the sparker [g]	Annual level B harassment take	5-Year total level B harassment take
North Atlantic right whale [b]	0.567	4.05	3.21	5	25
Fin whale [b]	0.436	3.11	2.47	4	20
Humpback whale	0.323	2.31	1.83	3	15
Minke whale	1.704	12.17	9.64	13	65
Sei whale [b]	0.193	1.38	1.09	2	10
Sperm whale [b h]	0.111	0.79	0.62	2	10
Atlantic spotted dolphin [h]	0.404	2.88	2.28	30	150
Atlantic white-sided dolphin [h]	3.406	24.34	19.26	28	140
Bottlenose dolphin, offshore [h]	1.753	12.53	9.92	18	90
Common dolphin [c]	28.314	202.3	160.13	203	1,015
Long-finned pilot whale [d h]	0.149	1.06	0.84	17	85
Short-finned pilot whale [d h]	0.11	0.78	0.62	9	45
Risso's dolphin [h]	0.187	1.34	1.06	7	35
False Killer whale [i]	N/A	N/A	N/A	5	15
Killer whale [i]	N/A	N/A	N/A	2	6
White-beaked dolphin [i]	N/A	N/A	N/A	30	90
Harbor porpoise	10.974	78.41	62.07	79	395
Gray seal [e]	27.901	199.35	157.8	200	1,000
Harbor seal [e]	62.687	447.89	354.54	448	2,240
Harp seal [e]	27.901	199.35	157.8	200	1,000

[a] Cetacean density values from the Roberts et al. (2016, 2022) model.
[b] Listed as Endangered under the ESA.
[c] Take rounded up to one group size.
[d] Long- and short-finned pilot whale densities are the annual pilot whale guild density scaled by their relative abundances.
[e] Gray and harbor seal densities are the seals guild density scaled by their relative abundances; gray seals are used as a surrogate for harp seals.
[f] Applied Acoustics AA251 boomer.
[g] GeoMarine Geo Spark 2000.
[h] Annual take by Level B harassment is rounded up to one group size.
[i] Rare species total take estimates are based on the assumption that a group would be seen every other year; hence, the 5-yr total is less than the sum of each year.

Total Authorized Take Across All Activities

The amount of Level A harassment and Level B harassment NMFS may be authorizing incidental to all project activities combined (*i.e.,* pile driving and drilling to install WTG and ESP monopile and jacket foundations, UXO/MEC detonations, and HRG surveys) are shown in table 33. The annual amount of take which may be authorized reflects the maximum number of take that may occur in each year, based on Avangrid's current schedules, as provided in table 1. Year 1 (2024) take estimates include HRG surveys and UXO/MEC detonations. Year 2 take includes all activities occurring: WTG and ESP foundation installation, HRG surveys, and UXO/MEC detonation. Year 3 includes WTG and ESP foundation installation and HRG surveys. Year 4 take includes WTG and ESP foundation installation (assuming construction schedule B) and HRG surveys. Year 5 take includes HRG surveys only. All activities are expected to be completed by 2030, equating to the 5 years of activities, as described in this preamble. NMFS recognizes that schedules may shift due to a number of planning and logistical constraints such that take may be redistributed throughout the 5 years. However, the total 5-year amount of take for each species, shown in table 33, and the maximum annual take in any one year (table 35) must not be exceeded. Additionally, to reduce impacts to marine mammals, NMFS has required several mitigation and monitoring measures, provided in the Mitigation and Monitoring and Reporting sections, which are activity-specific and are designed to minimize acoustic exposures to marine mammal species.

For common and uncommon, though not ''rare,'' species where the exposure estimate was less than the mean group size, it was assumed that if one group member was exposed, then the entire group would be exposed. For species where the annual number of predicted exposures was less than the mean group size, the annual take was increased to the mean group size rounded up to the nearest integer. The only species this applied to are the sei whale, Atlantic spotted dolphin, Risso's dolphin, and sperm whale. Because pile driving would occur over either 2 or 3 years, the mean group size rule was carried over from each of the annual take estimates to the total take estimates for the entire construction schedule to account for the possibility that a single exposure could occur in every year of a given construction schedule.

For species that are considered rare but still have the slight potential for occurrence in the Project area, Avangrid requested an amount of annual take

assuming one group size of that species may be harassed in any given year. However, due to how rare these species are in the project area, it is not assumed that they would be encountered every year, instead, a group is anticipated to occur only every other year; hence the total amount of take of the 5 years is less than the sum of the annual take across all 5 years. As described above, takes for these species are based on PSO sighting group sizes or on group size from OBIS data. NMFS concurs with this assessment and may authorize takes by Level A harassment and/or Level B harassment for these rare species (table 33).

The amount of take that Avangrid requested, and NMFS may authorize is considered conservative. NMFS does not typically authorize take of rare species in these circumstances; however, given the amount of foundation installation activities that Avangrid is proposing to undertake (*i.e.,* installation of up to 129 WTG and 2–5 ESP positions), the large harassment zone sizes estimated from foundation installation, the duration of the foundation installation (up to 3 years), that marine mammal distribution is changing and that foundation installation is not scheduled to begin until 2026, NMFS is proposing to allow take for rare species. The one exception is the request for take of beluga whales. There is no beluga whale stock in the U.S. Atlantic and the potential for a beluga whale to occur is incredibly unlikely. Hence, NMFS may not authorize take of beluga whales.

For the species for which modeling was conducted, the allowable take is considered conservative for a number of reasons. The amount of take that may be authorized assumes the most impactful scenario with respect to project design and schedules. As described in the Description of Specific Activities section, Avangrid plans to use monopile and jacket foundations (inclusive of bottom-frame foundations) for all permanent structures (*i.e.,* WTGs and ESPs). The take that NMFS may authorize for pile driving assumed a maximum piling schedule of two monopiles and four pin piles installed per 24-hour period. The take numbers NMFS may authorize for pile driving are conservatively based on the maximum densities across the construction months. The take numbers that NMFS may authorize for Level A harassment do not fully account for the likelihood that marine mammals would avoid a stimulus when possible before the individual accumulates enough acoustic energy to potentially cause auditory injury, nor do these numbers account for the effectiveness of the required mitigation measures.

If authorized, takes by Level A harassment and Level B harassment for the combined activities of pile driving and drilling during the installation of monopiles and pin piles (assuming 10 dB of sound attenuation), UXO/MEC detonation, and HRG surveys are provided in tables 33 and 34. NMFS also presents the percentage of each marine mammal stock estimated to be taken based on the total amount of annual take in table 35. To inform the negligible impact analysis, NMFS assesses the greatest amount of take of marine mammals allowable in any given year (which in the case of this rule is based on the predicted Year 1 for all species), as well as the total allowable take across all 5 years of the rule. Table 35 also depicts the amount of take relative to each stock assuming that each individual is taken only once, which specifically informs the small numbers determination. Table 34 provides the total take that may be authorized from the entire 5-year effective period of the rule and, if issued, associated LOA.

As a result of the updated modeling for impact pile driving, vibratory pile driving, and drilling, takes by Level A harassment and Level B harassment decreased for many species (values in **bold** in table 33, 34, and 35). Rare species, having not been included in the modeling for the proposed or final rule, as they are based on OBIS or PSO sighting data, are unchanged since the proposed rule with the exception of the Northern bottlenose whale. Northern bottlenose whale takes by Level B harassment decreased from 12 to 8 as a result of a correction submitted in the January 2024 Application Update by Avangrid (as previously described in the *Changes in Information Provided in the Preamble*).

TABLE 33—LEVEL A HARASSMENT AND LEVEL B HARASSMENT TAKES FOR ALL ACTIVITIES THAT MAY BE AUTHORIZED DURING THE CONSTRUCTION AND DEVELOPMENT OF THE PROJECT OVER 5 YEARS

Species	Year 1		Year 2		Year 3		Year 4		Year 5		Total 5–y take		
	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Level A harassment	Level B harassment	Total Takes by Harassment[e]
North Atlantic right whale	0	19	0	39	0	46	0	23	0	5	0	**126**	126
Blue whale	0	0	1	2	1	2	1	2	0	0	2	4	6
Fin whale	1	11	7	122	20	194	8	72	0	4	**35**	**386**	**421**
Humpback whale	1	8	7	84	17	129	8	58	0	3	**31**	**270**	**301**
Minke whale	4	41	20	305	86	480	38	219	0	13	**147**	**1046**	**1193**
Sei whale	1	6	2	17	3	27	2	15	0	2	**8**	**66**	**74**
Sperm whale	1	3	1	32	0	56	0	20	0	2	**2**	**108**	**110**
Dwarf sperm whale	0	0	2	2	2	2	2	2	0	0	4	4	8
Pygmy sperm whale	0	0	2	2	2	2	2	2	0	0	4	4	8
Cuvier's beaked whale	0	0	0	3	0	3	0	3	0	0	0	6	6
Blainville's beaked whale	0	0	0	4	0	4	0	4	0	0	0	8	8
Gervais' beaked whale	0	0	0	4	0	4	0	4	0	0	0	8	8
Sowerby's beaked whale	0	0	0	4	0	4	0	4	0	0	0	8	8
True's beaked whale	0	0	0	3	0	3	0	3	0	0	0	6	6
Northern bottlenose whale[d]	0	0	0	4	0	4	0	4	0	0	0	**8**	8
Atlantic spotted dolphin	1	31	1	116	0	169	0	73	0	30	**2**	**380**	**382**
Atlantic white sided dolphin	1	31	1	905	0	1713	0	788	0	28	**2**	**3329**	**3331**
Bottlenose dolphin, offshore	1	20	1	872	0	2065	0	772	0	18	**2**	**3541**	**3543**
Clymene dolphin	0	0	0	167	0	167	0	167	0	0	0	334	334
Common dolphin	1	222	1	12501	0	26553	0	10023	0	203	**2**	**46759**	**46761**
Long-finned pilot whale	1	18	1	118	0	216	0	92	0	17	**2**	**440**	**442**
Short-finned pilot whale	1	10	1	21	0	20	0	19	0	9	**2**	**78**	**80**
Risso's dolphin	1	8	1	172	0	456	0	147	0	7	**2**	**720**	**722**
False killer whale	0	5	0	7	0	12	0	7	0	5	0	25	25
Fraser's dolphin	0	0	0	192	0	192	0	192	0	0	0	384	384
Killer whale	0	2	0	8	0	10	0	8	0	2	0	10	10
Melon-headed whale	0	0	0	109	0	109	0	109	0	0	0	218	218
Pantropical Spotted dolphin	0	0	0	60	0	60	0	60	0	0	0	120	120
Pygmy killer whale	0	0	0	5	0	5	0	5	0	0	0	10	10
Rough-toothed dolphin	0	0	0	14	0	14	0	14	0	0	0	28	28
Spinner dolphin	0	0	0	51	0	51	0	51	0	0	0	102	102
Striped dolphin	0	0	0	64	0	64	0	64	0	0	0	128	128
White-beaked dolphin	0	30	0	14	0	44	0	14	0	30	0	150	150
Harbor porpoise	56	296	53	755	11	902	5	394	0	79	**125**	**2343**	**2468**
Gray seal	8	346	5	887	1	1391	1	762	0	200	**15**	**3290**	**3305**
Harbor seal	17	776	9	980	1	973	1	718	0	448	**28**	**3832**	**3860**
Harp seal	8	346	5	1000	1	1867	1	982	0	200	**15**	**4062**	**4077**
Hooded seal	0	0	0	1	0	1	0	1	0	0	0	**2**	2

Note: The annual takes are the maximum between the two construction schedules (A or B); therefore, year 2 is the maximum annual takes under Schedule A while years 3 and 4 are the maximum annual takes under Schedule B. As the total 5–Y takes for Schedule B are more than Schedule A, the total takes that may be authorized is based on Schedule B. Therefore, the sum of the annual takes that may be authorized do not add up to the total 5–Y takes which may be authorized. Values in **bold** for the 5–Y takes are less than in the proposed rule.

[a] The final rule and LOA, if issued, would be effective from March 27, 2025 to March 26, 2030.

[b] For days when pile installation includes both vibratory setting and drilling, only the vibratory setting Level B harassment takes are included (because more takes are predicted for this activity) and not the drilling Level B takes to avoid double counting. For the purpose of this take request, year 1 is assumed to be 2025. These dates reflect the currently projected construction start year and are subject to change because exact project start dates and construction schedules are not currently available.

[c] Rare species in the project area. Rare species total take estimates for the project are based on the assumption that a group would be seen every other year; hence, the 5–Y total is less than the sum of all years combined.

[d] Northern bottlenose whale takes by Level B harassment has been decreased from 12 to 8 as a result of a typo correction submitted in the January 2024 Application Update by Avangrid. Avangrid had previously not adjusted the total take request for this rare species by assuming encounters every other year but instead had unintentionally summed all annual takes at the time of the proposed rule.

[e] The amount of total takes for 5–Y, is the sum of the 5–Y takes by Level A harassment and takes by Level B harassment.

In making the negligible impact determination and the necessary small numbers finding, NMFS assesses the maximum total number of takes (Level A harassment and Level B harassment) of marine mammals species or stocks allowable within any one year, and in the negligible impact determination we also assess the impacts of the total take allowable over the 5-year period. In this calculation, the maximum estimated number of Level A harassment takes in any one year is summed with the maximum estimated number of Level B harassment takes in any one year for each species to yield the highest number of estimated take that could occur in any year (table 35). We recognize that certain activities could shift within the 5-year effective period of the rule and the rule allows for that flexibility, however, the takes are not allowed to exceed the maximum annual take shown in table 35 in any year. Of note, the maximum amount of take by Level A harassment is higher for some species in year 1 due to UXO/MEC detonations, though year 3 has the maximum amount of take when takes by Level A harassment is combined with those from Level B harassment. As schedules may shift, and to not underestimate the amount of takes by harassment, the takes under UXO/MEC detonation have been moved to Year 3 (table 34). Year 3 is the year with the maximum amount of take for foundation installation and maximum amount of take when Level A harassment and Level B harassment are combined (table 34).

TABLE 34—MAXIMUM NUMBER OF TAKES BY HARASSMENT THAT MAY BE AUTHORIZED UNDER YEAR 1 UXO/MEC DETONATION ADDED TO THE MAXIMUM NUMBER OF TAKES THAT MAY BE AUTHORIZED FOR YEAR 3 TO CREATE THE MAXIMUM ANNUAL TAKES

Species	UXO/MEC maximum year 1 Level A harassment	UXO/MEC maximum year 1 Level B harassment	Year 3 maximum Level A harassment	Year 3 maximum Level B harassment	Total maximum annual Level A harassment [a]	Total maximum annual Level B harassment [a]
North Atlantic right whale [c]	0	14	0	46	0	**60**
Blue whale [c d]	0	0	1	2	1	2
Fin whale [c]	1	7	20	**194**	**21**	**201**
Humpback whale	1	5	17	**129**	**18**	**134**
Minke whale	4	28	86	**480**	**90**	**508**
Sei whale [c]	1	4	3	**27**	**4**	**31**
Sperm whale [c]	1	1	0	**56**	**1**	**57**
Dwarf sperm whale [d]	0	0	2	2	2	2
Pygmy sperm whale [d]	0	0	2	2	2	2
Cuvier's beaked whale [d]	0	0	0	3	0	3
Blainville's beaked whale [d]	0	0	0	4	0	4
Gervais' beaked whale [d]	0	0	0	4	0	4
Sowerby's beaked whale [d]	0	0	0	4	0	4
True's beaked whale [d]	0	0	0	3	0	3
Northern bottlenose whale [d]	0	0	0	4	0	4
Atlantic spotted dolphin [d]	1	1	0	**169**	**1**	**170**
Atlantic white-sided dolphin	1	3	0	**1713**	**1**	**1716**
Bottlenose dolphin, offshore	1	2	0	**2065**	**1**	**2067**
Clymene dolphin [d]	0	0	0	167	0	167
Common dolphin	1	19	0	**26553**	**1**	**26572**
Long-finned pilot whale	1	1	0	**216**	**1**	**217**
Short-finned pilot whale	1	1	0	**20**	**1**	**21**
Risso's dolphin	1	1	0	**456**	**1**	**457**
False killer whale	0	0	0	12	0	12
Fraser's dolphin [d]	0	0	0	192	0	192
Killer whale [d]	0	0	0	10	0	10
Melon-headed whale [d]	0	0	0	109	0	109
Pantropical Spotted dolphin [d]	0	0	0	60	0	60
Pygmy killer whale [d]	0	0	0	5	0	5
Rough-toothed dolphin [d]	0	0	0	14	0	14
Spinner dolphin [d]	0	0	0	51	0	51
Striped dolphin [d]	0	0	0	64	0	64
White-beaked dolphin [d]	0	0	0	44	0	44
Harbor porpoise	56	217	11	**902**	**67**	**1119**
Gray seal	8	146	1	**1391**	**9**	**1537**
Harbor seal	17	328	1	**973**	**18**	**1301**
Harp seal	8	146	1	**1867**	**9**	**2013**
Hooded seal [d]	0	0	0	1	0	1

[a] The maximum values is the sum of the Year 1 takes by harassment for UXO/MECs and the takes by harassment for all year 3 activities (foundation installation and HRG). Values in bold are the result of the addition of UXO/MEC takes to year 3 takes.

[b] Using the draft 2023 stock assessment report (SAR) at time of publication as it is represents the best available science (89 FR 5495, January 29, 2024).

[c] Listed as Endangered under the ESA.

[d] Rare species in the project area. The number of Level A harassment and Level B harassment takes calculated for rare species is based on the mean group size assuming a 3 year construction schedule (all rare species) and encounters during HRG surveys for white-beaked dolphin, killer whale, and false killer whale.

TABLE 35—MAXIMUM NUMBER OF TAKES (LEVEL A HARASSMENT AND LEVEL B HARASSMENT) THAT MAY BE AUTHORIZED IN ANY ONE YEAR OF THE PROJECT AND THE PERCENT OF STOCK THAT WOULD BE TAKEN BASED ON THE MAXIMUM ANNUAL TAKE THAT MAY BE AUTHORIZED

Species	NMFS stock abundance [b]	Maximum annual Level A harassment	Maximum annual Level B harassment	Maximum annual take	Percent of stock taken based on maximum annual take [a]
North Atlantic right whale [c]	340	0	**60**	60	17.65
Blue whale [c d]	402	1	2	3	0.75
Fin whale [c]	6802	**21**	**201**	222	3.26
Humpback whale	1396	**18**	**134**	152	10.89
Minke whale	21968	**90**	**508**	598	2.72
Sei whale [c]	6292	**4**	**31**	35	0.56
Sperm whale [c]	5895	**1**	**57**	58	0.98
Dwarf sperm whale [d]	9474	2	2	4	0.04
Pygmy sperm whale [d]	9474	2	2	4	0.04
Cuvier's beaked whale [d]	4670	0	3	3	0.06
Blainville's beaked whale [d]	2936	0	4	4	0.14
Gervais' beaked whale [d]	8595	0	4	4	0.05
Sowerby's beaked whale [d]	492	0	4	4	0.81
True's beaked whale [d]	4480	0	3	3	0.07
Northern bottlenose whale [d]	UNK	0	4	4	UNK
Atlantic spotted dolphin [d]	31506	**1**	**170**	171	0.54
Atlantic white-sided dolphin	93233	**1**	**1716**	1717	1.84
Bottlenose dolphin, offshore	64587	**1**	**2067**	2068	3.20
Clymene dolphin [d]	21778	0	167	167	0.77
Common dolphin	93100	**1**	**26572**	26573	28.54
Long-finned pilot whale	39215	**1**	**217**	218	0.56
Short-finned pilot whale	18726	**1**	**21**	22	0.12
Risso's dolphin	44067	**1**	**457**	458	1.04
False killer whale	1298	0	12	12	0.92
Fraser's dolphin [d]	UNK	0	192	192	UNK
Killer whale [d]	UNK	0	10	10	UNK
Melon-headed whale [d]	UNK	0	109	109	UNK
Pantropical Spotted dolphin [d]	2757	0	60	60	2.18
Pygmy killer whale [d]	UNK	0	5	5	UNK
Rough-toothed dolphin [d]	UNK	0	14	14	UNK
Spinner dolphin [d]	3181	0	51	51	1.60
Striped dolphin [d]	48274	0	64	64	0.13
White-beaked dolphin [d]	536016	0	44	44	0.01
Harbor porpoise	85765	**67**	**1119**	1186	1.38
Gray seal	27911	**9**	**1537**	1546	5.54
Harbor seal	61336	**18**	**1301**	1319	2.15
Harp seal	7600000	**9**	**2013**	2022	0.03
Hooded seal [d]	UNK	0	1	1	UNK

Note: Year 3 of the project is expected to have the greatest amount of Level B harassment take possible. However, the years where UXO/MEC detonation could occur (currently scheduled for only years 1 and 2) have a higher amount of take by Level A harassment for some species; as the UXO/MEC detonation may shift, the Year 1 UXO/MEC takes were added to the foundation installation and HRG year 3 takes. Values in **bold** are a result of UXO/MEC takes by harassment being added to the Year 3 take amounts.

[a] The values in this column represent the assumption that each take that may be authorized would occur to a unique individual. Given the scope of work proposed, this is highly unlikely for species common to the project area (*e.g.,* North Atlantic right whales, humpback whales) such that the actual percentage of the population taken is less than the percentages identified here.

[b] Using the draft 2023 stock assessment report (SAR) at time of publication as it is represents the best available science (89 FR 5495, January 29, 2024).

[c] Listed as Endangered under the ESA.

[d] Rare species in the project area. The number of Level A harassment and Level B harassment takes calculated for rare species is based on the mean group size assuming a 3-year construction schedule (all rare species) and encounters during HRG surveys for white-beaked dolphin, killer whale, and false killer whale.

Mitigation

As noted in the Changes from the Proposed to Final Rule section, NMFS has added several new mitigation requirements and clarified a few others and has changed the minimum visibility zone for mysticetes and shutdown zone for North Atlantic right whales. These changes are described in detail in the sections below. Besides these changes, the required measures remain the same as those described in the proposed rule. However, NMFS has also re-organized and simplified the section to avoid full duplication of the specific requirements that are fully described in the regulatory text.

In order to promulgate a rulemaking under section 101(a)(5)(A) of the MMPA, NMFS must set forth the permissible methods of taking pursuant to the activity, and other means of effecting the least practicable adverse impact on the species or stock and its habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance, and on the availability of the species or stock for taking for certain subsistence uses (latter not applicable for this action). NMFS' regulations require applicants for ITAs to include information about the availability and feasibility (*e.g.,* economic and technological) of equipment, methods, and manner of

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

In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, as well as subsistence uses where applicable, 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 (*e.g.,* likelihood, scope, range). It further considers the likelihood that the measure will be effective if implemented (*i.e.,* the probability of accomplishing the mitigating result if implemented as planned), the likelihood of effective implementation (*i.e.,* the probability if implemented as planned); and

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

The mitigation strategies described below are consistent with those required and successfully implemented under previous ITAs issued in association with in-water construction activities (*e.g.,* soft-start, establishing shutdown zones). Additional measures have also been incorporated to account for the fact that the construction activities would occur offshore. Modeling was performed to estimate harassment zones, which were used to inform mitigation measures for the Project's activities to minimize Level A harassment and Level B harassment to the extent practicable, while providing estimates of the areas within which Level B harassment might occur.

Generally speaking, the mitigation measures considered and required here fall into three categories: temporal (*i.e.,* seasonal and daily) and spatial work restrictions, real-time measures (*e.g.,* shutdown, clearance, and vessel strike avoidance), and noise attenuation/reduction measures. Temporal and spatial work restrictions are designed to avoid or minimize operations when marine mammals are concentrated or engaged in behaviors that make them more susceptible or make impacts more likely, in order to reduce both the number and severity of potential takes, and are effective in reducing both chronic (longer-term) and acute effects. Real-time measures, such as implementation of shutdown and clearance zones, as well as vessel strike avoidance measures, are intended to reduce the probability or severity of harassment by taking steps in real time once a higher-risk scenario is identified (*e.g.,* once animals are detected within an impact zone). Noise attenuation measures such as bubble curtains are intended to reduce the noise at the source, which reduces both acute impacts, as well as the contribution to aggregate and cumulative noise that may result in longer term chronic impacts.

Below, we briefly describe the required training, coordination, and vessel strike avoidance measures that apply to all activity types, and in the following subsections we describe the measures that apply specifically to foundation installation, UXO/MEC detonations, and HRG surveys. Details on specific requirements can be found in 50 CFR part 217, subpart GG, set out at the end of this rule.

Training and Coordination

NMFS requires all Avangrid employees and contractors conducting activities on the water, including but not limited to, all vessel captains and crew to be trained in marine mammal detection and identification, communication protocols, and all required measures to minimize impacts on marine mammals and support Avangrid's compliance with the LOA, if issued. Additionally, all relevant personnel and the marine mammal species monitoring team(s) are required to participate in joint, onboard briefings prior to the beginning of project activities. The briefing must be repeated whenever new relevant personnel (*e.g.,* new PSOs, construction contractors, relevant crew) join the Project before work commences. During this training, Avangrid is required to instruct all project personnel regarding the authority of the marine mammal monitoring team(s). For example, the HRG acoustic equipment operator, pile driving personnel, *etc.,* is required to immediately comply with any call for a delay or shutdown by the Lead PSO. Any disagreement between the Lead PSO and the Project personnel must only be discussed after delay or shutdown has occurred. In particular, all captains and vessel crew must be trained in marine mammal detection and vessel strike avoidance measures to ensure marine mammals are not struck by any project or project-related vessel.

Prior to the start of in-water construction activities, vessel operators and crews will receive training about marine mammals and other protected species known or with the potential to occur in the Project Area, making observations in all weather conditions, and vessel strike avoidance measures. In addition, training will include information and resources available regarding applicable Federal laws and regulations for protected species. Avangrid will provide documentation of training to NMFS. Since the proposed rule, NMFS has added requirements for a description of the training program to be provided to NMFS at least 60 days prior to the initial training before in-water activities begin and for confirmation of all required training to be documented on a training course log sheet and reported to NMFS Office of Protected Resources prior to initiating project activities. These measures were added in response to several commenters' concerns regarding strengthening mitigation and monitoring measures.

North Atlantic Right Whale Awareness Monitoring

Avangrid must use available sources of information on North Atlantic right whale presence, including daily monitoring of the Right Whale Sightings Advisory System, monitoring of Coast Guard VHF Channel 16 throughout each day to receive notifications of any sightings, and information associated with any regulatory management actions (*e.g.,* establishment of a zone identifying the need to reduce vessel speeds). Maintaining daily awareness and coordination affords increased protection of North Atlantic right whales by understanding North Atlantic right whale presence in the area through ongoing visual and PAM efforts and opportunities (outside of Avangrid's efforts), and allows for planning of construction activities, when practicable, to minimize potential impacts on North Atlantic right whales. The vessel strike avoidance measures apply to all vessels associated with the Project within U.S. waters and on the high seas.

Vessel Strike Avoidance Measures

This final rule contains numerous vessel strike avoidance measures that reduce the risk that a vessel and marine mammal could collide. While the likelihood of a vessel strike is generally low, vessel strikes are one of the most common ways that marine mammals are seriously injured or killed by human activities. Therefore, enhanced mitigation and monitoring measures are required to further avoid vessel strikes to the extent practicable. While many of

these measures are proactive, intended to avoid the heavy use of vessels during times when marine mammals of particular concern may be in the area, several are reactive and occur when a marine mammal is sighted by project personnel. The mitigation requirements are described generally here and in detail in the regulatory text at the end of this final rule (50 CFR 217.324(b)). Avangrid will be required to comply with these measures, except under circumstances when doing so would create an imminent and serious threat to a person or vessel, or to the extent that a vessel is unable to maneuver and, because of the inability to maneuver, the vessel cannot comply.

While underway, Avangrid is required to monitor for and maintain a safe distance from marine mammals, and operate vessels in a manner that reduces the potential for vessel strike. Regardless of the vessel's size, all vessel operators, crews, and dedicated visual observers (*i.e.,* PSO or trained crew member) must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course as appropriate to avoid striking any marine mammal. The dedicated visual observer, equipped with suitable monitoring technology (*e.g.,* binoculars, night vision devices), must be located at an appropriate vantage point for ensuring vessels are maintaining required vessel separation distances from marine mammals (*e.g.,* 500 m from North Atlantic right whales).

All project vessels, regardless of size, must maintain the following minimum separation zones: 500 m from North Atlantic right whales; 100 m from sperm whales and non-North Atlantic right whale baleen whales; and 50 m from all delphinid cetaceans and pinnipeds (an exception is made for those species that approach the vessel (*i.e.,* bow-riding dolphins)). If any of these species are sighted within their respective minimum separation zone, the underway vessel must shift its engine to neutral and the engines must not be engaged until the animal(s) have been observed to be outside of the vessel's path and beyond the respective minimum separation zone. If a North Atlantic right whale is observed at any distance by any project personnel or acoustically detected, project vessels must reduce speeds to 10 knots (kn). Additionally, in the event that any project-related vessel, regardless of size, observes any large whale (other than a North Atlantic right whale) within 500 m of an underway vessel, the vessel is required to shift engines into neutral. The vessel shall remain in neutral until the North Atlantic right whale has moved beyond 500 m and the 10 kn speed restriction will remain in effect as outlined in 50 CFR 217.314(b). When NMFS vessel speed restrictions are not in effect and a vessel is traveling at greater than 10 kn, in addition to the required dedicated visual observer, Avangrid is required to monitor the transit corridor in real-time with PAM prior to and during transits. To maintain awareness of North Atlantic right whale presence in the Project Area, vessel operators, crew members, and the marine mammal monitoring team will monitor U.S. Coast Guard VHF Channel 16, WhaleAlert, the Right Whale Sighting Advisory System (RWSAS), and the PAM system. Any North Atlantic right whale or large whale detection will be immediately communicated to PSOs, PAM operators, and all vessel captains.

All vessels will be equipped with an AIS and Avangrid must report all MMSI numbers to NMFS Office of Protected Resources prior to initiating in-water activities. The requirement for vessels to be equipped with AIS has been added since the proposed rule to increase the accountability of project vessels. Avangrid will submit a NMFS-approved Marine Mammal Vessel Strike Avoidance Plan at least 180 days prior to commencement of vessel use.

Compliance with these measures will reduce the likelihood of vessel strike to the extent practicable. These measures increase awareness of marine mammals in the vicinity of project vessels and require project vessels to reduce speed when marine mammals are detected (by PSOs, PAM, and/or through another source, *e.g.,* RWSAS) and maintain separation distances when marine mammals are encountered. While visual monitoring is useful, reducing vessel speed is one of the most effective, feasible options available to reduce the likelihood of, and effects from, a vessel strike. Numerous studies have indicated that slowing the speed of vessels reduces the risk of lethal vessel collisions, particularly in areas where right whales are abundant and vessel traffic is common and otherwise traveling at high speeds (Vanderlaan and Taggart, 2007; Conn and Silber, 2013; Van der Hoop *et al.,* 2014; Martin *et al.,* 2015; Crum *et al.,* 2019).

Given the inherent low probability of vessel strike, combined with the vessel strike avoidance measures included herein, NMFS considers the potential for vessel strike to be unlikely and would not allow take from this activity under this final rule.

Seasonal and Daily Restrictions

Temporal and spatial restrictions in places where marine mammals are concentrated, engaged in biologically important behaviors, and/or present in sensitive life stages are effective measures for reducing the magnitude and severity of human impacts. The temporal restrictions required here are built around the protection of North Atlantic right whales. Based upon the best scientific information available (Roberts *et al.,* 2023), the highest densities of North Atlantic right whales in the Project Area are expected during the months of January through April, with an increase in density starting in December and continuing through May. However, North Atlantic right whales may be present in the Project Area throughout the year.

NMFS is requiring seasonal work restrictions to minimize noise exposure to North Atlantic right whales incidental to certain specified activities to the extent practicable. These seasonal work restrictions are expected to greatly reduce the number of takes of North Atlantic right whales that otherwise may have occurred without seasonal restrictions. These seasonal restrictions also afford protection to other marine mammals that are known to use the Project Area with greater frequency during winter months, including other baleen whales.

As described previously, no impact pile driving or drilling activities may occur January 1 through April 30 (and December 1 through May 31 for vibratory pile driving). As described in the proposed rule and carried forward in this final rule, Avangrid is to install the foundations as quickly as possible and avoid impact pile driving and drilling in December to the maximum extent practicable; however, impact pile driving and drilling may occur in December if it is unavoidable and only upon approval from NMFS. Avangrid did not propose to conduct vibratory pile driving in May or December and doing so is not considered in the take estimates. As such, this final rule establishes a seasonal restriction of no vibratory pile driving from December 1 through May 31.

No more than two foundation monopiles or four pin piles for jacket foundations (or bottom-frame foundations) would be installed per day. Monopiles must be no larger than 13 m in diameter and pin piles must be no larger than 4 m in diameter. For all monopiles and pin piles, the minimum amount of hammer energy necessary to effectively and safely install and maintain the integrity of the piles must

be used. Hammer energies must not exceed 6,000 kJ for monopile installation or 3,500 kJ for pin pile installation. No more than one pile may be installed at a given time (*i.e.,* concurrent/simultaneous pile driving and drilling may not occur).

Pile driving and drilling (*i.e.,* foundation installation) must not be initiated earlier than 1 hour after civil sunrise or later than 1.5 hours prior to civil sunset. Generally, foundation installation may continue after dark when the installation of the same pile began during daylight (1.5 hours before civil sunset), when clearance zones were fully visible for at least 30 minutes and must proceed for human safety or installation feasibility reasons. The exception to these limitations would be if Avangrid submits, and NMFS approves, an Alternative Monitoring Plan as part of the Foundation Installation and Marine Mammal Monitoring Plan (*i.e.,* Nighttime Monitoring Plan) that reliably demonstrates the efficacy of detecting marine mammals at night with its proposed devices. Nighttime hours are defined as the hours between 1.5 hours prior to civil sunset until 1 hour after civil sunrise. Foundation installation will not be initiated when the minimum visibility zones cannot be fully visually monitored, as determined by the lead PSO on duty.

As with foundation installation, NMFS is similarly restricting UXO/MEC detonations December through May, annually; however, Avangrid may detonate a UXO/MEC in December or May with NMFS' advanced approval on a case-by-case basis. NMFS is requiring this seasonal work restriction to minimize the North Atlantic right whales risk of exposure to noise incidental to foundation installation and UXO/MEC detonation. These seasonal work restrictions are expected to greatly reduce the number of takes of North Atlantic right whales that would have otherwise occurred should all activities be conducted during these months. These seasonal restrictions also afford protection to other marine mammals that are known to use the project area with greater frequency during winter months, including other baleen whales. No more than one UXO/MEC may be detonated per 24-hour period. Moreover, detonations may only occur during daylight hours.

Given the very small harassment zones resulting from HRG surveys and that the best available science indicates that any harassment from HRG surveys, should a marine mammal be exposed, would manifest as minor behavioral harassment only (*e.g.,* potentially some avoidance of the vessel). NMFS is not requiring any seasonal and daily restrictions for HRG surveys.

More information on activity-specific seasonal and daily restrictions can be found in the regulatory text at the end of this rule.

Noise Abatement Systems

Avangrid is required to employ noise abatement systems (NASs) during all foundation installation (*i.e.,* impact pile driving, vibratory pile driving, and drilling) activities and UXO/MEC detonations to reduce the sound pressure levels that are transmitted through the water to reduce ranges to acoustic thresholds and minimize any acoustic impacts resulting from these activities. Avangrid is required to use at least two NASs to ensure that measured sound levels do not exceed the levels modeled for a 10-dB sound level reduction for foundation installation, which is likely to include a double big bubble curtain or a double big bubble curtain combined with other NAS (*e.g.,* hydro-sound damper, or an AdBm Helmholz resonator), as well as the adjustment of operational protocols to minimize noise levels. As part of adaptive management, should the research and development phase of newer systems demonstrate effectiveness, Avangrid may submit data on the effectiveness of these systems and request approval from NMFS to use them during foundation installation and UXO/MEC detonation activities.

Two categories of NASs exist: primary and secondary. A primary NAS would be used to reduce the level of noise produced by foundation installation activities at the source, typically through adjustments on to the equipment (*e.g.,* hammer strike parameters). Primary NASs are still evolving and will be considered for use during mitigation efforts when the NAS has been demonstrated as effective in commercial projects. However, as primary NASs are not fully effective at eliminating noise, a secondary NAS would be employed. The secondary NAS is a device or group of devices that would reduce noise as it was transmitted through the water away from the pile, typically through a physical barrier that would reflect or absorb sound waves and therefore, reduce the distance the higher energy sound propagates through the water column. Together, these systems must reduce noise levels to those not exceeding modeled ranges to Level A harassment and Level B harassment isopleths corresponding to those modeled assuming 10-dB sound attenuation, pending results of SFV (see the *Sound Field Verification* section below and 50 CFR part 217).

Noise abatement systems, such as bubble curtains, are used to decrease the sound levels radiated from a source. Bubbles create a local impedance change that acts as a barrier to sound transmission. The size of the bubbles determines their effective frequency band, with larger bubbles needed for lower frequencies. There are a variety of bubble curtain systems, confined or unconfined bubbles, and some with encapsulated bubbles or panels. Attenuation levels also vary by type of system, frequency band, and location. Small bubble curtains have been measured to reduce sound levels but effective attenuation is highly dependent on depth of water, current, and configuration and operation of the curtain (Austin *et al.,* 2016; Koschinski and Lüdemann, 2013). Bubble curtains vary in terms of the sizes of the bubbles and those with larger bubbles tend to perform a bit better and more reliably, particularly when deployed with two separate rings (Bellmann, 2014; Koschinski and Lüdemann, 2013; Nehls *et al.,* 2016). Encapsulated bubble systems (*e.g.,* Hydro Sound Dampers (HSDs)), can be effective within their targeted frequency ranges (*e.g.,* 100–800 Hz), and when used in conjunction with a bubble curtain appear to create the greatest attenuation. The literature presents a wide array of observed attenuation results for bubble curtains. The variability in attenuation levels is the result of variation in design as well as differences in site conditions and difficulty in properly installing and operating in-water attenuation devices. Dähne *et al.* (2017) found that single bubble curtains that reduce sound levels by 7 to 10 dB reduced the overall sound level by approximately 12 dB when combined as a double bubble curtain for 6-m steel monopiles in the North Sea. During installation of monopiles (consisting of approximately 8 m in diameter) for more than 150 WTGs in comparable water depths (>25 m) and conditions in Europe indicate that attenuation of 10 dB is readily achieved (Bellmann, 2019; Bellmann *et al.,* 2020) using single BBCs for noise attenuation.

When a double big bubble curtain is used (noting a single bubble curtain is not allowed), Avangrid is required to maintain numerous operational performance standards. These standards are defined in the regulatory text at the end of this rule, and include, but are not limited to, construction contractors must train personnel in the proper balancing of airflow to the bubble ring and Avangrid must submit a performance test and maintenance

report to NMFS within 72 hours following the performance test. Corrections to the attenuation device to meet regulatory requirements must occur prior to use during foundation installation activities. In addition, a full maintenance check (*e.g.,* manually clearing holes) must occur prior to each pile being installed. If Avangrid uses a noise mitigation device in addition to a double big bubble curtain, similar quality control measures are required. Should the research and development phase of newer systems demonstrate effectiveness, as part of adaptive management, Avangrid may submit data on the effectiveness of these systems and request approval from NMFS to use them during foundation installation activities.

Avangrid is required to submit an SFV plan to NMFS for approval at least 180 days prior to installing foundations. They are also required to submit interim and final SFV data results to NMFS and make corrections to the NASs in the case that any SFV measurements demonstrate noise levels are above those modeled assuming 10 dB. These frequent and immediate reports allow NMFS to better understand the sound fields to which marine mammals are being exposed and require immediate corrective action should they be misaligned with anticipated noise levels within our analysis.

Noise abatement devices are not required during HRG surveys. Regarding HRG surveys, NAS cannot practicably be employed around a moving survey ship, but Avangrid is required to make efforts to minimize source levels by using the lowest energy settings on equipment that has the potential to result in harassment of marine mammals (*e.g.,* boomers) and turning off equipment when not actively surveying. Overall, minimizing the amount and duration of noise in the ocean from any of the Project's activities through use of all means necessary (*e.g.,* noise abatement, turning off power) will effect the least practicable adverse impact on marine mammals.

Clearance and Shutdown Zones

NMFS requires the establishment of both clearance and, where technically feasible, shutdown zones during project activities that have the potential to result in harassment of marine mammals. The purpose of ''clearance'' of a particular zone is to minimize potential instances of auditory injury and more severe behavioral disturbances by delaying the commencement of an activity if marine mammals are near the activity. The purpose of a shutdown is to prevent a specific acute impact, such as auditory injury or severe behavioral disturbance of sensitive species, by halting the activity.

All relevant clearance and shutdown zones during project activities would be monitored by NMFS-approved PSOs and PAM operators as described in the regulatory text at the end of this rule. At least one PAM operator must review data from at least 24 hours prior to foundation installation and UXO/MEC detonations and must actively monitor hydrophones for 60 minutes prior to commencement of these activities. Any North Atlantic right whale sighting at any distance by foundation installation PSOs, or acoustically detected within the PAM monitoring zone (12 km), triggers a delay to commencing pile driving and shutdown. Any large whale sighted by a PSO or acoustically detected by a PAM operator that cannot be identified as a non-North Atlantic right whale must be treated as if it were a North Atlantic right whale.

Prior to the start of certain specified activities (*i.e.,* foundation installation, UXO/MEC detonation, and HRG surveys), Avangrid must ensure designated areas (*i.e.,* clearance zones as provided in tables 36 and 37) are clear of marine mammals prior to commencing activities to minimize the potential for and degree of harassment. For foundation installation and UXO/MEC detonations, PSOs must visually monitor clearance zones for marine mammals for a minimum of 60 minutes prior to the activity. During this period, the clearance zones will be monitored by both PSOs and a PAM operator. Prior to the starting these activities, Avangrid will ensure the area is clear of marine mammals, per the clearance zones in tables 36 and 37, to minimize the potential for, and the degree of, harassment. All clearance zones must be confirmed to be free of marine mammals for 30 minutes immediately prior to starting a pile driving (including soft-start), drilling, or UXO/MEC detonation. If a marine mammal is observed within a clearance zone during the pre-start clearance period, the activity will be delayed and may not begin until the animal(s) has been observed exiting its respective zone, or until an additional time period has elapsed with no further sightings (*i.e.,* 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species). In addition, foundation installation and UXO/MEC detonation will be delayed upon a confirmed PAM detection of a North Atlantic right whale if the PAM detection is confirmed to have been located within the North Atlantic right whale PAM Clearance zone. PSO and PAM must continue throughout the duration of foundation installation and UXO/MEC detonation and for 30 minutes post-completion of the activity. In the event that a large whale is sighted or acoustically detected that cannot be confirmed as a non-North Atlantic right whale, it must be treated as if it were a North Atlantic right whale. Because UXO/MEC detonations are instantaneous, no shutdown is possible; therefore, there are clearance zones but no shutdown zones for UXO/MEC detonations (table 37).

Clearance and shutdown zones have been developed in consideration of modeled distances to relevant PTS thresholds with respect to minimizing the potential for take by Level A harassment. The clearance and shutdown zones for North Atlantic right whales during monopile and jacket foundation installation are visual observations at any distance by PSOs or any acoustic detection within the PAM monitoring zone (12 km). The visual and acoustic clearance zones for large whales other than North Atlantic right whales are 3,300 m (monopile) and 4,900 m (jacket), which corresponds to the largest modeled exposure range ($ER_{95\%}$) distances to Level A harassment thresholds (SEL and peak) under all scenarios for all whales, plus 20 percent, then rounded up for PSO clarity (table 36). The visual and acoustic shutdown zones for large whales other than North Atlantic right whales are 2,700 m (monopile) and 4,100 m (jacket) for all other large whales. These distances are also larger than the largest Level A harassment modeled exposure range ($ER_{95\%}$) for impact pile driving and impact+vibratory pile driving. The clearance and shutdown zones for other species, which are expected to reduce the likelihood and amount of Level A harassment and the severity of Level B harassment, are shown in table 36 and will effect the least practicable adverse impact (LPAI). For North Atlantic right whales, there is an additional requirement that the clearance zone may only be declared clear if no confirmed North Atlantic right whale acoustic detections (in addition to visual) have occurred during the 60-minute monitoring period.

Once an activity begins, any marine mammal entering their respective shutdown zone would trigger the activity to cease. In the case of foundation installation, the shutdown requirement may be waived if it is not practicable to shutdown the equipment due to imminent risk of injury or loss of life to an individual, risk of damage to a vessel that creates risk of injury or

loss of life for individuals, or where the lead engineer determines there is pile refusal or pile instability. In situations when shutdown is called for during impact pile driving, but Avangrid determines shutdown is not practicable due to aforementioned emergency reasons, reduced hammer energy must be implemented when the lead engineer determines it is practicable. Specifically, pile refusal or pile instability could result in not being able to shut down pile driving immediately. Pile refusal occurs when the pile driving sensors indicate the pile is approaching refusal and a shut-down would lead to a stuck pile which then poses an imminent risk of injury or loss of life to an individual, or risk of damage to a vessel that creates risk for individuals. Pile instability occurs when the pile is unstable and unable to stay standing if the piling vessel were to ''let go''. During these periods of instability, the lead engineer may determine a shut-down is not feasible because the shut-down combined with impending weather conditions may require the piling vessel to ''let go'', which then poses an imminent risk of injury or loss of life to an individual, or risk of damage to a vessel that creates risk for individuals. Avangrid must document and report to NMFS all cases where the emergency exemption is taken.

After shutdown, foundation installation may be reinitiated once all clearance zones are clear of marine mammals for the minimum species-specific periods, or, if required to maintain pile stability, at which time the lowest hammer energy must be used to maintain stability. If foundation installation has been shut down due to the presence of a North Atlantic right whale, pile driving must not restart until the North Atlantic right whale has neither been visually or acoustically detected by PSOs and PAM operators for 30 minutes. Upon re-starting pile driving, soft-start protocols must be followed if pile driving has ceased for 30 minutes or longer.

The clearance and shutdown zone sizes vary by species and are shown in tables 36 and 37. Avangrid is allowed to request modification to these zone sizes pending results of SFV (see the regulatory text at the end of this rule). Any changes to zone size would be part of adaptive management and would require NMFS' approval. The 12 km PAM monitoring zone for North Atlantic right whales has been carried forward from the proposed rule into this final rule. The clearance and shutdown zones for North Atlantic right whales have been increased to any visual distance by foundation installation PSOs and any acoustic detection within the 12-km PAM monitoring zone. The increase to these zones also increases protections for North Atlantic right whales during impact pile driving.

In addition to the clearance and shutdown zones that would be monitored both visually and acoustically, NMFS is requiring Avangrid to establish a minimum visibility zone during foundation installation activities to ensure both visual and acoustic methods are used in tandem to detect marine mammals resulting in maximum detection capability. No minimum visibility zone is required for UXO/MEC detonation as the entire visual clearance zone must be clear given the potential for lung and GI injury. The minimum visibility zone for foundation installation activities (pile driving and drilling) would extend from the location of the pile being driven out to 2.1 km (monopiles) and 3.4 km (jacket). This value corresponds to just greater than the modeled maximum $ER_{95\%}$ distances to the Level A harassment threshold for North Atlantic right whales, assuming 10 dB of attenuation. The entire minimum visibility zone must be visible for a full 60 minutes immediately prior to commencing pile driving and drilling. The entire clearance zone must be visible for a full 60 minutes immediately prior to commencing UXO/MEC detonation.

For HRG surveys, there are no mitigation measures prescribed for sound sources operating at frequencies greater than 180 kHz, as these would be expected to fall outside of marine mammal hearing ranges and would not result in harassment. However, all HRG survey vessels would be subject to the aforementioned vessel strike avoidance measures described earlier in this section. Furthermore, due to the frequency range and characteristics of some of the sound sources associated with lesser impacts, shutdown, clearance, and ramp-up procedures are not planned to be conducted during HRG surveys utilizing only non-impulsive sources (*e.g.,* other parametric sub-bottom profilers). Shutdown, clearance, and ramp-up procedures are planned to be conducted during HRG surveys utilizing SBPs and other non-parametric sub-bottom profilers (planned survey equipment are in table 31). PAM would not be required during HRG surveys. While NMFS agrees that PAM can be an important tool for augmenting detection capabilities in certain circumstances, its utility in further reducing impacts during HRG survey activities is limited.

Avangrid will be required to implement a 30-minute clearance period of the clearance zones (table 36) immediately prior to the commencing of the survey, or when there is more than a 30-minute break in survey activities and PSOs have not been actively monitoring. If a marine mammal is observed within a clearance zone during the clearance period, ramp up (described below) may not begin until the animal(s) have been observed voluntarily exiting its respective clearance zone or until an additional time period has elapsed with no further sighting (*i.e.,* 15 minutes for small odontocetes and pinnipeds, and 30 minutes for all other species). When the clearance process has begun in conditions with good visibility, including via the use of night vision equipment (*i.e.,* infrared (IR)/thermal camera), and the Lead PSO has determined that the clearance zones are clear of marine mammals, survey operations would be allowed to commence (*i.e.,* no delay is required) despite periods of inclement weather and/or loss of daylight.

Once the survey has commenced, Avangrid would be required to shut down SBPs if a marine mammal enters a respective shutdown zone (table 36). In cases where the shutdown zones become obscured for brief periods due to inclement weather, survey operations would be allowed to continue (*i.e.,* no shutdown is required) so long as no marine mammals have been detected. The use of SBPs will not be allowed to commence or resume until the animal(s) has been confirmed to have left the shutdown zone or until a full 15 minutes (for small odontocetes and seals) or 30 minutes (for all other marine mammals) have elapsed with no further sighting. Any large whale sighted by a PSO within 1,000 m of the SBPs that cannot be identified as a non-North Atlantic right whale would be treated as if it were a North Atlantic right whale for the purposes of mitigation implementation.

Once the survey has commenced, Avangrid would be required to shut down SBPs if a marine mammal enters a respective shutdown zone (table 36). In cases when the shutdown zones become obscured for brief periods due to inclement weather, survey operations would be allowed to continue (*i.e.,* no shutdown is required) so long as no marine mammals have been detected. The use of SBPs will not be allowed to commence or resume until the animal(s) has been confirmed to have left the shutdown zone or until a full 15 minutes (for small odontocetes and seals) or 30 minutes (for all other marine

mammals) have elapsed with no further sighting. Any large whale sighted by a PSO within 1,000 m of the SBPs that cannot be identified as a non-North Atlantic right whale would be treated as if it were a North Atlantic right whale.

If a SBP is shut down for reasons other than mitigation (*e.g.,* mechanical difficulty) for less than 30 minutes, it would be allowed to be activated again without ramp-up only if (1) PSOs have maintained constant observation, and (2) no additional detections of any marine mammal occurred within the respective shutdown zones. If a SBP was shut down for a period longer than 30 minutes, then all clearance and ramp-up procedures would be required, as previously described.

For any other in-water construction heavy machinery activities (*e.g.,* trenching, cable laying, *etc.*), if a marine mammal is on a path towards and about to enter or comes within 10 m (32.8 ft) of equipment, Avangrid is required to cease operations until the marine mammal has moved more than 10 m on a path away from the activity to avoid direct interaction with equipment.

TABLE 36—MINIMUM VISIBILITY, CLEARANCE, SHUTDOWN, AND LEVEL B HARASSMENT ZONES DURING FOUNDATION INSTALLATION AND HRG

Activity	Marine mammal	Minimum visibility zone (m)[4]	Visual and acoustic clearance zone (m)[5]	Visual and acoustic shutdown zone (m)[6]	Acoustic monitoring zone (m)	Vessel separation zone (m)
Monopile[1]	North Atlantic right whale	2,100	Any distance visual detection from PSOs, any acoustic detection within 12-km acoustic monitoring zone.		[7] 12,000	500
	Other baleen and sperm		3,300	2,700		100
	Small whales and dolphins		200	200		50
	Harbor porpoise		250	250		50
	Seals		200	200		50
Jacket[2]	North Atlantic right whale	3,400	Any distance visual detection from PSOs, any acoustic detection within 12-km acoustic monitoring zone.		[7] 12,000	500
	Other baleen and sperm		4,900	4,100		100
	Small whales and dolphins		200	200		50
	Harbor porpoise		250	250		50
	Seals		1,000	800		50
HRG[3]	North Atlantic right whale	500	500	500	N/A	500
	All other ESA		500	100		100
	All other non-ESA		100	100		50

[1] The zones for monopiles apply to all impact pile driving, vibratory pile driving, and drilling activities and are based on the largest distances to Level A harassment $ER_{95\%}$ thresholds across the monopile and hammer sizes (*i.e.,* 12m, 13m, 5,000 kJ, 6,000 kJ).The exact size may be modified through adaptive management should SFV demonstrate noise levels are lower or higher than expected. New zone sizes will be based on the definition provided in footnotes 5 and 6.

[2] The zones for the 4-m jacket pin piles apply to impact pile driving, vibratory pile driving, and drilling activities and are based on the largest distances to Level A harassment $ER_{95\%}$ thresholds. The exact zone size may be modified through adaptive management should SFV demonstrate noise levels are lower or higher than expected. New zone sizes will be based on the definition provided in footnotes 5 and 6.

[3] HRG zones are limited to visual clearance and shutdown zones as PAM is not required. Clearance and shutdown zones apply only when operating sound sources covered under the specified activities that may result in take (*i.e.,* SBPs).

[4] The minimum visibility zone is based on the largest distance to the Level A harassment $ER_{95\%}$ for low-frequency cetaceans, not including fin whales, rounded up for PSO clarity. The entire minimum visibility zone must be visible for a full 60 minutes immediately prior to commencing pile driving and drilling.

[5] The clearance zone for ''other baleen and sperm'' is based on the largest distance to the Level A harassment $ER_{95\%}$ of the species group plus a 20 percent increase and then rounded up for PSO clarity. The clearance zones for the other species groups, not including North Atlantic right whale, is set as a minimum of 200 m for those species whose distance to Level A harassment was less than 200 m so as to place the clearance zone outside the NAS. For harbor porpoise, Avangrid proposed, and NMFS accepted, a zone of 250 m though the distance to Level A harassment $ER_{95\%}$ was modeled at less than 200 m, therefore, no additional increase is warranted for the clearance zone. For seals, as its distance to Level A harassment was more than 200 m, the clearance zone was set as the largest distance to the Level A harassment $ER_{95\%}$ of the species group plus a 20 percent increase and then rounded up for PSO clarity.

[6] The shutdown zone for ''other baleen and sperm'' is based on the largest distance to the Level A harassment $ER_{95\%}$ then rounded up for PSO clarity. The shutdown zones for the other species groups, not including North Atlantic right whale, is set as a minimum of 200 m for those species whose distance to Level A harassment was less than 200 m so as to place the shutdown zone outside the NAS. For harbor porpoise, Avangrid proposed, and NMFS accepted, a zone of 250 m though the distance to Level A harassment $ER_{95\%}$ was modeled at less than 200 m. For seals during jacket foundation installation, the distance to Level A harassment was more than 200 m (790 m) so the shutdown zone was rounded up to 800 m.

[7] The PAM system must be designed to detect all marine mammals to the maximum extent practicable, maximize baleen whale detections, and must be capable of detecting North Atlantic right whales at 12 km. NMFS recognizes that other marine mammals (*e.g.,* harbor porpoise) may not be detected at 12 km.

TABLE 37—CLEARANCE, LEVEL A HARASSMENT, AND LEVEL B HARASSMENT ZONES DURING UXO/MEC DETONATIONS, BY CHARGE WEIGHT AND ASSUMING 10 dB OF SOUND ATTENUATION

UXO/MEC charge weights	Low-frequency cetaceans	Mid-frequency cetaceans	High-frequency cetaceans	Phocid pinnipeds
E4 (2.3 kg):				
Level A harassment (m)	552	50	1,820	182
Level B harassment (m)	282	453	6,160	1,470
Clearance Zone (m)[a b c]	*2,500	500	2,500	1,000
E6 (9.1 kg):				
Level A harassment (m)	982	75	2,590	357
Level B harassment (m)	4,680	773	8,000	2,350
Clearance Zone (m)[a b c]	*4,000	600	4,000	1,500
E8 (45.5 kg):				
Level A harassment (m)	1,730	156	3,900	690
Level B harassment (m)	7,490	1,240	10,300	3,820

TABLE 37—CLEARANCE, LEVEL A HARASSMENT, AND LEVEL B HARASSMENT ZONES DURING UXO/MEC DETONATIONS, BY CHARGE WEIGHT AND ASSUMING 10 dB OF SOUND ATTENUATION—Continued

UXO/MEC charge weights	Low-frequency cetaceans	Mid-frequency cetaceans	High-frequency cetaceans	Phocid pinnipeds
Clearance Zone (m) [a b c]	*6,000	1,000	6,000	3,000
E10 (227 kg):				
Level A harassment (m)	2,970	337	5,400	1,220
Level B harassment (m)	10,500	2,120	12,900	5,980
Clearance Zone (m) [a b c]	*9,000	1,500	9,000	4,000
E12 (454 kg):				
Level A harassment (m)	3,780	461	6,200	1,600
Level B harassment (m)	11,900	2,550	14,100	7,020
Clearance Zone (m) [a b c]	*10,000	2,000	10,000	5,000

*The clearance zone size for the North Atlantic right whale is ''any distance''. Detonation must not occur if a North Atlantic right whale is visually or acoustically detected at any distance from the detonation site.

[a] The clearance zones, which are visually and acoustically monitored, presented here for the Level B harassment thresholds were derived based on an approximate proportion of the size of the Level B harassment (TTS) isopleth. The clearance zone sizes are contingent on Avangrid being able to demonstrate that they can identify charge weights in the field; if they cannot identify the charge weight sizes in the field then Avangrid would need to assume the E12 charge weight size for all detonations and must implement the E12 clearance zone. No minimum visibility zone is required for UXO/MEC detonation as the entire clearance zone must be visually clear.

[b] Some of the zones have been rounded for PSO clarity.

[c] The exact zone sizes may be modified through adaptive management should SFV demonstrate noise levels are lower or higher than expected.

NMFS also notes that for any UXO/MECs that require removal, Avangrid is required to implement the ALARP process. This process would require Avangrid to undertake ''lift-and-shift'' (*i.e.,* physical removal) and then lead up to in situ disposal, which could include low-order (deflagration) to high-order (detonation) methods of removal. Another potential approach involves the cutting of the UXO/MEC to extract any explosive components. Implementing the ALARP approach would minimize potential impacts to marine mammals as UXOs/MECs would only be detonated as a last resort.

Soft-Start/Ramp-Up

The use of a soft-start or ramp-up procedure is believed to provide additional protection to marine mammals by warning them or providing them with a chance to leave the area, prior to the hammer or HRG equipment operating at full capacity. Soft-start typically involves initiating hammer operation at a reduced energy level relative to full operating capacity followed by a waiting period. Typically, NMFS requires a soft-start procedure of the applicant performing four to six strikes per minute at 10 to 20 percent of the maximum hammer energy, for a minimum of 20 minutes. For foundation installation, NMFS notes that it is difficult to specify a reduction in energy for any given hammer because of variation across drivers and installation conditions. The final methodology will be developed by Avangrid, in consultation with NMFS, considering final design details including site-specific soil properties and other considerations. A general soft-start requirement for impact pile driving is incorporated into the regulations. HRG survey operators are required to ramp-up sources when the acoustic sources are used unless the equipment operates on a binary on/off switch. The ramp-up would involve starting from the smallest setting and gradually increasing to the operating level over a period of approximately 30 minutes.

Soft-start and ramp-up will be required at the beginning of each day's activity and at any time following a cessation of activity of 30 minutes or longer. Prior to soft-start or ramp-up beginning, the operator must receive confirmation from the PSO that the clearance zone is clear of any marine mammals.

Fishery Monitoring Surveys

While the likelihood of Avangrid's fishery monitoring surveys impacting marine mammals is minimal, NMFS requires Avangrid to adhere to gear and vessel mitigation measures to reduce potential impacts to the extent practicable. In addition, all crew undertaking the fishery monitoring survey activities are required to receive protected species identification training prior to activities occurring and attend the aforementioned onboarding training. The specific requirements that NMFS has set for the fishery monitoring surveys can be found in the regulatory text at the end of this rule.

Based on our evaluation of the mitigation measures, as well as other measures considered by NMFS, NMFS has determined that these measures will provide the means of affecting 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.

Monitoring and Reporting

As noted in the Changes from the Proposed to Final Rule section, we have added, modified, or clarified a number of monitoring and reporting measures since the proposed rule. These changes are described in detail below. Since the proposed rule, we have increased the number of required active PSOs per platform (*i.e.,* foundation installation vessel, dedicated PSO vessels) during foundation installation activities from two to three PSOs. This requirement will increase monitoring effort to promote more effective detection of marine mammals during foundation installation activities. In addition, we have added specific requirements for SFV monitoring.

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

Monitoring and reporting requirements prescribed by NMFS

should contribute to improved understanding of one or more of the following:

- Occurrence of marine mammal species or stocks in the area in which take is anticipated (*e.g.,* presence, abundance, distribution, density);
- Nature, scope, or context of likely marine mammal exposure to potential stressors/impacts (*i.e.,* 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 (*i.e.,* behavioral or physiological) to acoustic stressors (*i.e.,* 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/or
- Mitigation and monitoring effectiveness.

Separately, monitoring is also regularly used to support mitigation implementation (*i.e.,* mitigation monitoring) and monitoring plans typically include measures that both support mitigation implementation and increase our understanding of the impacts of the activity on marine mammals.

During the planned activities, visual monitoring by NMFS-approved PSOs would be conducted before, during, and after all impact pile driving, vibratory pile driving, drilling, UXO/MEC detonations, and HRG surveys. PAM would be also conducted during impact pile driving, vibratory pile driving, drilling, and UXO/MEC detonations. Visual observations and acoustic detections would be used to support the activity-specific mitigation measures (*e.g.,* clearance zones). To increase understanding of the impacts of the activity on marine mammals, PSOs must record all incidents of marine mammal occurrence at any distance from the foundation installation locations (*i.e.,* location of impact pile driving, vibratory pile driving, and drilling), near the HRG acoustic sources, and during UXO/MEC detonations. PSOs would document all behaviors and behavioral changes, in concert with distance from an acoustic source. Further, SFV during foundation installation and UXO/MEC detonation is required to ensure compliance and that the potential impacts are within the bounds of that analyzed. The required monitoring, including PSO and PAM Operator qualifications, is described below, beginning with PSO measures that are applicable to all the aforementioned activities and PAM (for specific activities).

Protected Species Observer and PAM Operator Requirements

Avangrid is required to employ NMFS-approved PSOs and PAM operators. PSOs are trained professionals who are tasked with visually monitoring for marine mammals during pile driving, drilling, UXO/MEC detonation, and HRG surveys. The primary purpose of a PSO is to carry out the monitoring, collect data, and, when appropriate, call for the implementation of mitigation measures. In addition to visual observations, NMFS requires Avangrid to conduct PAM by PAM operators during impact pile driving, vibratory pile driving, drilling, UXO/MEC detonation, and vessel transit.

The inclusion of PAM, which would be conducted by NMFS-approved PAM operators, following standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind, combined with visual data collection, is a valuable way to provide the most accurate record of species presence as possible. These two monitoring methods are well understood to provide best results when combined together (*e.g.,* Barlow and Taylor, 2005; Clark *et al.,* 2010; Gerrodette *et al.,* 2011; Van Parijs *et al.,* 2021). Acoustic monitoring, in addition to visual monitoring, increases the likelihood of detecting marine mammals within the shutdown and clearance zones of project activities, which when applied in combination of required shutdowns helps to further reduce the risk of marine mammals being exposed to sound levels that could otherwise result in acoustic injury or more intense behavioral harassment.

The exact configuration and number of PAM systems depends on the size of the zone(s) being monitored, the amount of noise expected in the area, and the characteristics of the signals being monitored. More closely-spaced hydrophones would allow for more directionality and range to the vocalizing marine mammals. Larger baleen cetacean species (*i.e.,* mysticetes), which produce loud and lower-frequency vocalizations, may be able to be heard with fewer hydrophones spaced at greater distances. However, smaller cetaceans (*e.g.,* mid-frequency delphinids; odontocetes) may necessitate more hydrophones and to be spaced closer together given the shorter range of the shorter, mid-frequency acoustic signals (*e.g.,* whistles and echolocation clicks). As there are no ''perfect fit'' single-optimal-array configurations, these set-ups would need to be considered on a case-by-case basis during the PAM Plan review.

NMFS does not formally administer any PSO or PAM operator training programs or endorse specific providers but will approve PSOs and PAM operators that have successfully completed courses that meet the curriculum and training requirements referenced below and further specified in the regulatory text at the end of this rule. PSOs can act as PAM operators or visual PSOs (but not simultaneously) as long as they demonstrate that their training and experience are sufficient to perform each task.

NMFS will provide PSO and PAM operator approvals to ensure that PSOs and PAM operators have the necessary training and/or experience to carry out their duties competently. In order for PSOs and PAM operators to be approved, NMFS must review and approve PSO and PAM operator resumes indicating successful completion of an acceptable training course. PSOs and PAM operators must have previous experience observing marine mammals and must have the ability to work with all required and relevant software and equipment. NMFS may approve PSOs and PAM operators as conditional or unconditional. A conditional approval may be given to one who is trained but has not yet attained the requisite experience. An unconditional approval is given to one who is trained and has attained the necessary experience. The specific requirements for conditional and unconditional approval can be found in the regulatory text at the end of this rule.

Conditionally-approved PSOs and PAM operators must be paired with an unconditionally-approved PSO (or PAM operator, as appropriate) to ensure that the quality of marine mammal observations and data recording is kept consistent. Additionally, activities requiring PSO and/or PAM operator monitoring must have a lead on duty. The visual PSO field team, in conjunction with the PAM team, (*i.e.,* together, the marine mammal

monitoring team), would have a lead member (designated as the ''Lead PSO'' or ''Lead PAM operator'') who would be required to meet the unconditional approval standard.

Although PSOs and PAM operators must be approved by NMFS, third-party observer providers and/or companies seeking PSO and PAM operator staffing should expect that those having satisfactorily completed acceptable training and with the requisite experience (if required) will be quickly approved. Avangrid is required to request PSO and PAM operator approvals 60 days prior to those personnel commencing work. An initial list of previously approved PSO and PAM operators must be submitted by Avangrid at least 30 days prior to the start of the Project. Should Avangrid require additional PSOs or PAM operators throughout the Project, Avangrid must submit a subsequent list of pre-approved PSOs and PAM operators to NMFS at least 15 days prior to planned use of that PSO or PAM operator. A PSO may be trained and/or experienced as both a PSO and PAM operator and may perform either duty, pursuant to scheduling requirements.

A minimum number of PSOs would be required to actively observe for the presence of marine mammals during certain project activities, generally speaking, with more PSOs being required as the mitigation zone sizes increase. A minimum number of PAM operators would be required to actively monitor for the presence of marine mammals during foundation installation and UXO/MEC detonations. The types of equipment required (*e.g.,* big eyes on the pile driving vessel) are also designed to increase marine mammal detection capabilities. Specifics on these types of requirements can be found in the regulations at the end of this rule.

At least three PSOs must be on duty at a time on the foundation installation vessel/platform and UXO/MEC monitoring platform. A minimum of three PSOs must be active on a dedicated PSO vessel. If a dedicated PSO vessel is selected, the vessel must be located at the best vantage point to observe and document marine mammal sightings in proximity to the clearance and, if applicable, shutdown zones.

At least one PSO must be on-duty during HRG surveys conducted during daylight hours; and at least two PSOs must be on-duty during HRG surveys conducted during nighttime.

As part of their monitoring duties, PSOs and PAM operators are responsible for data collection. The data collected by PSO and PAM operators and subsequent analysis provide the necessary information to inform an estimate of the amount of take that occurred during the Project, better understand the impacts of the Project on marine mammals, address the effectiveness of monitoring and mitigation measures, and to adaptively manage activities and mitigation in the future. Data reported includes information on marine mammal sightings (*e.g.,* numbers of animals and their behavior), activity occurring at time of sighting, monitoring conditions, and if mitigative actions were taken. Specific data collection requirements are contained within the regulations at the end of this rule.

Avangrid is required to submit a Foundation Installation Monitoring Plan and a PAM Plan to NMFS 180 days in advance of foundation installation activities. The Plan must include details regarding PSO and PAM monitoring protocols and equipment proposed for use, as described in the regulatory text at the end of this rule. NMFS must approve the plan prior to foundation installation activities commencing. Specific details on NMFS' PSO or PAM operator qualifications and requirements can be found in 50 CFR part 217, subpart GG, set out at the end of this rule.

Sound Field Verification

Previously in the proposed rule, Avangrid had to conduct SFV measurements during all UXO/MEC detonations, and all pile driving and drilling activities associated with the installation of, at minimum, the first three monopile foundations. SFV measurements must continue until at least three consecutive piles demonstrate distances to thresholds that are at or below those modeled assuming 10 dB of attenuation. Subsequent SFV measurements are also required should larger piles be installed or additional piles be driven that are anticipated to produce longer distances to harassment isopleths than those previously measured (*e.g.,* higher hammer energy, greater number of strikes, *etc.*).

For the final rule, NMFS has expanded this requirement for SFV during foundation installation to align with the BiOp. At minimum, Thorough SFV must be conducted in: the first construction year for the first three monopiles installed with only an impact hammer; the first three monopiles installed with a vibratory hammer followed by an impact hammer; the first two jacket foundations (all piles) installed; the first foundation (regardless of type) where drilling (*i.e.,* relief drilling) is used; all monopiles and the first jacket foundation (all piles) installed in December (winter sound speed profile); and, the first foundation for any foundation scenarios that were modeled for the exposure analysis (*e.g.,* rated hammer energy, number of strikes, representative location) that does not fall into one of the previously listed categories (*e.g.,* if the first two jacket foundation are installed with an impact hammer only, Thorough SFV would be required for the first jacket foundation installed with vibratory and impact pile driving). Without exception, Thorough SFV is required for all UXO/MEC detonations.

After the first construction year, if there are no changes to the pile driving equipment (*i.e.,* same hammer, same Noise Attenuation System)—the first monopile and first jacket foundation (all piles) must have Thorough SFV; if changes to the equipment (*e.g.,* different hammer, different noise attenuation system)—the Thorough SFV requirements from the first construction year apply. Any foundation type or technique included in the requirements for the first construction year that was not installed until a subsequent construction year (*e.g.,* if drilling is not used until year 2 or 3, the first foundation where drilling is used must have Thorough SFV). During Thorough SFV, installation of the next foundation (of the same type/foundation method) may not proceed until Avangrid has reviewed the initial results from the Thorough SFV and determined that there were no exceedances of any distances to the identified thresholds based on modeling assuming 10 dB of attenuation.

If any of the Thorough SFV measurements from any pile indicate that the distance to any isopleth of concern for any species is greater than those modeled assuming 10 dB of attenuation, Avangrid must notify NMFS within 24 hours of reviewing the Thorough SFV measurements and must implement the measures described in detail in the regulatory text at the end of this final rule for the next pile of the same type/installation methodology, as applicable.

Abbreviated SFV monitoring must be performed on all foundation installations for which the complete SFV monitoring described above is not conducted. In addition, SFV measurements must be conducted upon commencement of turbine operations to estimate turbine operational source levels, in accordance with a NMFS-approved Foundation Installation Pile Driving SFV Plan. The measurements and reporting associated with SFV can be found in the regulatory text at the end of this rule. The requirements are

extensive to ensure monitoring is conducted appropriately and the reporting frequency is such that Avangrid is required to make adjustments quickly (*e.g.,* ensure bubble curtain hose maintenance, check bubble curtain air pressure supply, add additional sound attenuation, *etc.*) to ensure marine mammals are not experiencing noise levels above those considered in this analysis. For recommended SFV protocols for impact pile driving, please consult International Organization for Standardization (ISO) 18406, ''Underwater acoustics—Measurement of radiated underwater sound from percussive pile driving'' (2017).

Reporting

Prior to any construction activities occurring, Avangrid will provide a report to NMFS Office of Protected Resources that demonstrates that all Avangrid personnel, including the vessel crews, vessel captains, PSOs, and PAM operators, have completed all required trainings.

NMFS will require standardized and frequent reporting from Avangrid during the life of the regulations and the LOA. All data collected relating to the Project will be recorded using industry-standard software (*e.g.,* Mysticetus or a similar software) installed on field laptops and/or tablets. Avangrid is required to submit weekly, monthly, annual, situational, and final reports. The specifics of what we require to be reported can be found in the regulatory text at the end of this final rule.

Weekly Report—During foundation installation activities, Avangrid would be required to compile and submit weekly marine mammal monitoring reports for foundation installation activities to NMFS Office of Protected Resources that document the daily start and stop of all pile-driving and drilling activities, the start and stop of associated observation periods by PSOs, details on the deployment of PSOs, a record of all detections of marine mammals (acoustic and visual), any mitigation actions (or if mitigation actions could not be taken, provide reasons why), and details on the noise abatement system(s) (*e.g.,* system type, distance deployed from the pile, bubble rate, *etc.*), and abbreviated SFV results. Weekly reports will be due on Wednesday for the previous week (Sunday to Saturday). The weekly reports are also required to identify which turbines become operational and when (a map must be provided). Once all foundation pile installation is complete, weekly reports would no longer be required.

Monthly Report—Avangrid is required to compile and submit monthly reports to NMFS Office of Protected Resources that include a summary of all information in the weekly reports, including project activities carried out in the previous month, vessel transits (number, type of vessel, and route), number of piles installed, number of UXO/MECs detonated, all detections of marine mammals, and any mitigative actions taken. Monthly reports would be due on the 15th of the month for the previous month. The monthly report would also identify which turbines become operational and when, and a map must be provided. Once all foundation pile installation is complete, monthly reports would no longer be required.

Annual Reporting—Avangrid is required to submit an annual marine mammal monitoring (both PSO and PAM) report to NMFS Office of Protected Resources by March 31, annually, describing, in detail, all of the information required in the monitoring section above for the previous calendar year. A final annual report must be prepared and submitted within 30 calendar days following receipt of any NMFS comments on the draft report.

Final Reporting—Avangrid must submit its draft 5-year report(s) to NMFS Office of Protected Resources. The report must contain, but is not limited to, a description of activities conducted (including GIS files where relevant), and all visual and acoustic monitoring, including SFV and monitoring effectiveness, conducted under the LOA within 90 calendar days of the completion of activities occurring under the LOA. A final 5-year report must be prepared and submitted within 60 calendar days following receipt of any NMFS comments on the draft report.

Situational Reporting—Specific situations encountered during the development of the Project require immediate reporting. For instance, if a North Atlantic right whale is observed at any time by PSOs or project personnel, the sighting must be immediately reported to NMFS, or, if not feasible, as soon as possible and no longer than 24 hours after the sighting. If a North Atlantic right whale is acoustically detected at any time via a project-related PAM system, the detection must be reported as soon as possible and no longer than 24 hours after the detection to NMFS via the 24-hour North Atlantic right whale Detection Template (*https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates*). Calling the hotline is not necessary when reporting PAM detections via the template.

If a sighting of a stranded, entangled, injured, or dead marine mammal occurs, the sighting would be reported within 24 hours to NMFS Office of Protected Resources, the NMFS Greater Atlantic Stranding Coordinator for the New England/Mid-Atlantic area (866–755–6622) in the Northeast Region (if in the Southeast Region (NC to FL), contact 877–942–5343), and the U.S. Coast Guard within 24 hours.

In the event of a vessel strike of a marine mammal by any vessel associated with the Project or if project activities cause a non-auditory injury or death of a marine mammal, Avangrid must immediately report the incident to NMFS. If in the Greater Atlantic Region (Maine to Virginia), Avangrid must call the NMFS Greater Atlantic Stranding Hotline. Separately, Avangrid must also and immediately report the incident to NMFS Office of Protected Resources and GARFO. Avangrid must immediately cease all on-water activities, including pile driving, until NMFS Office of Protected Resources 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 MMPA. NMFS Office of Protected Resources may impose additional measures covered in the adaptive management provisions of this rule to minimize the likelihood of further prohibited take and ensure MMPA compliance. Avangrid may not resume their activities until notified by NMFS.

In the event of any lost gear associated with the fishery surveys, Avangrid must report to the GARFO as soon as possible or within 24 hours of the documented time of missing or lost gear. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear.

The specifics of what NMFS Office of Protected Resources requires to be reported is listed at the end of this rulemaking in the regulatory text.

Sound Field Verification—Avangrid is required to submit interim SFV reports after each foundation installation and UXO/MEC detonation monitored as soon as possible but within 48 hours for Thorough SFV. Abbreviated SFV reports must be included in the weekly monitoring reports. A final SFV report for all foundation installations and UXO/MEC detonations will be required within 90 days following completion of acoustic monitoring.

Adaptive Management

These regulations contain an adaptive management component. Our understanding of the effects of offshore wind construction activities (*e.g.,* acoustic stressors) on marine mammals continues to evolve, which makes the inclusion of an adaptive management component both valuable and necessary within the context of 5-year regulations.

The monitoring and reporting requirements in this final rule will provide NMFS with information that helps us to better understand the impacts of the Project's activities on marine mammals and informs our consideration of whether any changes to mitigation and monitoring are appropriate. The use of adaptive management allows NMFS to consider new information and modify mitigation, monitoring, or reporting requirements, as appropriate, with input from Avangrid regarding practicability, if such modifications will have a reasonable likelihood of more effectively accomplishing the goal of the measures.

The following are some of the possible sources of new information to be considered through the adaptive management process: (1) results from monitoring reports, including the weekly, monthly, situational, and annual reports required; (2) results from research on marine mammals, noise impacts, or other related topics; and (3) any information that reveals that marine mammals may have been taken in a manner, extent, or number not authorized by these regulations or subsequent LOA. Adaptive management decisions may be made at any time, as new information warrants it. NMFS may consult with Avangrid regarding the practicability of the modifications.

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'' by mortality, serious injury, or by Level A harassment and Level B harassment, we consider other factors, such as the likely nature of any behavioral responses (*e.g.,* intensity, duration), the context of any such responses (*e.g.,* critical reproductive time or location, migration), as well as effects on habitat, and the likely effectiveness of mitigation. We also assess the number, intensity, and context of estimated takes by evaluating this information relative to population status. Consistent with the 1989 preamble for NMFS' implementing regulations (54 FR 40338, September 29, 1989), the impacts from other past and ongoing anthropogenic activities are incorporated into this analysis via their impacts on the 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).

In the Estimated Take section, we estimated the maximum number of takes by Level A harassment and Level B harassment that are reasonably expected to occur from the specified activities based on the methods described. The impact that any given take would have is dependent on many case-specific factors that need to be considered in the negligible impact analysis (*e.g.,* the context of behavioral exposures such as duration or intensity of a disturbance, the health of impacted animals, the status of a species that incurs fitness-level impacts to individuals, *etc.*). In this final rule, we evaluate the likely impacts of the enumerated harassment takes that may be authorized in the context of the specific circumstances surrounding these predicted takes. We also collectively evaluate this information, as well as other more taxa-specific information and mitigation measure effectiveness, in group-specific discussions that support our negligible impact conclusions for each stock. As described above, no serious injury or mortality is expected or may be authorized for any species or stock.

The Description of the Specified Activities section describes Avangrid's specified activities that may result in take of marine mammals and an estimated schedule for conducting those activities. Avangrid has provided a realistic construction schedule although we recognize schedules may shift for a variety of reasons (*e.g.,* weather or supply delays). However, the total amount of take would not exceed the 5-year totals and maximum annual total in any given year indicated in tables 33 and 35, respectively.

We base our analysis and negligible impact determination on the maximum number of takes expected to occur annually and across the 5-year effective period of these regulations, as well as extensive qualitative consideration of other contextual factors that influence the severity and nature of impact the takes have on the affected individuals and the number and the number of individuals affected. As stated before, the number of takes, both maximum annual and 5-year total, alone are only a part of the analysis.

To avoid repetition, we provide some general analysis in this Negligible Impact Analysis and Determination section that applies to all the species listed in table 2, given that some of the anticipated effects of Avangrid's construction activities on marine mammals are expected to be relatively similar in nature. Then, we subdivide into more detailed discussions for mysticetes, odontocetes, and pinnipeds which have broad life-history traits that support an overarching discussion of some factors considered within the analysis for those groups (*e.g.,* habitat-use patterns, high-level differences in feeding strategies).

Last, we provide a negligible impact determination for each species or stock, providing species or stock-specific information or analysis, where appropriate, for example, for North Atlantic right whales, given their population status. Organizing our analysis by grouping species or stocks that share common traits or that would respond similarly to effects of Avangrid's activities and then providing species- or stock-specific information allows us to avoid duplication while ensuring that we have analyzed the effects of the specified activities on each affected species or stock. It is important to note that in the group or species sections, we base our negligible impact analysis on the maximum annual take that is predicted under the 5-year rule and that the negligible impact determination also examines the total taking over the 5-year period; however, the majority of the impacts are associated with WTG foundation and ESP foundation installation, which would occur largely during years 2 and 3 (2026 through 2027). The estimated take in the other years is expected to be notably less, which is reflected in the total take that would be allowable under the rule (table 33).

As described previously, no serious injury or mortality is anticipated or may be authorized in any LOA issued under this rule. Non-auditory injury (*e.g.,* lung injury or gastrointestinal injury from UXO/MEC detonation) is also not anticipated and would not be authorized in any LOA issued under this rule. Any Level A harassment that

may be authorized would be in the form of auditory injury (*i.e.,* PTS).

The amount of harassment Avangrid has requested, and NMFS may authorize, is based on exposure models that consider the outputs of acoustic source and propagation models and other data such as frequency of occurrence or group sizes. Several conservative parameters and assumptions are ingrained into these models, such as assuming forcing functions that consider direct contact with piles (*i.e.,* no cushion allowances) and application of the highest species density monthly among the areas of interest (*i.e.,* Lease Area, cable route) for each species was applied to the exposure calculations. The exposure model results do not reflect any mitigation measures (other than 10-dB sound attenuation) or avoidance response. The amount of take requested and that may be authorized in a LOA also reflects careful consideration of other data (*e.g.,* group size data, PSO data). As described above, while current planning includes pile installation divided between 2 or 3 years (Schedule A or Schedule B), the maximum annual take estimates assume the maximum amount of take between the two schedules, to allow flexibility should schedules change again. For all species, the amount of take that may be authorized represents the maximum amount of Level A harassment and Level B harassment reasonably expected to occur.

Behavioral Disturbance

In general, NMFS anticipates that impacts on an individual that has been harassed are likely to be more intense when exposed to higher received levels and for a longer duration, though this is in no way a strictly linear relationship for behavioral effects across species, individuals, or circumstances, and less severe impacts result when exposed to lower received levels for a brief duration. However, there is also growing evidence of the importance of contextual factors such as distance from a source in predicting marine mammal behavioral response to sound (*i.e.,* sounds of a similar level emanating from a more distant source have been shown to be less likely to evoke a response of equal magnitude (DeRuiter and Doukara, 2012; Falcone *et al.,* 2017)). As described in the ''Potential Effects to Marine Mammals and their Habitat'' section of the proposed rule, the intensity and duration of any impact resulting from exposure to the specified activities is dependent upon a number of contextual factors including, but not limited to, sound source frequencies, whether the sound source is moving towards the animal, hearing ranges of marine mammals, behavioral state at time of exposure, status of individual exposed (*e.g.,* reproductive status, age class, health) and an individual's experience with similar sound sources. Southall *et al.* (2021), Ellison *et al.* (2012), and Moore and Barlow (2013), among others, emphasize the importance of context (*e.g.,* behavioral state of the animals, distance from the sound source) in evaluating behavioral responses of marine mammals to acoustic sources.

Harassment of marine mammals may result in behavioral modifications (*e.g.,* avoidance, temporary cessation of foraging or communicating, changes in respiration or group dynamics, masking) or may result in auditory impacts such as hearing loss. In addition, some of the lower-level physiological stress responses (*e.g.,* change in respiration, change in heart rate) discussed previously would likely co-occur with the behavioral modifications, although these physiological responses are more difficult to detect and fewer data exist relating these responses to specific received levels of sound. Takes by Level B harassment, then, may have a stress-related physiological component as well; however, we would not expect the specified activities to produce conditions of long-term and continuous exposure to noise leading to long-term physiological stress responses in marine mammals that could affect reproduction or survival.

In the range of exposures that might result in Level B harassment (which by nature of the way it is modeled/counted, occurs within 1 day), the less severe end might include exposure to comparatively lower levels of a sound, at a greater distance from the animal, for a few or several minutes. A less severe exposure of this nature could result in a behavioral response such as avoiding an area that an animal would otherwise have chosen to move through or feed in for some amount of time, or breaking off one or a few feeding bouts. More severe effects could occur if an animal gets close enough to the source to receive a comparatively higher level, is exposed continuously to one source for a longer time, or is exposed intermittently to different sources throughout a day. Such effects might result in an animal having a more severe avoidance response and leaving a larger area for a day or more or potentially losing feeding opportunities for a day or more. Such severe behavioral effects are expected to occur infrequently, though, and given the extensive mitigation and monitoring measures included in this rule, we expect severe behavioral effects to be minimized.

Many species perform vital functions, such as feeding, resting, traveling, and socializing, on a diel cycle (*i.e.,* a 24-hour cycle). Behavioral reactions to noise exposure, when taking place in a biologically important context, such as disruption of critical life functions, displacement, or avoidance of important habitat, are more likely to be significant if they last more than 1 day or recur on subsequent days (Southall *et al.,* 2007) due to diel and lunar patterns in diving and foraging behaviors observed in many cetaceans (Baird *et al.,* 2008; Barlow *et al.,* 2020; Henderson *et al.,* 2016; Schorr *et al.,* 2014). It is important to note the water depth in the Project Area is shallow (2 to 62 m) and deep diving species, such as sperm whales, are not expected to be engaging in deep foraging dives when exposed to noise above NMFS harassment thresholds during the specified activities. Therefore, we do not anticipate impacts to deep foraging behavior to be impacted by the specified activities.

It is important to identify that the estimated number of takes for each stock does not necessarily equate to the number of individual marine mammals expected to be harassed (which may be lower, depending on the circumstances), but rather to the instances of take (*e.g.,* exposures above the Level B harassment thresholds) that may occur. These instances may represent either brief exposures of seconds for UXO/MEC detonations, seconds to minutes for HRG surveys, or, in some cases, longer durations of exposure within (but not exceeding) a day (*e.g.,* pile driving). Some members of a species or stock may experience one exposure (*i.e.,* be taken on one day) as they move through an area, while other individuals may experience recurring instances of take over multiple days throughout the year, in which case the number of individuals taken is smaller than the total estimated take for that species or stock. In short, for species that are more likely to be migrating through the area and/or for which only a comparatively smaller number of takes are predicted (*e.g.,* some of the mysticetes), it is more likely that each take represents a different individual. However, for non-migrating species and/or species with larger amounts of predicted take, we expect that the total anticipated takes represent exposures of a smaller number of individuals of which some would be taken across multiple days.

For Avangrid, impact pile driving of foundation piles is most likely to result in a higher magnitude and severity of behavioral disturbance than other

activities (*i.e.,* drilling, vibratory pile driving, UXO/MEC detonation, and HRG surveys). Impact pile driving has higher source levels and longer durations (on an annual basis) than vibratory pile driving or drilling activities. HRG survey equipment also produces much higher frequencies than pile driving, resulting in minimal sound propagation. While UXO/MEC detonations may have higher source levels, impact pile driving is planned for longer durations (*i.e.,* a maximum of 10 UXO/MEC detonations are planned, which would result in only instantaneous exposures).

While foundation installation impact pile driving is anticipated to be most impactful for these reasons, impacts are minimized through implementation of mitigation measures, including soft-starts, use of a sound attenuation system, the implementation of clearance zones that would facilitate a delay of pile driving commencement, and the implementation of shutdown zones. For example, given sufficient notice through the use of soft-start, marine mammals are expected to move away from a sound source that is disturbing prior to becoming exposed to very loud noise levels. The requirement to couple visual monitoring and PAM before and during all foundation installation and UXO/MEC detonations would increase the overall capability to detect marine mammals rather than when one method is used alone. Measures such as the requirement to apply sound attention devices and implement clearance zones also apply to UXO/MEC detonation(s), which also have the potential to elicit more severe behavioral reactions in the unlikely event that an animal is relatively close to the explosion in the instant that it occurs; hence, severity of behavioral responses are expected to be lower than would be the case without mitigation.

Occasional, milder behavioral reactions are unlikely to cause long-term consequences for individual animals or populations, and even if some smaller subset of the takes are in the form of a longer (several hours or a day) and more severe response, if they are not expected to be repeated over numerous or sequential days, impacts to individual fitness are not anticipated. Also, the effect of disturbance is strongly influenced by whether it overlaps with biologically important habitats when individuals are present—avoiding biologically important habitats will reduce the likelihood of more significant behavioral impacts, for example reduced or lost foraging (Keen *et al.,* 2021). Nearly all studies and experts agree that infrequent exposures of a single day or less are unlikely to impact an individual's overall energy budget (Farmer *et al.,* 2018; Harris *et al.,* 2017; King *et al.,* 2015; National Academy of Science, 2017; New *et al.,* 2014; Southall *et al.,* 2007; Villegas-Amtmann *et al.,* 2015).

Temporary Threshold Shift

TTS is one form of Level B harassment that marine mammals may incur through exposure to the specified activities and, as described earlier, the takes by Level B harassment may represent takes in the form of direct behavioral disturbance, TTS, or both. As discussed in the ''Potential Effects of Specified Activities on Marine Mammals and their Habitat'' section of the proposed rule, in general, TTS can last from a few minutes to days, be of varying degree, and occur across different frequency bandwidths, all of which determine the severity of the impacts on the affected individual, which can range from minor to more severe. Impact and vibratory pile driving, drilling, and UXO/MEC detonation are broadband noise sources but generate sounds in the lower frequency ranges (with most of the energy below 1–2 kHz, but with a small amount energy ranging up to 20 kHz); therefore, in general and all else being equal, we would anticipate the potential for TTS is higher in low-frequency cetaceans (*i.e.,* mysticetes) than other marine mammal hearing groups, and would be more likely to occur in frequency bands in which they communicate. However, we would not expect the TTS to span the entire communication or hearing range of any species given that the frequencies produced by these activities do not span entire hearing ranges for any particular species. Additionally, though the frequency range of TTS that marine mammals might sustain would overlap with some of the frequency ranges of their vocalizations, the frequency range of TTS from the Project's pile driving, drilling, and UXO/MEC detonation activities would not typically span the entire frequency range of one vocalization type, much less span all types of vocalizations or other critical auditory cues for any given species. The required mitigation measures further reduce the potential for TTS in mysticetes.

Generally, both the degree of TTS and the duration of TTS would be greater if the marine mammal is exposed to a higher level of energy (which would occur when the peak dB level is higher or the duration is longer). The threshold for the onset of TTS was discussed previously (refer back to Estimated Take section). However, source level alone is not a predictor of TTS. An animal would have to approach closer to the source or remain in the vicinity of the sound source appreciably longer to increase the received SEL, which would be difficult considering the required mitigation and the nominal speed of the receiving animal relative to the stationary sources such as impact pile driving. The recovery time is also of importance when considering the potential impacts from TTS. In TTS laboratory studies (as discussed in the ''Potential Effects of the Specified Activities on Marine Mammals and their Habitat'' section of the proposed rule), some using exposures of almost an hour in duration or up to 217 SEL, almost all individuals recovered within 1 day or less (often in minutes) and we note that while the pile-driving activities last for hours a day, it is unlikely that most marine mammals would stay in the close vicinity of the source long enough to incur more severe TTS. UXO/MEC detonation also has the potential to result in TTS. However, given the duration of exposure is extremely short (milliseconds), the degree of TTS (*i.e.,* the amount of dB shift) is expected to be small and TTS duration is expected to be short (minutes to hours). Overall, given the small number of times that any individual might incur TTS, the low degree of TTS and the short anticipated duration, and the unlikely scenario that any TTS overlapped the entirety of a critical hearing range, it is unlikely that TTS (of the nature expected to result from the Project's activities) would result in behavioral changes or other impacts that would impact any individual's (of any hearing sensitivity) reproduction or survival.

Permanent Threshold Shift

NMFS may authorize a very small amount of take by PTS to some marine mammal individuals. The numbers of annual takes by Level A harassment that may be authorized are relatively low for all marine mammal stocks and species (table 35). The only activity incidental to which we anticipate PTS may occur is from exposure to impact pile driving and UXO/MEC detonations, which produce sounds that are both impulsive and primarily concentrated in the lower frequency ranges (below 1 kHz) (David, 2006; Krumpel *et al.,* 2021).

There are no PTS data on cetaceans and only one recorded instance of PTS being induced in older harbor seals (Reichmuth *et al.,* 2019). However, available TTS data of mid-frequency hearing specialists exposed to mid- or high-frequency sounds (Southall *et al.,* 2007; NMFS, 2018; Southall *et al.,* 2019)

suggest that most threshold shifts occur in the frequency range of the source up to one octave higher than the source. We would anticipate a similar result for PTS. Further, no more than a small degree of PTS is expected to be associated with any of the incurred Level A harassment, given that it is unlikely that animals would stay in the close vicinity of a source for a duration long enough to produce more than a small degree of PTS. Given UXO/MEC detonation is instantaneous, the potential for PTS is not a function of duration. NMFS recognizes the distances to PTS thresholds may be large for certain species (*e.g.,* over 4 km based on the largest charge weights; table 37); however, there would be multiple vessels/platforms equipped with PSOs as well as activity PAM requirements to observe and acoustically detect marine mammals. A marine mammal within the PTS zone would trigger a delay to detonation; thereby minimizing potential for PTS for all marine mammal species and ensuring that any PTS that does occur is of a relatively low degree.

PTS would consist of minor degradation of hearing capabilities occurring predominantly at frequencies one-half to one octave above the frequency of the energy produced by pile driving or instantaneous UXO/MEC detonations (*i.e.,* the low-frequency region below 2 kHz) (Cody and Johnstone, 1981; McFadden, 1986; Finneran, 2015), not severe hearing impairment. If hearing impairment occurs from either impact pile driving or UXO/MEC detonation, it is most likely that the affected animal would lose a few decibels in its hearing sensitivity, which in most cases is not likely to meaningfully affect its ability to forage and communicate with conspecifics. Avangrid estimates 10 UXO/MECs may be detonated and the exposure analysis assumes the worst-case scenario that all of the UXO/MECs found would consist of the largest charge weight of UXO/MEC (E12; 454 kg). However, it is highly unlikely that all charges would be this maximum size; thus, the amount of Level A harassment that may occur incidental to the detonation of the UXO/MECs would likely be less than what is estimated here. In addition, during impact pile driving, given sufficient notice through use of soft-start prior to implementation of full hammer energy during impact pile driving, marine mammals are expected to move away from a sound source that is annoying prior to it resulting in severe PTS.

Auditory Masking or Communication Impairment

The ultimate potential impacts of masking on an individual are similar to those discussed for TTS (*e.g.,* decreased ability to communicate, forage effectively, or detect predators), but an important difference is that masking only occurs during the time of the signal, versus TTS, which continues beyond the duration of the signal. Masking may also result from the sum of exposure to multiple signals, none of which might individually cause TTS. Fundamentally, masking is referred to as a chronic effect because one of the key potential harmful components of masking is its duration—the fact that an animal would have reduced ability to hear or interpret critical cues becomes much more likely to cause a problem the longer it is occurring. Inherent in the concept of masking is the fact that the potential for the effect is only present during the times that the animal and the source are in close enough proximity for the effect to occur (and further, this time period would need to coincide with a time that the animal was utilizing sounds at the masked frequency).

As our analysis has indicated, for this project we expect that impact pile driving foundations have the greatest potential to mask marine mammal signals, and this pile driving may occur for several, albeit intermittent, hours per day, for multiple days per year. Masking is fundamentally more of a concern at lower frequencies (which are pile-driving dominant frequencies) because low frequency signals propagate significantly further than higher frequencies. Low frequency signals are also more likely to overlap with the narrower low frequency calls of mysticetes, many non-communication cues related to fish and invertebrate prey, and geologic sounds that inform navigation. However, the area in which masking would occur for all marine mammal species and stocks (*e.g.,* predominantly in the vicinity of the foundation pile being driven) is small relative to the extent of habitat used by each species and stock.

In summary, the nature of the specified activities, paired with habitat use patterns by marine mammals, makes it unlikely that the level of masking that could occur would have the potential to affect reproductive success or survival.

Impacts on Habitat and Prey

Construction activities (*i.e.,* foundation installation and UXO/MEC detonation) may result in fish and invertebrate mortality or injury very close to the source, and all of the specified activities may cause some fish to leave the area of disturbance. It is anticipated that any mortality or injury would be limited to a very small subset of available prey and the implementation of mitigation measures such as the use of a NAS during foundation installation and UXO/MEC detonations would further limit the degree of impact. Behavioral changes in prey in response to construction activities could temporarily impact 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 at any given time (*e.g.,* around a pile being driven), the impacts to marine mammal habitat are not expected to cause significant or long-term negative consequences.

Cable presence is not anticipated to impact marine mammal habitat as these would be buried, and any electromagnetic fields emanating from the cables are not anticipated to result in consequences that would impact marine mammals prey to the extent they would be unavailable for consumption.

The presence of wind turbines within the Lease Area could have longer-term impacts on marine mammal habitat, as the Project would result in the persistence of the structures within marine mammal habitat for more than 30 years. The presence of an extensive number of structures such as wind turbines are, in general, likely to result in local and broader oceanographic effects in the marine environment, and may disrupt dense aggregations and distribution of marine mammal zooplankton prey through altering the strength of tidal currents and associated fronts, changes in stratification, primary production, the degree of mixing, and stratification in the water column (Chen *et al.,* 2021; Johnson *et al.,* 2021; Christiansen *et al.,* 2022; Dorrell *et al.,* 2022). However, the scale of impacts is difficult to predict and may vary from hundreds of meters for local individual turbine impacts (Schultze *et al.,* 2020) to large-scale changes stretching hundreds of kilometers (Christiansen *et al.,* 2022).

As discussed in the ''Potential Effects of the Specified Activities on Marine Mammals and their Habitat'' section of the proposed rule, the Project would consist of no more than 132 foundation positions (WTGs and ESPs) in the Lease Area, which will gradually become operational following construction completion and by the end of this rule. While there are likely to be oceanographic impacts from the presence of the Project, meaningful oceanographic impacts relative to stratification and mixing that would

significantly affect marine mammal habitat and prey over large areas in key foraging habitats during the effective period of the regulations are not anticipated. Although this area supports aggregations of zooplankton (*i.e.,* baleen whale prey) that could be impacted if long-term oceanographic changes occurred, prey densities are typically significantly less in the Project Area than in known baleen whale foraging habitats to the east and north (*e.g.,* south of Nantucket and Martha's Vineyard, Great South Channel). For these reasons, if oceanographic features are affected by the Project during the effective period of the regulations, the impact on marine mammal habitat and their prey is likely to be comparatively minor.

The New England Wind BiOp provided an evaluation of the presence and operation of the Project on, among other species, listed marine mammals and their prey. Overall, the BiOp concluded that impacts from loss of soft bottom habitat from the presence of turbines and placement of scour protection as well as any beneficial reef effects, are expected to be so small that they cannot be meaningfully measured, evaluated, or detected and are, therefore, insignificant. The BiOp also concluded that while the presence and operation of the wind farm may change the distribution of plankton with the wind farm, these changes are not expected to affect the oceanographic forces transporting zooplankton into the area. Regional distribution of plankton may vary from pre-wind facility conditions; however, given the lack of a known bathymetric feature that aggregates zooplankton prey in the lease area and acknowledging the information and uncertainty presented in the BiOp, the BiOp was not able to conclude that adverse effects on North Atlantic right whale foraging success due to near-field effects are reasonably certain to occur. Relative to far-field effects (tens of kilometers from the outermost row of foundations in the New England Wind lease area), the BiOp does not anticipate disruption to conditions that would aggregate prey in or outside the WFA that would have significant effects on ESA listed species. This is due to the scale of the project and its location in the center of the southern New England region and away from Nantucket Shoals and the tidal jet along the edge of Nantucket Shoals that are thought to aggregate zooplankton prey in that region.

Therefore, the BiOp concluded that an overall reduction in biomass of plankton is not an anticipated outcome of operating the Project. Thus, because broader changes in the biomass of zooplankton are not anticipated, any higher trophic level impacts are also not anticipated. That is, no effects to pelagic fish or benthic invertebrates that depend on plankton as forage food are expected to occur. Zooplankton, fish, and invertebrates are all considered marine mammal prey and, as fully described in the BiOp, measurable, detectable, or significant changes to marine mammal prey abundance and distribution from wind farm operation are not anticipated.

Mitigation To Reduce Impact on All Species

This rule includes an extensive suite of mitigation measures designed to minimize impacts on all marine mammals, with a focus on North Atlantic right whales. The Mitigation section discusses the manner in which the required mitigation measures reduce the magnitude and/or severity of the take of marine mammals, including the following. For installation of foundation piles, 10 overarching mitigation measures are required, which are intended to reduce both the number and intensity of marine mammal takes: (1) seasonal/time of day work restrictions; (2) use of multiple PSOs to visually observe for marine mammals (with any detection within specifically designated zones that would trigger a delay or shutdown); (3) use of PAM to acoustically detect marine mammals, with a focus on detecting baleen whales (with any detection within designated zones triggering delay or shutdown); (4) implementation of clearance zones; (5) implementation of shutdown zones; (6) use of soft-start (impact pile driving only); (7) use of noise attenuation technology; (8) maintaining situational awareness of marine mammal presence through the requirement that any marine mammal sighting(s) by Avangrid personnel must be reported to PSOs; (9) SFV monitoring; and (10) vessel strike avoidance measures to reduce the risk of a collision with a marine mammal and vessel. For UXO/MEC detonation, all the same measures as foundation installation are required except for soft-start and shutdown zones; neither are possible as a detonation is an instantaneous event. Lastly, for HRG surveys, we are requiring six measures: (1) measures specifically for Vessel Strike Avoidance; (2) specific requirements during daytime and nighttime HRG surveys; (3) implementation of clearance zones; (4) implementation of shutdown zones; (5) use of ramp-up of acoustic sources; and (6) maintaining situational awareness of marine mammal presence through the requirement that any marine mammal sighting(s) by Avangrid personnel must be reported to PSOs.

For activities with large harassment isopleths, Avangrid is committed to reducing the noise levels generated to the lowest levels practicable and is required to ensure that they do not exceed a noise footprint above that which was modeled, assuming a 10-dB attenuation. Use of a soft-start during impact pile driving will allow animals to move away from (*i.e.,* avoid) the sound source prior to applying higher hammer energy levels needed to install the pile (*i.e.,* Avangrid will not use a hammer energy greater than necessary to install piles). Similarly, ramp-up during HRG surveys would allow animals to move away and avoid the acoustic sources before they reach their maximum energy level. For all activities, clearance zone and shutdown zone implementation, which are required when marine mammals are within given distances associated with certain impact thresholds for all activities, will reduce the magnitude and severity of marine mammal take. Additionally, the use of multiple PSOs (*e.g.,* WTG and ESP foundation installation, UXO/MEC detonation, HRG surveys), PAM operators (for foundation installation and UXO/MEC detonation), and maintaining awareness of marine mammal sightings reported in the region during all specified activities will aid in detecting marine mammals that would trigger the implementation of the mitigation measures. The reporting requirements including SFV reporting (for foundation installation and foundation operation), will assist NMFS in identifying if impacts beyond those analyzed in this final rule are occurring, potentially leading to the need to enact adaptive management measures in addition to or in place of the mitigation measures.

Mysticetes

Six mysticete species (comprising six stocks) of cetaceans (*i.e.,* North Atlantic right whale, blue whale, humpback whale, fin whale, sei whale, and minke whale) may be taken by harassment. These species, to varying extents, utilize the specified geographical region, including the Project Area, for the purposes of migration, foraging, and socializing. Mysticetes are in the low-frequency hearing group.

Behavioral data on mysticete reactions to pile-driving noise are scant. Kraus *et al.* (2019) predicted that the three main impacts of offshore wind farms on marine mammals would consist of displacement, behavioral disruptions, and stress. Broadly, we can look to studies that have focused on

other noise sources such as seismic surveys and military training exercises, which suggest that exposure to loud signals can result in avoidance of the sound source (or displacement if the activity continues for a longer duration in a place where individuals would otherwise have been staying, which is less likely for mysticetes in this area), disruption of foraging activities (if they are occurring in the area), local masking around the source, associated stress responses, impacts to prey, and TTS or PTS (in some cases).

Mysticetes encountered in the Project Area are expected to be migrating or foraging. The extent to which an animal engages in these behaviors in the area is species-specific and varies seasonally. Given that feeding Biologically Important Areas (BIAs) for the North Atlantic right whale, humpback whale, fin whale, sei whale, and minke whale exist to the east and north of the Project Area (LaBrecque *et al.,* 2015; Van Parijs *et al.,* 2015), many mysticetes are expected to predominantly be migrating through the Project Area towards or from these feeding grounds. While we acknowledged above that mortality, hearing impairment, or displacement of mysticete prey species may result locally from impact pile driving and UXO/MEC detonations, given the very short duration of and broad availability of prey species in the area and the availability of alternative suitable foraging habitat for the mysticete species most likely to be affected, any impacts on mysticete foraging is expected to be minor. Whales temporarily displaced from the Project Area are expected to have sufficient remaining feeding habitat available to them and would not be prevented from feeding in other areas within the biologically important feeding habitats found further north. In addition, any displacement of whales or interruption of foraging bouts would be expected to be relatively temporary in nature.

The potential for repeated exposures is dependent upon the residency time of whales with migratory animals unlikely to be exposed on repeated occasions and animals remaining in the area to be more likely exposed repeatedly. For mysticetes, where relatively low numbers of species-specific take by Level B harassment are predicted (compared to the abundance of each mysticete species or stock; see table 35) and movement patterns suggest that individuals would not necessarily linger in a particular area for multiple days, each predicted take likely represents an exposure of a different individual, with perhaps a subset of takes for a few species potentially representing a few repeated of a limited number of individuals across multiple days. In other words, the behavioral disturbance to any individual mysticete would, therefore, be expected to mostly likely occur within a single day within a year, or potentially across a few days, and would not be expected to impact reproduction or survival. In general, the duration of exposures would not be continuous throughout any given day and pile driving would not occur on all consecutive days within a given year due to weather delays or any number of logistical constraints Avangrid has identified. Species-specific analysis regarding potential for repeated exposures and impacts is provided below.

Fin, blue, minke, sei, and humpback whales are the only mysticete species for which PTS is anticipated and may be authorized. As described previously, PTS for mysticetes from some project activities may overlap frequencies used for communication, navigation, or detecting prey. However, given the nature and duration of the activity, the mitigation measures, and likely avoidance behavior, any PTS is expected to be of a small degree, would be limited to frequencies where pile-driving noise is concentrated (*i.e.,* only a small subset of their expected hearing range) and would not be expected to impact reproductive success or survival.

North Atlantic Right Whale

North Atlantic right whales are listed as endangered under the ESA and as both a depleted and strategic stock under the MMPA. As described in the ''Potential Effects to Marine Mammals and Their Habitat'' section of the proposed rule, North Atlantic right whales are threatened by a low population abundance, higher than average mortality rates, and lower than average reproductive rates. Recent studies have reported individuals showing high stress levels (*e.g.,* Corkeron *et al.,* 2017) and poor health, which has further implications on reproductive success and calf survival (Christiansen *et al.,* 2020; Stewart *et al.,* 2021; Stewart *et al.,* 2022). As described below, a UME has been designated for North Atlantic right whales. Given this, the status of the North Atlantic right whale population is of heightened concern and, therefore, merits additional analysis and consideration. No Level A harassment, serious injury, or mortality is anticipated or may be authorized for this species.

For North Atlantic right whales, this rule may authorize up to 126 takes, by Level B harassment only, over the 5-year period, with a maximum annual allowable take of 60 (equating to approximately 17.65 percent of the stock abundance, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation or UXO/MEC detonations (*e.g.,* years when only HRG surveys would be occurring). The Project Area is known as a migratory corridor for North Atlantic right whales and given the nature of migratory behavior (*e.g.,* continuous path), as well as the low number of total takes, we anticipate that few, if any, of the instances of take would represent repeat takes of any individual.

The highest density of North Atlantic right whales in the Project Area occurs in the winter (tables 7–9). The New York Bight, including the Project Area, may be a stopover site for migrating North Atlantic right whales moving to or from southeastern calving grounds. As described above, the Project Area represents part of an important migratory area for right whales. Quintana-Rizzo *et al.* (2021) noted that southern New England, northeast of the Project Area, may be a stopover site for migrating right whales moving to or from southeastern calving grounds. The North Atlantic right whales observed during the study period were primarily concentrated in the northeastern and southeastern sections of the MA WEA during the summer (June–August) and winter (December–February). North Atlantic right whale distribution did shift to the west into the Rhode Island/Massachusetts Wind Energy Area (RI/MA WEA) in the spring (March–May). Overall, the Project Area contains habitat less frequently utilized by North Atlantic right whales than the more northerly southern New England region.

In general, North Atlantic right whales in the Project Area are expected to be engaging in migratory behavior. Given the species' migratory behavior in the Project Area, we anticipate individual whales would be typically migrating through the area during most months when foundation installation and UXO/MEC detonation would occur, given the strict seasonal restrictions on foundation installation and UXO/MEC detonations from January through April, rather than lingering in the Project Area for extended periods of time. Other work that involves either much smaller harassment zones (*e.g.,* HRG surveys) or is limited in amount (*e.g.,* UXO/MEC detonation) may also occur during periods when North Atlantic right whales are using the habitat for migration. Therefore, it is likely that many of the takes would occur to separate individual whales, each

disturbed on no more than 1 day. It is important to note that the activities occurring from December through May that may impact North Atlantic right whales would be primarily HRG surveys, which would not result in very high received levels, if any at all, because of both the lower sources and the mitigation and monitoring measures that avoid or minimize impacts. Across all years, while it is possible an animal could have been exposed during a previous year, the low amount of take that may be authorized during the 5-year period of the rule makes this scenario possible but unlikely. However, if an individual were to be exposed during a subsequent year, the impact of that exposure is likely independent of the previous exposure and would cause no additive effect given the duration between exposures.

As described in the Description of Marine Mammals in the Geographic Area section of the proposed rule, North Atlantic right whales are presently experiencing an ongoing UME (beginning in June 2017). Preliminary findings support human interactions, specifically vessel strikes and entanglements, as the cause of death for the majority of North Atlantic right whales. Given the current status of the North Atlantic right whale, the loss of even one individual could significantly impact the population. No mortality, serious injury, or injury of North Atlantic right whales as a result of the Project is expected or may be authorized. Any disturbance to North Atlantic right whales due to the specified activities is expected to result in temporary avoidance of the immediate area of construction. As no injury, serious injury, or mortality is expected or may be authorized, and Level B harassment of North Atlantic right whales will be reduced to the level of least-practicable adverse impact through use of mitigation measures, the number of takes of North Atlantic right whales that may be authorized would not exacerbate or compound the effects of the ongoing UME.

As described in the general *Mysticetes* section above, foundation installation is likely to result in the highest amount of annual take and is of greatest concern given loud source levels. This activity would likely be limited to up to 113 days over a maximum of 3 years, during times when, based on the best available scientific data, North Atlantic right whales are less frequently encountered due to their migratory behavior. The potential types, severity, and magnitude of impacts are also anticipated to mirror that described in the general *Mysticetes* section above, including avoidance (the most likely outcome), changes in foraging or vocalization behavior, masking, a small amount of TTS, and temporary physiological impacts (*e.g.,* change in respiration, change in heart rate). Importantly, the effects of the activities are expected to be sufficiently low-level and localized to specific areas as to not meaningfully impact important behaviors such as migratory behavior of North Atlantic right whales. These takes are expected to result in temporary behavioral reactions, such as slight displacement (but not abandonment) of migratory habitat or temporary cessation of feeding. Further, given these exposures are generally expected to occur to different individual right whales migrating through (*i.e.,* many individuals would not be impacted on more than 1 day in a year), and with some subset potentially being exposed on no more than a few days within the year, they are unlikely to result in energetic consequences that could affect reproduction or survival of any individuals.

Overall, NMFS expects that any behavioral harassment of North Atlantic right whales incidental to the specified activities would not result in changes to their migration patterns or foraging success, as only temporary avoidance of an area during construction is expected to occur. As described previously, North Atlantic right whales migrating through the Project Area are not expected to remain in this habitat for extensive durations, and any temporarily displaced animals would be able to return to or continue to travel through and forage in these areas once activities have ceased.

Although acoustic masking may occur in the vicinity of the foundation installation activities, based on the acoustic characteristics of noise associated with pile driving and drilling (*e.g.,* frequency spectra, short duration of exposure) and construction surveys (*e.g.,* intermittent signals), NMFS expects masking effects to be minimal (*e.g.,* effects of foundation installation) and for HRG surveys, would not appreciably occur given the directionality of the signals for the HRG survey equipment planned for use and the brief period for when an individual mammal would likely be exposed. In addition, masking would likely only occur during the period of time that a North Atlantic right whale is in the relatively close vicinity of pile driving, which is expected to be intermittent within a day, and confined to the months in which North Atlantic right whales are at lower densities and primarily moving through the area, anticipated mitigation effectiveness, and likely avoidance behaviors. TTS is another possible form of Level B harassment that could result in brief periods of slightly reduced hearing sensitivity, affecting behavioral patterns by making it more difficult to hear or interpret acoustic cues within the frequency range (and slightly above) of sound produced during impact pile driving. However, any TTS would likely be of low amount, limited duration, and limited to frequencies where most construction noise is centered (*i.e.,* below 2 kHz). NMFS expects that right whale hearing sensitivity would return to pre-exposure levels shortly after migrating through the area or moving away from the sound source.

As described in the ''Potential Effects to Marine Mammals and Their Habitat'' section of the proposed rule, the distance of the receiver to the source influences the severity of response, with greater distances typically eliciting less severe responses. NMFS recognizes North Atlantic right whales migrating could be pregnant females (in the fall) and mothers with older calves (in the spring) and that these animals may slightly alter their migration course in response to any foundation pile driving. However, as described in the ''Potential Effects to Marine Mammals and Their Habitat'' section of the proposed rule, we anticipate that course diversion would be of small magnitude. Hence, while some avoidance of the pile-driving activities may occur, we anticipate any avoidance behavior of migratory North Atlantic right whales would be similar to that of gray whales (Tyack *et al.,* 1983), on the order of hundreds of meters up to 1 to 2 km. This diversion from a migratory path otherwise uninterrupted by the Project's activities is not expected to result in meaningful energetic costs that would impact annual rates of recruitment of survival. NMFS expects that North Atlantic right whales would be able to avoid areas during periods of active noise production while not being forced out of this portion of their habitat.

North Atlantic right whale presence in the Project Area is year-round. However, abundance during summer months is lower compared to the winter months, with spring and fall serving as ''shoulder seasons'' wherein abundance waxes (fall) or wanes (spring). Given this year-round habitat usage, in recognition that where and when whales may actually occur during project activities is unknown as it depends on the annual migratory behaviors, NMFS is requiring a suite of mitigation measures designed to reduce impacts to North Atlantic right whales to the maximum extent practicable.

These mitigation measures (*e.g.,* seasonal/daily work restrictions, vessel separation distances, reduced vessel speed) would not only avoid the likelihood of vessel strikes but also would minimize the severity of behavioral disruptions by minimizing impacts (*e.g.,* through sound reduction using attenuation systems and reduced temporal overlap of project activities and North Atlantic right whales). This would further ensure that the number of takes by Level B harassment that are estimated to occur are not expected to affect reproductive success or survivorship by detrimental impacts to energy intake or cow/calf interactions during migratory transit. However, even in consideration of recent habitat-use and distribution shifts, Avangrid would still be installing foundations when the presence of North Atlantic right whales is expected to be lower.

As described in the Description of Marine Mammals in the Geographic Area section, Avangrid would be constructed within the North Atlantic right whale migratory corridor BIA, which represents areas and months within which a substantial portion of a species or population is known to migrate. The area over which North Atlantic right whales may be harassed is relatively small compared to the width of the migratory corridor. The width of the migratory corridor in this area is approximately 300 km while the width of the Lease Area, at the longest point, is approximately 50 km and the width of the ensonified area with the largest distance to Level B harassment for North Atlantic right whale during foundation installation (vibratory pile driving) is approximately 105 km from the westernmost point to easternmost point. North Atlantic right whales may be displaced from their normal path and preferred habitat in the immediate activity area primarily from pile-driving activities; however, we do not anticipate displacement to be of high magnitude (*e.g.,* beyond a few kilometers). Thereby, any associated bio-energetic expenditure is anticipated to be small. There are no known North Atlantic right whale feeding, breeding, or calving areas within the Project Area. Prey species are mobile (*e.g.,* calanoid copepods can initiate rapid and directed escape responses) and are broadly distributed throughout the Project Area (noting again that North Atlantic right whale prey is not particularly concentrated in the Project Area relative to nearby habitats). Therefore, any impacts to prey that may occur are also unlikely to impact North Atlantic right whales.

The most significant measure to minimize impacts to individual North Atlantic right whales during monopile installations is the seasonal moratorium on foundation installation for all piles from January 1 through April 30 (with no impact pile driving or drilling scheduled in December and no vibratory pile driving in May and December, though pile driving may occur in December if it is unavoidable and only upon approval from NMFS) when North Atlantic right whale abundance in the Project Area is expected to be highest. UXO/MEC detonations would also be restricted from December through May. NMFS also expects this measure to greatly reduce the potential for mother/calf pairs to be exposed to foundation installation noise above the Level B harassment threshold during their annual spring migration through the Project Area from calving grounds to primary foraging grounds (*e.g.,* Cape Cod Bay). NMFS expects that the severity of any take of North Atlantic right whales would be reduced due to the additional mitigation measures that would ensure that any exposures above the Level B harassment threshold would result in only short-term effects to individuals exposed.

Foundation installation and UXO/MEC detonation may only begin in the absence of North Atlantic right whales, as determined by visual and PAM. If foundation installation or UXO/MEC detonation has commenced, NMFS anticipates North Atlantic right whales would avoid the area, utilizing nearby waters to carry on pre-exposure behaviors. However, foundation installation must be shut down if a North Atlantic right whale is sighted at any distance, unless a shutdown is not feasible due to risk of injury or loss of life. Shutdown may occur anywhere if North Atlantic right whales are seen within or beyond the Level B harassment zone, further minimizing the duration and intensity of exposure. NMFS anticipates that if North Atlantic right whales go undetected and are exposed to foundation installation or UXO/MEC detonation noise, it is unlikely a North Atlantic right whale would approach the source location to the degree that they would purposely expose themselves to very high noise levels. These measures are designed to avoid PTS and also reduce the severity of Level B harassment, including the potential for TTS. While some TTS could occur, given the planned mitigation measures (*e.g.,* delay pile driving upon a sighting or acoustic detection and shutting down upon a sighting or acoustic detection), the potential for TTS to occur is low.

The clearance and shutdown measures are most effective when detection efficiency is maximized, as the measures are triggered by a visual or acoustic detection. To maximize detection efficiency, NMFS requires the combination of PAM and visual observers. NMFS is requiring communication protocols with other project vessels, and other heightened awareness efforts (*e.g.,* daily monitoring of North Atlantic right whale sighting databases) such that as a North Atlantic right whale approaches the source, and thereby could be exposed to higher noise energy levels, PSO detection efficacy would increase, the whale would be detected, and a delay to commencing foundation installation or shutdown (if feasible) would occur. In addition, the implementation of a soft-start for impact pile driving would provide an opportunity for whales to move away from the source if they are undetected, reducing their received levels. Further, Avangrid will not install pile foundations simultaneously. North Atlantic right whales would, therefore, not be exposed to concurrent impact pile driving on any given day and the area ensonified at any given time would be limited. The UXO/MEC detonations mitigation measures described above would further reduce the potential to be exposed to high received levels.

For HRG surveys, the maximum distance to the Level B harassment threshold is 178 m. The estimated take, by Level B harassment only, associated with HRG surveys is to account for any North Atlantic right whale sightings PSOs may miss when HRG acoustic sources are active. However, because of the short maximum distance to the Level B harassment isopleth (178 m), the requirement that vessels maintain a distance of 500 m from any North Atlantic right whales, the fact whales are unlikely to remain in close proximity to an HRG survey vessel for any length of time, and that the acoustic source would be shut down if a North Atlantic right whale is observed within 500 m of the source, any exposure to noise levels above the harassment threshold (if any) would be very brief. To further minimize exposures, ramp-up of sub-bottom profilers must be delayed during the clearance period if PSOs detect a North Atlantic right whale, or any other ESA-listed species, within 500 m of the acoustic source. With implementation of the mitigation requirements, take by Level A harassment is unlikely and, therefore, NMFS would not plan to authorize. Potential impacts associated with Level

B harassment would include low-level, temporary behavioral modifications, most likely in the form of avoidance behavior. Given the high level of precautions taken to minimize both the amount and intensity of Level B harassment on North Atlantic right whales, it is unlikely that the anticipated low-level exposures would lead to reduced reproductive success or survival.

As described above, no serious injury or mortality, or Level A harassment, of North Atlantic right whale is anticipated or may be authorized. Extensive North Atlantic right whale-specific mitigation measures beyond the robust suite required for all species are expected to further minimize the amount and severity of Level B harassment. Given the documented habitat use within the area, the majority of the individuals predicted taken (*i.e.,* no more than 126 instances of take, by Level B harassment, over the course of the 5-year rule, with an annual maximum of no more than 60 takes) would be impacted on only 1, or maybe 2, days in a year, and any impacts to North Atlantic right whales are expected to be in the form of lower-level behavioral disturbance. Given the magnitude and severity of the impacts discussed above, and in consideration of the required mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take, by Level B harassment only, anticipated and that may be authorized would have a negligible impact on the North Atlantic right whale.

Blue Whale

The blue whale, including the Western North Atlantic stock, is listed as Endangered under the ESA, and as both Depleted and Strategic under the MMPA. There are no known areas of specific biological importance in or around the project area, nor are there any UMEs. The actual abundance of the stock is likely significantly greater than what is reflected in each SAR because, as noted in the SARs, the most recent population estimates are primarily based on surveys conducted in U.S. waters and the stock's range extends well beyond the U.S. exclusive economic zone (EEZ). No serious injury or mortality is anticipated or may be authorized for this species.

The rule would allow for the authorization of up to 6 takes, by harassment only, over the 5-year period. The maximum annual allowable take by Level A harassment and Level B harassment, would be 1 and 2, respectively (combined, this annual take (n=3) equates to approximately 0.75 percent of the stock abundance, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HR surveys would be occurring). Based on the migratory nature of blue whales and the fact that there are neither feeding nor reproductive areas documented in or near the project area, and in consideration of the very low number of predicted annual takes, it is unlikely that the predicted instances of takes would represent repeat takes of any individual—in other words, each take likely represents one whale exposed on one day within a year.

With respect to the severity of those individual takes by behavioral Level B harassment, we would anticipate impacts to be limited to low-level, temporary behavioral responses with avoidance and potential masking impacts in the vicinity of the turbine installation to be the most likely type of response. Any potential PTS or TTS would be concentrated at half or one octave above the frequency band of pile driving noise (most sound is below 2 kHz) which does not include the full predicted hearing range of sei whales. Any hearing ability temporarily impaired from TTS is anticipated to return to pre-exposure conditions shortly after the exposures cease (*e.g.,* if the animal moves away or the source stops). Any avoidance of the project area due to the Project's activities would be expected to be temporary.

Given the magnitude and severity of the impacts discussed above, and in consideration of the proposed mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take (by harassment only) anticipated and that may be authorized would have a negligible impact on the Western North Atlantic stock of blue whales.

Fin Whale

The fin whale is listed as Endangered under the ESA, and the western North Atlantic stock is considered both Depleted and Strategic under the MMPA. No UME has been designated for this species or stock. No serious injury or mortality is anticipated or may be authorized for this species. Fin whales are present in the waters off of Massachusetts year-round and are one of the most frequently observed large whales and cetaceans in continental shelf waters, principally from Cape Hatteras in the Mid-Atlantic northward to Nova Scotia, Canada (Sergeant, 1977; Sutcliffe and Brodie, 1977; Cetacean and Turtle Assessment Program (CETAP), 1982; Hain *et al.,* 1992; Geo-Marine, 2010; BOEM, 2012; Edwards *et al.,* 2015; Hayes *et al.,* 2022).

The rule would allow for the authorization of up to 421 takes, by harassment only, over the 5-year period. The maximum annual allowable take by Level A harassment and Level B harassment, would be 21 and 201, respectively. Combined, this annual take (n=222) equates to approximately 3.26 percent of the stock abundance, if each take were considered to be of a different individual, with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HRG surveys would be occurring). Given the project overlaps a small portion of a fin whale feeding BIA (2,933 km^2) in the months the project will occur and that southern New England is generally considered a feeding area, it is likely that some subset of the individual whales exposed could be taken several times annually.

Level B harassment is expected to be in the form of behavioral disturbance, primarily resulting in avoidance of the Project Area where foundation installation is occurring, and some low-level TTS and masking that may limit the detection of acoustic cues for relatively brief periods of time. Any potential PTS would be minor (*i.e.,* limited to a few dB) and any TTS would be of short duration and concentrated at half or one octave above the frequency band of pile-driving noise with most sound below 2 kHz, which does not include the full predicted hearing range of fin whales.

Fin whales are present in the waters off of New England year-round and are one of the most frequently observed large whales and cetaceans in continental shelf waters, principally from Cape Hatteras, North Carolina in the Mid-Atlantic northward to Nova Scotia, Canada (Sergeant, 1977; Sutcliffe and Brodie, 1977; CETAP, 1982; Hain *et al.,* 1992; Geo-Marine, 2010; BOEM 2012; Edwards *et al.,* 2015; Hayes *et al.,* 2022). In the Project Area, fin whales densities are highest in the winter and summer months (Roberts *et al.,* 2023) though detections do occur in spring and fall (Watkins *et al.,* 1987; Clark and Gagnon, 2002; Geo-Marine, 2010; Morano *et al.,* 2012). However, fin whales feed more extensively in waters in the Great South Channel north to the

Gulf Maine into the Gulf of St. Lawrence, areas north and east of the Project Area (89 FR 5495, January 29, 2024).

As described previously in the proposed rule, the project area slightly overlaps a small fin whale feeding BIA that is active from March to October. Foundation installations and UXO/MEC detonations have seasonal work restrictions such that the temporal overlap between these project activities and the active BIA timeframe would exclude the months of March or April. We anticipate that if foraging is occurring in the Project Area and foraging whales are exposed to noise levels of sufficient strength, they would avoid the Project Area and move into the remaining area of the feeding BIA that would be unaffected to continue foraging without substantial energy expenditure or, depending on the time of year, travel to the larger year-round feeding BIA. Given the availability of other nearby feeding habitat, any impacts from any of the planned activities to feeding activities are not anticipated to have significant impacts on fin whale energetics or fitness.

Given the magnitude and severity of the impacts discussed above, including no more than 421 takes by harassment only over the course of the 5-year rule, and a maximum annual allowable take by Level A harassment and Level B harassment, of 21 and 201, respectively, and in consideration of the required mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take by harassment anticipated and that may be authorized will have a negligible impact on the western North Atlantic stock of fin whales.

Humpback Whale

The West Indies DPS of humpback whales is not listed as threatened or endangered under the ESA. However, as described in the Description of Marine Mammals in the Geographic Area, humpback whales along the Atlantic Coast have been experiencing an active UME as elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through Florida since January 2016. Of the cases examined, approximately 40 percent had evidence of human interaction (*i.e.,* vessel strike or entanglement). Despite the UME, the relevant population of humpback whales (the West Indies breeding population, or DPS of which the Gulf of Maine stock is a part) remains stable at approximately 12,000 individuals.

The rule would allow for the authorization of up to 301 takes by Level B harassment only over the 5-year period. No take by Level A harassment may be authorized. The maximum annual allowable take by Level A harassment and Level B harassment would be 18 and 134, respectively (this maximum annual take (n=152) equates to approximately 10.89 percent of the stock abundance, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HRG surveys would be occurring). Among the activities analyzed, foundation installation is likely to result in the highest amount of Level A harassment and Level B harassment annual take (*i.e.,* 17 and 126, respectively) of humpback whales.

A recent study examining humpback whale occurrence in the New York Bight area has shown that humpback whales exhibit extended occupancy (mean 37.6 days) in the Bight area and were likely to return from one year to the next (mean 31.3 percent). Whales were also seen at a variety of other sites in the New York Bight within the same year, suggesting that they may occupy this broader area throughout the feeding season. The majority of whales were seen during summer (July–September, 62.5 percent), followed by autumn (October–December, 23.5 percent), and spring (April–June, 13.9 percent) (Brown *et al.,* 2022). These data suggest that the 0 and 63 maximum annual instances of predicted takes by Level A harassment and Level B harassment, respectively, could consist of individuals exposed to noise levels above the harassment thresholds once during migration through the Project Area and/or individuals exposed on multiple days if they are utilizing the area as foraging habitat. The Lease Area, which is 321 km^2, comprises only a minor portion of the New York Bight area (43,388 km^2), and a few repeated takes of the same individuals would be unlikely to meaningfully impact the energetics of any individuals given the availability of favorable foraging habitat across the Bight.

For all the reasons described in the *Mysticetes* section above, we anticipate any potential PTS and TTS would be concentrated at one half or one octave above the frequency band of pile-driving noise (most sound is below 2 kHz), which does not include the full predicted hearing range of baleen whales. If TTS is incurred, hearing sensitivity would likely return to pre-exposure levels relatively shortly after exposure ends. Any masking or physiological responses would also be of low magnitude and severity for reasons described above.

Given the magnitude and severity of the impacts discussed above, including no more than 301 takes over the course of the 5-year rule, and a maximum annual allowable take by Level A harassment and Level B harassment of 18 and 134, respectively, and in consideration of the required mitigation measures and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take by harassment anticipated and may be authorized will have a negligible impact on the Gulf of Maine stock of humpback whales.

Minke Whale

Minke whales are not listed under the ESA, and the Canadian East Coast stock is neither considered depleted nor strategic under the MMPA. There are no known areas of specific biological importance in or adjacent to the Project Area. As described in the Description of Marine Mammals in the Geographic Area section, a UME has been designated for this species but is pending closure. No serious injury or mortality is anticipated or authorized for this species.

The rule would allow for the authorization of up to 1,193 takes, by harassment only, over the 5-year period. The maximum annual allowable take by Level A harassment and Level B harassment would be 90 and 508, respectively (combined, this annual take (n=598) equates to approximately 2.72 percent of the stock abundance, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HRG surveys would be occurring).

Minke whales are common offshore the U.S. Eastern Seaboard with a strong seasonal component in the continental shelf and in deeper, off-shelf waters (CETAP, 1982; Hayes *et al.,* 2022). In the Project Area, minke whales are predominantly migratory and their known feeding areas are to the north, including a feeding BIA in the southwestern Gulf of Maine and George's Bank. Therefore, they would be more likely to be moving through the Project Area, with each take representing a separate individual. However, it is possible that some subset

of the individual whales exposed could be taken up to a few times annually.

As described in the Description of Marine Mammals in the Geographic Area section, there is a UME for Minke whales, along the Atlantic coast from Maine through South Carolina, with highest number of deaths in Massachusetts, Maine, and New York, and preliminary findings in several of the whales have shown evidence of human interactions or infectious diseases. However, we note that the population abundance is greater than 21,000 and the take that may be authorized through this action is not expected to exacerbate the UME in any way.

We anticipate the impacts of this harassment to follow those described in the general *Mysticetes* section above. Any potential PTS would be minor (*i.e.,* limited to a few dB) and any TTS would be of short duration and concentrated at one half or one octave above the frequency band of pile-driving noise (most sound is below 2 kHz), which does not include the full predicted hearing range of minke whales. Level B harassment would be temporary, with primary impacts being temporary displacement of the Project Area but not abandonment of any migratory or foraging behavior.

Given the magnitude and severity of the impacts discussed above (including no more than 1,193 takes of the course of the 5-year rule, and a maximum annual allowable take by Level A harassment and Level B harassment, of 90 and 508, respectively), and in consideration of the required mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take by harassment anticipated and that may be authorized will have a negligible impact on the Canadian Eastern Coastal stock of minke whales.

Sei Whale

Sei whales are listed as Endangered under the ESA, and the Nova Scotia stock is considered both depleted and strategic under the MMPA. There are no known areas of specific biological importance in or adjacent to the Project Area and no UME has been designated for this species or stock. No serious injury or mortality is anticipated or may be authorized for this species.

The rule would allow for the authorization of up to 74 takes, by harassment only, over the 5-year period. The maximum annual allowable take by Level A harassment and Level B harassment would be 4 and 31, respectively (combined, this annual take (n=35) equates to approximately 0.56 percent of the stock abundance, if each take were considered to be of a different individual). Similar to other mysticetes, we would anticipate the number of takes to represent individuals taken only once or, in rare cases two or three times, as most whales in the Project Area would be migrating. To a small degree, sei whales may forage in the Project Area, although the currently identified foraging habitats (BIAs) are to the northeast of the area in which the specified activities would occur (LaBrecque *et al.,* 2015).

With respect to the severity of those individual takes by behavioral Level B harassment, we would anticipate impacts to be limited to low-level, temporary behavioral responses with avoidance and potential masking impacts in the vicinity of the turbine installation to be the most likely type of response. Any potential PTS and TTS would likely be concentrated at half or one octave above the frequency band of pile-driving noise (most sound is below 2 kHz), which does not include the full predicted hearing range of sei whales. Moreover, any TTS would be of a small degree. Any avoidance of the Project Area due to the Project's activities would be expected to be temporary.

Given the magnitude and severity of the impacts discussed above (including no more than 74 takes of the course of the 5-year rule, and a maximum annual allowable take by Level A harassment and Level B harassment of 4 and 31, respectively), and in consideration of the required mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take by harassment anticipated and that may be authorized will have a negligible impact on the Nova Scotia stock of sei whales.

Odontocetes

In this section, we include information that applies to all of the odontocete species and stocks addressed below. Odontocetes include dolphins, porpoises, and all other whales possessing teeth, and we further divide them into the following subsections: sperm whales, small whales and dolphins, and harbor porpoises. These subsections include more specific information, as well as conclusions, for each stock represented.

The takes that may be authorized for odontocetes are incidental to the specified activities. No serious injury or mortality may be authorized. We anticipate that, given ranges of individuals (*i.e.,* that some individuals remain within a small area for some period of time), and non-migratory nature of some odontocetes in general (especially as compared to mysticetes), a larger subset of these takes are more likely to represent multiple exposures of some number of individuals than is the case for mysticetes, though some takes may also represent one-time exposures to an individual. Foundation installation is likely to disturb odontocetes to the greatest extent, compared to UXO/MEC detonations and HRG surveys. While we do expect animals to avoid the area during foundation installation and UXO/MEC detonations, their habitat range is extensive compared to the area ensonified during these activities. In addition, UXO/MEC detonations are instantaneous; therefore, any disturbance would be very limited in time.

As described earlier, Level B harassment may include direct disruptions in behavioral patterns (*e.g.,* avoidance, changes in vocalizations (from masking) or foraging), as well as those associated with stress responses or TTS. Odontocetes are highly mobile species, and, similar to mysticetes, NMFS expects any avoidance behavior to be limited to the area near the sound source. Passive acoustic data show that odontocete foraging dives may be disrupted by exposure to loud sounds (Madsen *et al.,* 2006; Miller *et al.,* 2009; see ''Diving and Foraging'' in the proposed rule). However, as stated in the proposed rule, changes in dive behavior in response to noise exposure can vary widely and the changes may be a result of exposure to a sound source or a natural variation in behavior. As foraging behavior may be temporarily affected in the vicinity of the sound source (*e.g.,* reduced dive rates, temporary area avoidance), NMFS expects that foraging efforts would shift to other nearby foraging areas away from the sound source but does not expect this to occur for a long duration but be limited to when sound sources (*e.g.,* pile driving, near instantaneous UXO/MEC detonation) are active. We do not expect foraging to be appreciably reduced from HRG surveys given the minor nature of disturbance associated with the activity and evidence that some odontocete species do not appear disturbed at all from these surveys (*e.g.,* bow riding dolphins). While masking could also

occur during foundation installation (*e.g.,* to vocalizations, echolocation; see ''Vocalizations and Auditory Masking'' section in the proposed rule for a detailed discussion), it would only occur in the vicinity of and during the duration of the activity, and would not generally occur in a frequency range that overlaps most odontocete communication or any echolocation signals. The mitigation measures (*e.g.,* use of sound attenuation systems, implementation of clearance and shutdown zones) would also minimize received levels such that the severity of any behavioral response would be expected to be less than exposure to unmitigated noise exposure.

Any masking or TTS effects are anticipated to be of low severity. First, while the frequency range of pile driving, the most impactful planned activity in terms of response severity, falls within a portion of the frequency range of most odontocete vocalizations, odontocete vocalizations span a much wider range than the low frequency construction activities planned for the project. Also, as described above, recent studies suggest odontocetes have a mechanism to self-mitigate the impacts of noise exposure (*i.e.,* reduce hearing sensitivity), which could potentially reduce TTS impacts. Any masking or TTS is anticipated to be limited and would typically only interfere with communication within a portion of an odontocete's range and as discussed earlier, the effects would only be expected to be of a short duration and for TTS, a relatively small degree.

Furthermore, odontocete echolocation occurs predominantly at frequencies significantly higher than low frequency construction activities. Therefore, there is little likelihood that threshold shift would interfere with feeding behaviors. For HRG surveys, the sources operate at higher frequencies than foundation installation activities and UXO/MEC detonations. However, sounds from these sources attenuate very quickly in the water column, as described above. Therefore, any potential for PTS and TTS and masking is very limited. Further, odontocetes (*e.g.,* common dolphins, spotted dolphins, and bottlenose dolphins) have demonstrated an affinity to bow-ride actively surveying HRG surveys. Therefore, the severity of any harassment, if it does occur, is anticipated to be minimal based on the lack of avoidance previously demonstrated by these species.

The waters off the coast of Massachusetts are used by several odontocete species. However, none except the sperm whale are listed under the ESA, and there are no known habitats of particular importance. In general, odontocete habitat ranges are far-reaching along the Atlantic coast of the United States, and the waters off of Massachusetts, including the Project Area, do not contain any particularly unique odontocete habitat features.

Sperm Whale

Sperm whales are listed as endangered under the ESA, and the North Atlantic stock is considered both Depleted and Strategic under the MMPA. The North Atlantic stock spans the East Coast out into oceanic waters well beyond the U.S. EEZ. Although listed as endangered, the primary threat faced by the sperm whale across its range (*i.e.,* commercial whaling) has been eliminated. Current potential threats to the species globally include vessel strikes, entanglement in fishing gear, anthropogenic noise, exposure to contaminants, climate change, and marine debris. There is no currently reported trend for the stock and, although the species is listed as endangered under the ESA, there are no current related issues or events associated with the status of the stock that cause particular concern (*e.g.,* no UMEs). There are no known areas of biological importance (*e.g.,* critical habitat or BIAs) in or near the Project Area. No mortality or serious injury is anticipated or may be authorized for this species.

The rule would allow for the authorization of up to 2 takes by Level A harassment and 108 takes by Level B harassment (n=110), over the 5-year period. No serious injury or mortality may be authorized. The maximum annual allowable take by Level A harassment would be 1 and Level B harassment would be 57, which equates to approximately 0.98 percent of the stock abundance, if each take were considered to be of a different individual, with lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HRG surveys would be occurring). Given sperm whale's preference for deeper waters, especially for feeding, it is unlikely that individuals will remain in the Project Area for multiple days, and therefore, the estimated takes likely represent exposures of different individuals on 1 day annually.

If sperm whales are present in the Project Area during any Project activities, they will likely be only transient visitors and not engaging in any significant behaviors. Further, the potential for TTS is low for reasons described in the general *Odontocetes* section, but if it does occur, any hearing shift would be small and of a short duration. Because whales are not expected to be foraging in the Project Area, neither direct behavioral disturbance nor TTS are not expected to interfere with foraging behavior. The most likely impact would be avoidance of the ensonified areas around the activities during the time that the activities are occurring.

Given the magnitude and severity of the impacts discussed above (*i.e.,* no more than 2 takes by Level A harassment and 108 takes by Level B harassment, over the course of the 5-year rule, and a maximum annual allowable take of 58), and in consideration of the required mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take by harassment anticipated and that may be authorized will have a negligible impact on the North Atlantic stock of sperm whales.

Dolphins and Small Whales (Including Delphinids)

The twenty-six species and stocks included in this group (which are indicated in table 2 in the Delphinidae, Ziphiidae, and Kogiidae families) are not listed under the ESA, however, pantropical spotted dolphins and spinner dolphins are listed as Depleted under the MMPA and Short-finned pilot whales are listed as Strategic under the MMPA. The remaining species are not listed as depleted or strategic under the MMPA. There are no known areas of specific biological importance in or around the project area for any of these species, nor has a UME been designated for any. No serious injury or mortality is anticipated or may be authorized for these species.

The eighteen delphinid species with take that may be authorized for the Project are Atlantic spotted dolphin, Atlantic white-sided dolphin, bottlenose dolphin, Clymene dolphin, common dolphin, long-finned pilot whale, short-finned pilot whale, Risso's dolphin, false killer whale, Fraser's dolphin, killer whale, melon-headed whale, pantropical spotted dolphin, pygmy killer whale, rough-toothed dolphin, spinner dolphin, striped dolphin, and white-beaked dolphin.

Many of these delphinid species are rare for the project area, with preferred habitat at much deeper water depths or different water temperatures than what are found within the project area. For instance, the Clymene dolphin, false killer whale, Fraser's dolphin, melon-

headed whale, pantropical spotted dolphin, pygmy killer whale, rough-toothed dolphin, and spinner dolphin prefer tropical to subtropical waters but have, on occasion, been sighted in deep waters at or beyond the continental shelf break in the New England area during the summer months (Hayes *et al.,* 2019; Hayes *et al.,* 2020). Striped dolphins are found in warm-temperate to tropical waters but prefer continental slope waters offshore to the Gulf Stream, when in the New England area they have only been sighted at water depths deeper than 900 m (Hayes *et al.,* 2020). White-beaked dolphins prefer colder waters and are found more northerly than the project area in the western Gulf of Maine and around Cape Cod (Hayes *et al.,* 2020). Killer whales, a rarity in the New England area, prefer much deeper and colder waters than those in the New England area (Waring *et al.,* 2015).

For seventeen of the Delphinid species, the rule would allow for the authorization of up to between 10 and 3,543 takes (depending on species), by harassment only, over the 5-year period. The maximum annual allowable take for these species by Level A harassment and Level B harassment, would range from 0 to 1 and 5 to 2,067, respectively, (combined, this annual take (*n*=5 to 2,068) equates to approximately 0.1 to 3.20 percent of the stock abundance, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HR surveys would be occurring).

For common dolphins, the eighteenth of the delphinid species, the rule would allow for the authorization of up to 46,761 takes, by harassment only, over the 5-year period. The maximum annual allowable take by Level A harassment is 1 and by Level B harassment is 26,572 (combined, this annual take (*n*=26,573) equates to approximately to 28.54 percent of the stock abundance, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HR surveys would be occurring). Given both the comparatively higher number of takes and the higher number of takes relative to the stock abundance, as well as the residential tendencies of this species, while some of the takes likely represent exposures of different individuals on 1 or 2 days a year, it is likely that some subset of the individuals exposed could be taken several times annually. As described above for odontocetes broadly, given the comparatively higher number of estimated takes for some species and the behavioral patterns of odontocetes, we anticipate that a fair number of these instances of take in a day represent multiple exposures of a smaller number of individuals, meaning the actual number of individuals taken is lower. Although some amount of repeated exposure to some individuals is likely given the duration of activity planned for the specified activities, the intensity of any Level B harassment combined with the availability of alternate nearby foraging habitat suggests that the likely impacts would not impact the reproduction or survival of any individuals.

For Atlantic white-sided dolphin and Bottlenose dolphin, given the relatively higher number of takes and as compared to the abundance, while many of the takes likely represent exposures of different individuals on one day a year, some subset of the individuals exposed could be taken up to a few times annually. For the remaining Delphinids, given they are considered rare or uncommon in the area, it is unlikely that individuals would remain in the project area for multiple days, and therefore the estimated takes likely represent exposures of different individuals on one day each annually.

The six Ziphiidae species with take that may be authorized for the Project are Cuvier's beaked whale, Blainville's beaked whale, Gervais' beaked whale, Sowerby's beaked whale, True's beaked whale, and Northern bottlenose whale. The two species of Kogiidae with take that may be authorized for the Project are the dwarf sperm whale and pygmy sperm whale. These species are rare for the project area and prefer habitat at much deeper water depths than what are found within the project area. For instance, the beaked whales and Kogiidae species have been sighted in deep waters at or beyond the continental shelf break in the New England area (Hayes *et al.,* 2020). The Northern bottlenose whales are extremely uncommon or rare in waters of the U.S and are rarely in waters less than 2,000 m deep (Waring *et al.,* 2015). For these eight species, the rule would allow for the authorization of up to between 6 and 8 takes for each species, by harassment only, over the 5-year period. The maximum annual allowable take for these species by Level A harassment and Level B harassment, would range from 0 to 2 and 2 to 4, respectively (combined, this annual take (*n*= 3 to 4) equates to approximately <0.1 percent of the stock abundance for each species, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HR surveys would be occurring). Given this species is considered rare in the area and prefers deeper waters, especially for feeding, it is unlikely that individuals would remain in the project area for multiple days, and therefore the estimated takes likely represent exposures of different individuals on one day each annually.

The number of takes, likely movement patterns of the affected species, and the intensity of any Level A or B harassments, combined with the availability of alternate nearby foraging habitat suggests that the likely impacts would not impact the fitness, reproduction or survival of any individuals. Some species, such as the common dolphin, are gregarious in nature (*i.e.,* travel in large groups) with high densities in the project area, which results in a relatively higher amount of take. While delphinids may be taken on several occasions, none of these species are known to have small home ranges within the project area or known to be particularly sensitive to anthropogenic noise. The potential for PTS in dolphins and small whales is very low and, if PTS does occur, would occur to a limited number of individuals, be of small degree, and would be limited to the frequency ranges of the activity which does not span across most of their hearing range. Some TTS can also occur but, again, it would be limited to the frequency ranges of the activity and any loss of hearing sensitivity is anticipated to return to pre-exposure conditions shortly after the animals move away from the source or the source ceases.

Beaked whales are known to be particularly sensitive to anthropogenic noise (*e.g.,* Southall *et al.,* 2017; Clowewiak *et al.,* 2017); however, the project area does not contain primary beaked whale habitat and only two to three groups of beaked whales could be harassed by Project activities. Further, beaked whales are deep diver foragers and the shallow-water project area does not contain suitable beaked whale foraging habitat. Hence, no foraging impacts are anticipated.

Given the magnitude and severity of the impacts discussed above, and in consideration of the proposed mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take (by harassment only) that may be authorized would have a negligible

impact on all of the species and stocks addressed in this section.

Harbor Porpoise

Harbor porpoises are not listed as Threatened or Endangered under the ESA, and the Gulf of Maine/Bay of Fundy stock is neither considered depleted or strategic under the MMPA. The stock is found predominantly in northern United States coastal waters, at less than 150 m depth and up into Canada's Bay of Fundy, between New Brunswick and Nova Scotia. Although the population trend is not known, there are no current related issues or events associated with the status of the stock that cause particular concern (*e.g.,* no UMEs).

The rule would allow for the authorization of up to 2,468 takes, by harassment only, over the 5-year period. The maximum annual allowable take by Level A harassment and Level B harassment would be 67 and 1,119, respectively (combined, this annual take (*n*=1,186) equates to approximately 1.38 percent of the stock abundance, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HRG surveys would be occurring). Given the number of takes, while many of the takes likely represent exposures of different individuals on 1 day a year, some subset of the individuals exposed could be taken up to a few times annually. No serious injury or mortality may be authorized.

Regarding the severity of takes by Level B harassment, because harbor porpoises are particularly sensitive to noise, it is likely that a fair number of the responses could be of a moderate nature, particularly to pile driving. In response to pile driving, harbor porpoises are likely to avoid the area during construction, as previously demonstrated in Tougaard *et al.* (2009) in Denmark, in Dahne *et al.* (2013) in Germany, and in Vallejo *et al.* (2017) in the United Kingdom, although a study by Graham *et al.* (2019) may indicate that the avoidance distance could decrease over time. However, foundation installation is scheduled to occur off the coast of Massachusetts and, given alternative foraging areas, any avoidance of the area by individuals is not likely to impact the reproduction or survival of any individuals.

With respect to PTS and TTS, the effects on an individual are likely relatively low given the frequency bands of pile driving (most energy below 2 kHz) compared to harbor porpoise hearing (150 Hz to 160 kHz peaking around 40 kHz). Specifically, TTS is unlikely to impact hearing ability in their more sensitive hearing ranges, or the frequencies in which they communicate and echolocate. We expect any PTS that may occur to be within the very low end of their hearing range where harbor porpoises are not particularly sensitive and any PTS would be of small magnitude. As such, any PTS would not interfere with key foraging or reproductive strategies necessary for reproduction or survival.

As discussed in the draft 2023 SARs (89 FR 5495, January 29, 2024), harbor porpoises are seasonally distributed. During fall (October–December) and spring (April–June), harbor porpoises are widely dispersed from New Jersey to Maine, with lower densities farther north and south. During winter (January to March), intermediate densities of harbor porpoises can be found in waters off New Jersey to North Carolina, and lower densities are found in waters off New York to New Brunswick, Canada. In non-summer months they have been seen from the coastline to deep waters (*i.e.,* >1800 m; Westgate *et al.,* 1998), although the majority are found over the continental shelf. While harbor porpoises are likely to avoid the area during any of the Project's construction activities, as demonstrated during European wind farm construction, the time of year in which work would occur is when harbor porpoises are not in highest abundance, and any work that does occur would not result in the species' abandonment of the waters off of Massachusetts.

Given the magnitude and severity of the impacts discussed above, and in consideration of the required mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take by harassment anticipated and that may be authorized will have a negligible impact on the Gulf of Maine/Bay of Fundy stock of harbor porpoises.

Phocids (Harbor Seals, Gray Seals, and Harp Seals)

The harbor seal, gray seal, harp seal, and hooded seal are not listed under the ESA, and neither the western North Atlantic stock of gray seal, western North Atlantic stock of harp seal, nor the western North Atlantic stock of harbor seal are considered depleted or strategic under the MMPA. There are no known areas of specific biological importance in or around the Project Area. As described in the Description of Marine Mammals in the Geographic Area section, a UME has been designated for harbor seals and gray seals and is described further below. No serious injury or mortality is anticipated or may be authorized for these species.

For the four seal species, the rule would allow for the authorization of up to between 2 and 4,077 takes for each species by harassment only over the 5-year period. The maximum annual allowable take for these species by Level A harassment and Level B harassment, respectively, would be 0 and 1 (hooded seals), 18 and 1,301 (harbor seals), 9 and 1,537 (gray seal), and 9 to 2,013 (harp seals) (this annual take equates to approximately <0.1 percent of the stock abundance for harp seals, 5.54 percent of the stock abundance for gray seals, and 2.15 percent of the stock abundance for harbor seals). The population abundance of hooded seal is unknown but, considering that no more than one hooded seal would be taken by Level B harassment annually, it would be reasonable to assume this would constitute a small percentage of the stock. For the four species, if each take were considered to be of a different individual), with far lower numbers than that expected in the years without foundation installation (*e.g.,* years when only HRG surveys would be occurring). Though gray seals, harbor seals, and harp seals are considered migratory and no specific feeding areas have been designated in the area, the higher number of takes relative to the stock abundance suggests that while some of the takes likely represent exposures of different individuals on 1 day a year, it is likely that some subset of the individuals exposed could be taken several times annually. For hooded seals, given this species is considered rare in the area, it is unlikely that individuals would remain in the project area for multiple days, and therefore the estimated takes likely represent exposures of different individuals on one day each annually.

Harbor, gray, and harp seals occur in Massachusetts waters most often in winter (December through May), when most foundation installation and UXO/MEC detonations would not occur due to seasonal restrictions on conducting these activities). Seals are also more likely to be close to shore (*e.g.,* closer to the edge of the area ensonified above NMFS' harassment threshold), such that exposure to foundation installation would be expected to be at comparatively lower levels. Take of these species is noise from pile driving, drilling, UXO/MEC detonations, and HRG surveys.

There are no gray seal pupping colonies or known haul-out sites near

the Project Area, although gray seals may haul out at known harbor seal haul out sites. The nearest known gray seal pupping sites are greater than 100 nautical miles (nmi) (185 km) away, at Muskeget Island in the Nantucket Sound, Monomoy National Wildlife Refuge, and in eastern Maine (Rough, 1995). Known haul out locations are located closer to Monomoy Refuge and on Nantucket in Massachusetts (Kenney and Vigness-Raposa, 2010). Harbor seals have the potential to occur in areas adjacent to the export cable corridors and landfall sites. Although there are no known harbor seal haul outs in the Project Area, harbor seals occur throughout the Massachusetts coastline and have the potential to haul out at many beach sites. As the closest documented pinniped haul out sites are located further than 150 km away from the Project Area, NMFS does not expect any harassment to occur and would not plan to authorize any take from in-air impacts on hauled-out seals.

As described in the ''Potential Effects to Marine Mammals and Their Habitat'' section in the proposed rule, construction of wind farms in Europe resulted in pinnipeds temporarily avoiding construction areas but returning within short time frames after construction was complete (Carroll *et al.,* 2010; Hamre *et al.,* 2011; Hastie *et al.,* 2015; Russell *et al.,* 2016; Brasseur *et al.,* 2010). Effects on pinnipeds that are taken by Level B harassment in the Project Area would likely be limited to reactions such as avoidance in the form of increased swimming speeds, increased surfacing time, or decreased foraging (if such activity were occurring). Most likely, individuals would simply move away from the sound source and be temporarily displaced from those areas (Lucke *et al.,* 2006; Edren *et al.,* 2010; Skeate *et al.,* 2012; Russell *et al.,* 2016). Given the low anticipated magnitude of impacts from any given exposure (*e.g.,* temporary avoidance), even repeated Level B harassment across a few days of some small subset of individuals, is unlikely to result in impacts on the reproduction or survival of any individuals. Moreover, pinnipeds would benefit from the mitigation measures described in 50 CFR part 217.

As described above, noise from UXO/MEC detonation is low frequency and, while any PTS and TTS that does occur would fall within the lower end of pinniped hearing ranges (50 Hz to 86 kHz), PTS and TTS would not occur at frequencies where pinniped hearing is most sensitive. In summary, any PTS and TSS would be of small degree and not occur across the entire, or even most sensitive, hearing range. Hence, any impacts from PTS and TTS are likely to be of low severity and not interfere with behaviors critical to reproduction or survival.

For harbor seals, the population abundance is over 61,000 and the annual mortality/serious injury (M/SI; 339) for the seals is well below PBR (*i.e.,* 1,729) (89 FR 5495, January 29, 2024). The population abundance for gray seals in the United States is over 27,000, with an estimated overall abundance, including seals in Canada, of approximately 366,400 (89 FR 5495, January 29, 2024). In addition, the abundance of gray seals is likely increasing in the U.S. Atlantic, as well as in Canada (89 FR 5495, January 29, 2024). For harp seals and hooded seals, for which there is no recent UME, the total U.S. fishery-related mortality and serious injury for this stock is very low relative to the stock size and can be considered insignificant and approaching zero mortality and serious injury rate (Hayes *et al.,* 2019; Hayes *et al.,* 2022). The harp seal stock abundance appears to have stabilized (Hayes *et al.,* 2022).

Given the magnitude and severity of the impacts from the specified activities discussed above, and in consideration of the required mitigation and other information presented, the specified activities are not expected to result in impacts on the reproduction or survival of any individuals, much less affect annual rates of recruitment or survival. For these reasons, we have determined that the take by harassment anticipated and may be authorized will have a negligible impact on harbor, gray, harp, and hooded seals.

Negligible Impact Determination

No mortality or serious injury is anticipated to occur or may be authorized. As described in the analysis above, the impacts resulting from the Project's activities cannot be reasonably expected to, and are not reasonably likely to, adversely affect any of the species or stocks through effects on annual rates of recruitment or survival. 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 required mitigation and monitoring measures, NMFS finds that the marine mammal take from all of the specified activities combined will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

As noted above, only small numbers of incidental take may be authorized under sections 101(a)(5)(A) and (D) of the MMPA for specified activities other than military readiness activities. The MMPA does not define small numbers; therefore, in practice, and where estimated numbers are available, NMFS compares the number of individuals estimated to be 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 less 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.

NMFS may authorize incidental take by Level A harassment and/or Level B harassment of 38 species of marine mammals (with 38 managed stocks). The maximum number of instances of takes by combined Level A harassment and Level B harassment possible within any one year relative to the best available population abundance is less than one-third for all species and stocks potentially impacted. Unless otherwise noted, the small numbers analysis conservatively assumes each take occurs to a different individual in the population.

For 28 stocks, less than 6 percent of the stock abundance may be authorized for take by harassment under this final rule. Specific to the North Atlantic right whale, the maximum amount of take reasonably likely to occur per year, which is by Level B harassment only, is 60, or 17.65 percent of the stock abundance, assuming that each instance of take represents a different individual. Please see table 35 for information relating to this small numbers analysis.

For seven species, there are no current abundance estimates available; hence the percentage of the population taken is unknown. However, these constitute rare species and only a small amount of take may be authorized each year under this final rule. For three of these species, no more than five takes per year may be authorized under this final rule (hooded seal, pygmy killer whale, and northern bottlenose whale). For the melon-headed whale, Fraser's dolphin, and killer whale, a maximum of 109, 192, and 10, respectively, takes are allowed under this final rule, based on the prediction that a group may be encountered up to a few times during

the activity and representing approximately one to three average group sizes. Hence, the amount of take for all rare species with unknown populations can reasonably be considered a small number.

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

Unmitigable Adverse Impact Analysis and Determination

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

Classification

Endangered Species Act

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

This final rule allows for the take of five marine mammal species listed under the ESA: the North Atlantic right, blue, sei, fin, and sperm whale. The Permit and Conservation Division requested initiation of section 7 consultation with NMFS GARFO on May 9, 2023 for the promulgation of the rulemaking. NMFS GARFO issued a BiOp on February 16, 2024, concluding that the promulgation of the rule and issuance of LOAs thereunder is not likely to jeopardize the continued existence of threatened and endangered species under NMFS' jurisdiction and is not likely to result in the destruction or adverse modification of designated or proposed critical habitat. The BiOp is available at *https://repository.library.noaa.gov/view/noaa/60610.*

Avangrid is required to abide by the promulgated regulations, as well as the reasonable and prudent measure and terms and conditions of the BiOp and Incidental Take Statement, as issued by NMFS.

National Environmental Policy Act

To comply with NEPA (42 U.S.C. 4321 *et seq.*) and the NOAA Administrative Order 216–6A, NMFS must evaluate our proposed action (*i.e.,* promulgation of regulation) and alternatives with respect to potential impacts on the human environment. NMFS participated as a cooperating agency on the BOEM 2024 Final EIS (FEIS), which was finalized on March 1, 2024, and is available at: *https://www.boem.gov/renewable-energy/state-activities/new-england-wind-formerly-vineyard-wind-south.* In accordance with 40 CFR 1506.3, NMFS independently reviewed and evaluated the 2024 New England Wind FEIS and determined that it is adequate and sufficient to meet our responsibilities under NEPA for the promulgation of this rule and issuance of the associated LOA. NMFS, therefore, has adopted the 2024 New England Wind FEIS through a joint Record of Decision (ROD) with BOEM. The joint ROD for adoption of the 2024 New England Wind FEIS and promulgation of this final rule and subsequent issuance of a LOA can be found at: *https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act.*

Executive Order 12866

The Office of Management and Budget (OMB) has determined that this rule is not significant for purposes of Executive Order 12866.

Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), the Chief Counsel for Regulation of the Department of Commerce has certified to the Chief Counsel for Advocacy of the Small Business Administration during the proposed rule stage that this action would not have a significant economic impact on a substantial number of small entities. The factual basis for the certification was published in the proposed rule and is not repeated here. No comments were received regarding this certification. As a result, a regulatory flexibility analysis was not required and none was prepared.

Paperwork Reduction Act

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 unless that collection of information displays a currently valid OMB control number. These requirements have been approved by OMB under control number 0648–0151 and include applications for regulations, subsequent LOA, and reports. Send comments regarding any aspect of this data collection, including suggestions for reducing the burden, to NMFS.

Coastal Zone Management Act

The Coastal Zone Management Act requires that any applicant for a required Federal license or permit to conduct an activity, within the coastal zone or within the geographic location descriptions (*i.e.,* areas outside the coastal zone in which an activity would have reasonably foreseeable coastal effects), affecting any land or water use or natural resource of the coastal zone be consistent with the enforceable policies of a state's federally approved coastal management program. As required, in June 2022, Park City Wind (now Avangrid) submitted a Federal consistency certification to Massachusetts Coastal Zone Management's (MA CZM) and to the Rhode Island Coastal Resources Management Council (CRMC) for approval of the COP by BOEM and the issuance of an Individual Permit by United States Army Corps of Engineers, under sections 10 and 14 of the Rivers and Harbors Act and section 404 of the Clean Water Act (15 CFR part 930, subpart E).

NMFS determined that Avangrid's application for MMPA ITRs is an unlisted activity under the State of New York's coastal management program and, thus, is not subject to Federal consistency requirements in the absence of the receipt and prior approval of an unlisted activity review request from the State by the Director of NOAA's Office for Coastal Management. Pursuant to 15 CFR 930.54, NMFS published a NOR for the application in the **Federal Register** on August 22, 2022 (87 FR 51345), and published the proposed rule on June 8, 2023 (88 FR 37606). The states of Massachusetts and Rhode Island did not request approval from the Director of NOAA's Office for Coastal Management to review the application as an unlisted activity, and the time period for making such request has expired. Therefore, NMFS has determined the ITA is not subject to Federal consistency review.

List of Subjects in 50 CFR Part 217

Administrative practice and procedure, Endangered and threatened species, Fish, Fisheries, Marine mammals, Penalties, Reporting and recordkeeping requirements, Wildlife.

Dated: May 28, 2024.

Samuel D. Rauch III,

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

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 GG, consisting of §§ 217.320 through 217.329, to read as follows:

Subpart GG—Taking Marine Mammals Incidental to the New England Wind Project Offshore of Massachusetts

Sec.

Subpart GG—Taking Marine Mammals Incidental to the New England Wind Project Offshore of Massachusetts

§ 217.320 Specified activity and specified geographical region.

(a) Regulations in this subpart apply only to activities associated with Phase 1 and Phase 2 of the New England Wind project (hereafter referred to as the ''Project'') developed by Avangrid Renewables, LLC, and its successors or assigns (hereafter referred to as the ''LOA Holder''), and those persons it authorizes or funds to conduct activities on its behalf in the area outlined in paragraph (b) of this section. Requirements imposed on LOA Holder must be implemented by those persons it authorizes or funds to conduct activities on its behalf.

(b) The specified geographical region is the Mid-Atlantic Bight, defined as waters from Cape Hatteras, North Carolina to Cape Cod, Massachusetts and extending into the west Atlantic to the 100-m isobath, and includes, but it not limited to, the Bureau of Ocean Energy Management (BOEM) Lease Area Outer Continental Shelf (OCS)-A 0534, OCS–A 0561, and portions of OCS–A 0501 Commercial Lease of Submerged Lands for Renewable Energy Development, along export cable routes, and at the sea-to-shore transition points in Barnstable County, Massachusetts.

(c) The specified activities are impact pile driving, vibratory pile driving, and drilling of wind turbine generator (WTG) and electrical service platform (ESP) foundations; high-resolution geophysical (HRG) site characterization surveys; detonation of unexploded ordnances (UXOs) or munitions and explosives of concern (MECs); fisheries and benthic monitoring surveys; placement of scour protection; trenching, laying, and burial activities associated with the installation of the export cable from the ESP(s) to shore based converter stations and inter-array cables between WTG foundations; vessel transit within the specified geographical region to transport crew, supplies, and materials; and WTG operations.

§ 217.321 Effective dates.

Regulations in this subpart are effective from March 27, 2025, through March 26, 2030.

§ 217.322 Permissible methods of taking.

Under a Letter of Authorization (LOA) issued pursuant to § 216.106 of this chapter and § 217.326 or § 217.327, LOA Holder, and those persons it authorizes or funds to conduct activities on its behalf, may incidentally, but not intentionally, take marine mammals within the area described in § 217.320(b) in the following ways, provided LOA Holder is in complete compliance with all terms, conditions, and requirements of the regulations in this subpart and the appropriate LOA:

(a) By Level B harassment associated with the acoustic disturbance of marine mammals by impact and vibratory pile driving and drilling (foundation installation), UXO/MEC detonations, and HRG site characterization surveys;

(b) By Level A harassment associated with the acoustic disturbance of marine mammals by impact pile driving of WTG and ESP foundations and UXO/MEC detonations;

(c) Take by mortality or serious injury of any marine mammal species is not authorized; and

(d) The incidental take of marine mammals by the activities listed in paragraphs (a) and (b) of this section is limited to the following species:

TABLE 1 TO PARAGRAPH (d)

Marine mammal species	Scientific name	Stock
Atlantic spotted dolphin	*Stenella frontalis*	Western North Atlantic.
Atlantic white-sided dolphin	*Lagenorhynchus acutus*	Western North Atlantic.
Blainsville's beaked whale	*Mesoplodon densirostris*	Western North Atlantic.
Blue whale	*Balaenoptera musculus*	Western North Atlantic.
Bottlenose dolphin	*Tursiops truncatus*	Western North Atlantic, offshore.
Clymene dolphin	*Stenella clymene*	Western North Atlantic.
Cuvier's beaked whale	*Ziphius cavirostris*	Western North Atlantic.
Dwarf sperm whale	*Kogia sima*	Western North Atlantic.
False killer whale	*Pseudorca crassidens*	Western North Atlantic.
Fin whale	*Balaenoptera physalus*	Western North Atlantic.
Fraser's dolphin	*Lagenodelphis hosei*	Western North Atlantic.
Gervais' beaked whale	*Mesoplodon europaeus*	Western North Atlantic.
Gray seal	*Halichoerus grypus*	Western North Atlantic.
Harbor porpoise	*Phocoena phocoena*	Gulf of Maine/Bay of Fundy.
Harbor seal	*Phoca vitulina*	Western North Atlantic.
Harp seal	*Pagophilus groenlandicus*	Western North Atlantic.
Hooded seal	*Cystophora cristata*	Western North Atlantic.
Humpback whale	*Megaptera novaeangliae*	Gulf of Maine
Killer whale	*Orcinus orca*	Western North Atlantic.
Long-finned pilot whale	*Globicephala melas*	Western North Atlantic.
Melon-headed whale	*Peponocephala electra*	Western North Atlantic.
Minke whale	*Balaenoptera acutorostrata*	Canadian Eastern Coastal.
North Atlantic right whale	*Eubalaena glacialis*	Western North Atlantic.
Northern bottlenose whale	*Hyperoodon ampullatus*	Western North Atlantic.

TABLE 1 TO PARAGRAPH (d)—Continued

Marine mammal species	Scientific name	Stock
Pantropical spotted dolphin	*Stenella attenuata*	Western North Atlantic.
Pygmy killer whale	*Feresa attenuata*	Western North Atlantic.
Pygmy sperm whale	*Kogia breviceps*	Western North Atlantic.
Risso's dolphin	*Grampus griseus*	Western North Atlantic.
Rough-toothed dolphin	*Steno bredanensis*	Western North Atlantic.
Sei whale	*Balaenoptera borealis*	Nova Scotia.
Short-beaked common dolphin	*Delphinus delphis*	Western North Atlantic.
Short-finned pilot whale	*Globicephala macrorhynchus*	Western North Atlantic.
Sowerby's beaked whale	*Mesoplodon bidens*	Western North Atlantic.
Sperm whale	*Physeter macrocephalus*	Western North Atlantic.
Spinner dolphin	*Stenella longirostris*	Western North Atlantic.
Striped dolphin	*Stenella coeruleoalba*	Western North Atlantic.
True's beaked whale	*Mesoplodon mirus*	Western North Atlantic.
White-beaked dolphin	*Lagenorhynchus albirostris*	Western North Atlantic.

§ 217.323 Prohibitions.

Except for the takings described in § 217.322 and authorized by a LOA issued under § 217.326 or § 217.327, it is unlawful for any person to do any of the following in connection with the activities described in this subpart:

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

(b) Take any marine mammal not specified in § 217.322(d);

(c) Take any marine mammal specified in § 217.322(d) in any manner other than as specified in § 217.322(a) and (b); or

(d) Take any marine mammal specified in § 217.322(d), after NMFS Office of Protected Resources determines such taking results in more than a negligible impact on the species or stocks of such marine mammals.

§ 217.324 Mitigation requirements.

When conducting the specified activities in the specified geographical region, LOA Holder must implement the following mitigation measures contained in this section and any LOA issued under §§ 217.326 and 217.327. These mitigation measures include, but are not limited to:

(a) *General conditions.* LOA Holder must comply with the following general measures:

(1) A copy of any issued LOA must be in the possession of LOA Holder and its designees, all vessel operators, visual protected species observers (PSOs), passive acoustic monitoring (PAM) operators, pile driver operators, and any other relevant designees operating under the authority of the issued LOA;

(2) LOA Holder must conduct training for construction, survey, and vessel personnel and the marine mammal monitoring team (PSO and PAM operators) prior to the start of all in-water construction activities in order to explain responsibilities, communication procedures, marine mammal detection and identification, mitigation, monitoring, and reporting requirements, safety and operational procedures, and authorities of the marine mammal monitoring team(s). This training must be repeated for new personnel who join the work during the project. A description of the training program must be provided to NMFS at least 60 days prior to the initial training before in-water activities begin. Confirmation of all required training must be documented on a training course log sheet and reported to NMFS Office of Protected Resources prior to initiating project activities;

(i) A copy of the Marine Mammal Monitoring Plan must be made available on all vessels and staffed platforms. A simple guide must be included with the Marine Mammal Monitoring Plan to aid personnel in identifying species if they are observed in the vicinity of the project area.

(ii) [Reserved]

(3) Prior to and when conducting any in-water activities and vessel operations, LOA Holder personnel and contractors (*e.g.,* vessel operators, PSOs) must use available sources of information on North Atlantic right whale presence in or near the Project Area including daily monitoring of the Right Whale Sightings Advisory System, and monitoring of Coast Guard VHF Channel 16 throughout the day to receive notification of any sightings and/or information regarding the establishment of mandatory or voluntary speed restrictions (*e.g.,* Dynamic Management Areas (DMAs), Seasonal Management Areas (SMAs), and/or acoustically-triggered slow zones),and any information regarding North Atlantic right whale sighting locations to provide situational awareness for both vessel operators, PSO(s), and PAM operators; The marine mammal monitoring team must monitor these systems no less than every 4 hours;

(4) Any marine mammal observed by project personnel must be immediately communicated to any on-duty PSOs, PAM operator(s), and all vessel captains. Any large whale observation or acoustic detection by PSOs or PAM operators must be conveyed to all vessel captains;

(5) LOA Holder must establish and implement minimum visibility, clearance, and shutdown zones as described in the LOA. For North Atlantic right whales, any visual detection by a PSO at any distance or acoustic detection by PAM operators within the PAM monitoring zone (where applicable for the specified activities) must trigger a delay to the commencement of pile driving (*i.e.,* impact pile driving and vibratory pile driving) and drilling;

(6) PSOs and PAM operators have the authority to call for a delay or shutdown to an activity, and LOA Holder must instruct all vessel personnel regarding the authority of the PSOs and PAM operators. If a delay to commencing an activity is called for by the Lead PSO or PAM operator, LOA Holder must take the required mitigative action. If a shutdown of an activity is called for by a PSO or PAM operator, LOA Holder must take the required mitigative action unless shutdown would result in imminent risk of injury or loss of life to an individual, pile refusal, or pile instability. Any disagreement between the PSO, PAM operator, and the activity operator regarding delays or shutdowns must only be discussed after the mitigative action has occurred;

(7) If an individual from a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized take number has been met, is observed entering or within the relevant

clearance zone prior to beginning a specified activity (*e.g.,* pile driving (impact and vibratory), drilling, UXO/MEC detonations, and HRG acoustic sources), the activity must be delayed. If an activity is ongoing and individual from a species for which authorization has not been granted, or a species for which authorization has been granted but the authorized take number has been met, is observed entering or within the relevant shutdown zone, the activity must be shut down (*i.e.,* cease) immediately, unless shutdown would result in imminent risk of injury or loss of life to an individual, pile refusal, or pile instability. The activity must not commence or resume until the animal(s) has been confirmed to have left the clearance area and is on a path away from the applicable zone or after 15 minutes with no further sightings for small odontocetes and pinnipeds or 30 minutes with no further sightings for all other species;

(8) Foundation installation (*i.e.,* impact and vibratory pile driving, drilling), UXO/MEC detonation, and HRG survey activities must only commence when minimum visibility zones (for UXO/MEC detonations the visual clearance zones) are fully visible (*e.g.,* not obscured by darkness, rain, fog, *etc.*) and the clearance zones are clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to initiation of equipment (*i.e.,* vibratory and impact pile driving, drilling, UXO/MEC detonations, and HRG surveys that use boomers, sparkers). Any marine mammals observed within a clearance or shutdown zone must be allowed to remain in the area (*i.e.,* must leave of their own volition) prior to commencing foundation installation activities, UXO/MEC detonation, or HRG surveys;

(9) In the event that a large whale species is sighted or acoustically detected that cannot be confirmed as a non-North Atlantic right whale, it must be treated as if it were a North Atlantic right whale for purposes of mitigation;

(10) For in-water construction heavy machinery activities listed in § 217.320(c), if a marine mammal is on a path towards or comes within 10 meters (m; 32.8 feet (ft)) of equipment, LOA Holder must cease operations until the marine mammal has moved more than 10 m on a path away from the activity to avoid direct interaction with equipment;

(11) All vessels must be equipped with a properly installed, operational Automatic Identification System (AIS) device and LOA Holder must report all Maritime Mobile Service Identify (MMSI) numbers to NMFS Office of Protected Resources;

(12) By accepting the LOA, LOA Holder consents to on-site observation and inspections by Federal agency personnel (including NOAA personnel) during activities described in this subpart, for the purposes of evaluating the implementation and effectiveness of measures contained within the LOA and this subpart; and

(13) It is prohibited to assault, harm, harass (including sexually harass), oppose, impede, intimidate, impair, or in any way influence or interfere with a PSO, PAM operator, or vessel crew member acting as an observer, or attempt the same. This prohibition includes, but is not limited to, any action that interferes with an observer's responsibilities, or that creates an intimidating, hostile, or offensive environment. Personnel may report any violations to the NMFS Office of Law Enforcement.

(b) *Vessel strike avoidance measures.* LOA Holder must comply with the following vessel strike avoidance measures while in the specified geographical region, unless a deviation is necessary to maintain safe maneuvering speed and justified because the vessel is in an area where oceanographic, hydrographic, and/or meteorological conditions severely restrict the maneuverability of the vessel; an emergency situation presents a threat to the health, safety, life of a person; or when a vessel is actively engaged in emergency rescue or response duties, including vessel-in distress or environmental crisis response. An emergency is defined as a serious event that occurs without warning and requires immediate action to avert, control, or remedy harm.

(1) Prior to the start of the Project's activities involving vessels, all vessel personnel must receive a protected species training that covers, at a minimum: Identification of marine mammals that have the potential to occur in the specified geographical region; detection and observation methods in good weather conditions (*i.e.,* clear visibility, low winds, low sea states) and bad weather conditions (*i.e.,* fog, high winds, high sea states, with glare); sighting communication protocols; all vessel strike avoidance mitigation requirements; and information and resources available to the project personnel regarding the applicability of Federal laws and regulations for protected species. This training must be repeated for any new vessel personnel who join the Project.

(i) Confirmation of the vessel personnel's training and understanding of the LOA requirements must be documented on a training course log sheet and reported to NMFS Office of Protected Resources prior to vessel activities.

(ii) [Reserved]

(2) All vessel operators and dedicated visual observers must maintain a vigilant watch for all marine mammals and slow down, stop their vessel, or alter course to avoid striking any marine mammal;

(3) All underway vessels operating at any speed must have a dedicated visual observer on duty at all times to monitor for marine mammals within a 180 degree direction of the forward path of the vessel (90 degree port to 90 degree starboard) located at an appropriate vantage point for ensuring vessels are maintaining appropriate separation distances. Dedicated visual observers may be third-party observers (*i.e.,* NMFS-approved PSOs; see § 217.325(a)) or trained crew members (see paragraph (b)(1) of this section). Dedicated visual observers must be equipped with alternative monitoring technology (*e.g.,* night vision devices, infrared cameras) for periods of low visibility (*e.g.,* darkness, rain, fog, *etc.*). The dedicated visual observer must not have any other duties while observing for marine mammals and must receive prior training on protected species detection and identification, vessel strike avoidance procedures, how and when to communicate with the vessel captain, and reporting requirements in this subpart;

(4) All vessel operators and dedicated visual observers on each transiting vessel must continuously monitor U.S. Coast Guard VHF Channel 16, at the onset of transiting through the duration of transiting, over which North Atlantic right whale sightings are broadcasted. At the onset of transiting and at least once every 4 hours, vessel operators and/or trained crew member(s) must also monitor the project's Situational Awareness System (if applicable), WhaleAlert, and relevant NOAA information systems such as the Right Whale Sighting Advisory System (RWSAS) for the presence of North Atlantic right whales. Any large whale sighting by any Project personnel must be communicated immediately to all project-associated vessels;

(5) Any observations of any large whale by any LOA Holder staff or contractor, including vessel crew, must be communicated immediately to on-duty PSOs, PAM operators, and all vessel captains to increase situational awareness;

(6) All vessel operators must abide by existing applicable vessel speed

regulations (50 CFR 224.105). Nothing in this subpart exempts vessels from any other applicable marine mammal speed or approach regulations;

(7) Vessels, regardless of size, must not travel over 10 kn (11.5 mph) from November 1st through April 30th, annually, in the specified geographical region. During all other time periods, all vessels must transit active Slow Zones (*i.e.,* DMAs or acoustically-triggered slow zone), and SMAs at 10 kn or less (11.5 mph);

(i) If vessel(s) are traveling at speeds greater than 10 kn (11.5 mph) (*i.e.,* no speed restrictions are enacted) in the transit corridor (defined as from a port to the Lease Area or return), in addition to the required dedicated visual observer, LOA Holder must monitor the transit corridor in real-time with PAM prior to and during transits.

(ii) [Reserved]

(8) All vessels operators, regardless of their vessel's size, must immediately reduce speed to 10 kn or less when any large whale (other than a North Atlantic right whale), mother/calf pairs, or large assemblages of cetaceans are observed within 500 m (0.31 mi) of a transiting vessel;

(9) All vessels, regardless of size, must immediately reduce speed to 10 kn (11.5 mph) or less for at least 24 hours when a North Atlantic right whale is sighted at any distance by any project related personnel or acoustically detected by any project-related PAM system. Each subsequent observation or acoustic detection in the Project area must trigger an additional 24-hour period. If a North Atlantic right whale is reported via any of the monitoring systems (described in paragraph (b)(4) of this section) within 10 km of a transiting vessel(s), that vessel must operate at 10 kn (11.5 mph) or less for 24 hours following the reported detection. A slowdown in the transit corridor expires when there has been no further visual or acoustic detection in the transit corridor in the past 24 hours;

(10) All vessels must maintain a minimum separation distance of 500 m from North Atlantic right whales. If underway, all vessels must steer a course away from any sighted North Atlantic right whale at 10 kn (11.5 mph) or less such that the 500-m minimum separation distance requirement is not violated. If a North Atlantic right whale is sighted within 500 m of an underway vessel, that vessel must turn away from the whale(s), reduce speed and shift the engine to neutral. Engines must not be engaged until the whale has moved outside of the vessel's path and beyond 500 m. All vessels must comply with North Atlantic right whale approach restrictions at 50 CFR 224.103(c);

(11) All vessels must maintain a minimum separation distance of 100 m (328 ft) from sperm whales and non-North Atlantic right whale baleen whales. If one of these species is sighted within 100 m of a transiting vessel, that vessel must turn away from the whale(s), reduce speed, and shift the engine(s) to neutral. Engines must then not be engaged until the whale has moved outside of the vessel's path and beyond 100 m;

(12) All vessels must maintain a minimum separation distance of 50 m from all delphinid cetaceans and pinnipeds with an exception made for those that approach the vessel (*e.g.,* bow-riding dolphins). If a delphinid cetacean or pinniped is sighted within 50 m of a transiting vessel, that vessel must turn away from the animal(s), reduce speed, and shift the engine to neutral, with an exception made for those that approach the vessel (*e.g.,* bow-riding dolphins). Engines must not be engaged until the animal(s) has moved outside of the vessel's path and beyond 50 m;

(13) When a marine mammal(s) is sighted while a vessel is transiting, the vessel must take action as necessary to avoid violating the relevant separation distances (*e.g.,* attempt to remain parallel to the animal's course, slow down, and avoid abrupt changes in direction until the animal has left the area). This measure does not apply to any vessel towing gear or any situation where respecting the relevant separation distance would be unsafe (*i.e.,* any situation where the vessel is navigationally constrained);

(14) All vessels underway must not divert or alter course to approach any marine mammal; and

(15) LOA Holder must submit a Marine Mammal Vessel Strike Avoidance Plan to NMFS Office of Protected Resources for review and approval at least 180 days prior to the planned start of vessel activity. The plan must provide details on the vessel-based observer and PAM protocols for transiting vessels. The plan must also provide details on the transit corridor. If a plan is not submitted and approved by NMFS prior to vessel operations, all project vessels must travel at speeds of 10 kn (11.5 mph) or less. LOA Holder must comply with any approved Marine Mammal Vessel Strike Avoidance Plan.

(c) *WTG and ESP foundation installation.* The following requirements apply to impact and vibratory pile driving and drilling activities associated with the installation of WTG and ESP foundations:

(1) Impact pile driving and drilling must not occur January 1 through April 30, annually. Impact pile driving and drilling must not be planned in December; however, it may only occur if necessary to complete the Project within a given year with prior approval by NMFS. LOA Holder must notify NMFS in writing by September 1 of that year that pile driving or drilling cannot be avoided and circumstances are expected to necessitate pile driving or drilling in December;

(2) Vibratory pile driving (*e.g.,* vibratory setting of piles) must not occur December 1–May 31, annually;

(3) Monopiles must be no larger than 13-m in diameter. Pin piles must be no larger than 4 m in diameter. During all monopile and pin pile installation, the minimum amount of hammer energy necessary to effectively and safely install and maintain the integrity of the piles must be used. Hammer energies must not exceed 6,000 kilojoules (kJ) for monopile installations and 3,500 kJ for pin pile installation. No more than two monopiles or four pin piles may be installed per day. No concurrent pile driving (*i.e.,* impact pile driving or vibratory pile driving) or drilling may occur. All mitigation measures required for or applicable to jacket foundations are required for bottom-frame foundations that utilize pile foundations;

(i) LOA Holder must not initiate foundation installation (impact pile driving, vibratory pile driving, and drilling) except during daylight hours; daylight hours are defined as no earlier than 1 hour after civil sunrise and no later than 1.5 hours prior to civil sunset. Foundation installation may only continue into darkness if stopping operations represents a risk to human health, safety, and/or pile stability; and

(ii) LOA Holder must not initiate pile driving or drilling earlier than 1 hour after civil sunrise or later than 1.5 hours prior to civil sunset, unless LOA Holder submits, and NMFS approves, an Alternative Monitoring Plan for Nighttime Foundation Installation (*i.e.,* Nighttime Foundation Installation Plan), that demonstrates the efficacy of their night vision devices to effectively monitor the mitigation zones. LOA Holder must submit this plan or plans (if separate Daytime Reduced Visibility and Nighttime Monitoring Plans are prepared) at least 180 calendar days before foundation installation is planned to begin. This plan(s) must include, but is not limited to, a complete description of how LOA Holder will monitor foundation installation activities during reduced visibility conditions (*e.g.,* rain, fog) and

at night, including proof of the efficacy of monitoring devices (*e.g.,* mounted thermal/infrared camera systems, hand-held or wearable night vision devices NVDs, spotlights) in detecting marine mammals over the full extent of the required clearance and shutdown zones, including demonstration that the full extent of the minimum visibility zones can be effectively and reliably monitored. The plan must identify the efficacy of the technology at detecting marine mammals in the clearance and shutdown zones under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. If the plan does not include a full description of the proposed technology, monitoring methodology, and data demonstrating to NMFS Office of Protected Resources' satisfaction that marine mammals can reliably and effectively be detected within the clearance and shutdown zones for monopiles and pin pile before and during pile driving and drilling, nighttime foundation installation (unless a pile was initiated 1.5 hours prior to civil sunset) may not occur. Additionally, this plan must contain a thorough description of how LOA Holder will monitor foundation installation activities during daytime when unexpected changes to lighting or weather occur during pile driving (*i.e.,* impact or vibratory) or drilling that prevent visual monitoring of the full extent of the clearance and shutdown zones.

(4) LOA Holder must utilize soft-start at the beginning of monopile and pin pile impact pile driving and at any time following a cessation of impact pile driving of 30 minutes or longer;

(5) LOA Holder must establish clearance and shutdown zones, which must be measured using the radial distance around the pile driving or drilling location;

(6) LOA Holder must utilize PSO(s) and PAM operator(s), as described in § 217.325. At least nine on-duty PSOs must be actively observing marine mammals before, during, and after installation of foundation piles (*i.e.,* monopiles and pin piles). At least three on-duty PSOs must be stationed and observing on the foundation installation vessel/platform. A minimum of three PSOs must be active on each of the two dedicated PSO vessels. On-duty PSOs must be located at the best vantage point to observe and document marine mammal sightings in proximity to the clearance and, if applicable, shutdown zones. Concurrently, at least one PAM operator must be actively monitoring for marine mammals with PAM 60 minutes before, during, and 30 minutes after pile driving and drilling in accordance with a NMFS-approved PAM Plan;

(7) PSOs must visually monitor clearance zones for marine mammals for a minimum of 60 minutes prior to commencing pile driving or drilling. At least one PAM operator must review data from at least 24 hours prior to pile driving or drilling and actively monitor hydrophones for 60 minutes prior to, at all times during, and for 30 minutes after pile driving and drilling. The entire minimum visibility zone must be visible (*i.e.,* not obscured by dark, rain, fog, *etc.*) for a full 60 minutes immediately prior to commencing pile driving or drilling. All clearance zones must be confirmed to be free of marine mammals for 30 minutes immediately prior to the beginning of pile driving, drilling, and soft-start procedures. PAM operators must immediately communicate all detections of marine mammals at any distance to the Lead PSO, including any determination regarding species identification, distance, and bearing and the degree of confidence in the determination;

(8) If a marine mammal is detected within or about to enter the applicable clearance zones during the clearance periods defined in paragraph (c)(7) of this section, activities must be delayed until the animal has been visually observed exiting the clearance zone or until a specific time period has elapsed with no further sightings. The specific time periods are 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other species;

(i) For foundation installation activities between May 1–May 14 and November 1–December 31, if a North Atlantic right whale is observed at any distance or acoustically detected within the PAM monitoring zone of the pile being driven (impact or vibratory) or area being drilled, pile driving and drilling must be delayed or stopped (unless activities must proceed for human safety or installation feasibility concerns) and may not resume until the following day or until the animal is confirmed to have exited the zone via aerial or additional vessel surveys;

(ii) [Reserved]

(9) LOA Holder must deploy at least two functional noise abatement systems that reduce noise levels to the modeled harassment isopleths, assuming 10-dB attenuation, during all pile driving and drilling and comply with the following measures:

(i) A single bubble curtain must not be used;

(ii) A big double bubble curtain may be used without being paired with another noise attenuation device;

(iii) The bubble curtain(s) must distribute air bubbles using an air flow rate of at least 0.5 $m^3/(min*m)$. The bubble curtain(s) must surround 100 percent of the piling perimeter throughout the full depth of the water column. In the unforeseen event of a single compressor malfunction, the offshore personnel operating the bubble curtain(s) must adjust the air supply and operating pressure such that the maximum possible noise attenuation performance of the bubble curtain(s) is achieved;

(iv) The lowest bubble ring must be in contact with the seafloor for the full circumference of the ring, and the weights attached to the bottom ring must ensure 100-percent seafloor contact;

(v) No parts of the ring or other objects may prevent full seafloor contact with a bubble curtain ring;

(vi) Construction contractors must train personnel in the proper balancing of airflow to the bubble curtain ring. LOA Holder must provide NMFS Office of Protected Resources with a bubble curtain performance test and maintenance report to review within 72 hours after each pile using a bubble curtain is installed. Additionally, a full maintenance check (*e.g.,* manually clearing holes) must occur prior to each pile being installed;

(vii) Corrections to the bubble ring(s) to meet the performance standards in this paragraph (c)(9) must occur prior to pile driving and drilling of foundation piles. For any noise mitigation device in addition to the bubble curtain, LOA Holder must inspect and carry out appropriate maintenance on the system and ensure the system is functioning properly prior to every pile driving event; and

(viii) LOA Holder must inspect and carry out appropriate maintenance on the noise attenuation system prior to every foundation installation event (*i.e.,* for each pile driven foundation) and UXO/MEC detonation and prepare and submit a Noise Attenuation System (NAS) inspection/performance report to NMFS Office of Protected Resources. For piles for which Thorough sound field verification (SFV) is carried out, this report must be submitted as soon as it is available, but no later than when the interim SFV report is submitted for the respective pile.

(10) PAM operator(s) must review data from at least 24 hours prior to pile driving and drilling and actively monitor hydrophones for 60 minutes prior to pile driving and drilling. All

clearance zones must be acoustically confirmed to be free of marine mammals for 60 minutes before activities can begin immediately prior to starting vibratory pile driving, drilling, and a soft-start of impact pile driving. PAM operators will continue to monitor for marine mammals for at least 30 minutes after pile driving or drilling concludes. The exact details for PAM requirements must be submitted to NMFS within the PAM plan;

(i) LOA Holder must implement PAM in accordance with the NMFS-approved PAM Plan, as described in § 217.325(c)(9). The PAM system components (*i.e.,* acoustic buoys) must not be placed closer than 1 km (0.6 mi) to the pile being driven so that the activities do not mask the PAM system. LOA Holder must demonstrate and prove the detection range of the system they plan to deploy while considering potential masking from concurrent pile-driving and vessel noise. The PAM system must be designed to detect all marine mammals to the maximum extent practicable, maximize baleen whale detections, and must be capable of detecting North Atlantic right whales within the PAM monitoring zone;

(ii) [Reserved]

(11) For North Atlantic right whales, any visual observation by a PSO at any distance or acoustic detection within the PAM Monitoring Zone must trigger a delay to the commencement of pile driving. The North Atlantic right whale clearance zone may only be declared clear if no North Atlantic right whale acoustic or visual detections have occurred within the clearance zone during the 60-minute monitoring period. Any large whale sighting by a PSO or detected by a PAM operator that cannot be identified as a non-North Atlantic right whale must be treated as if it were a North Atlantic right whale;

(12) If a marine mammal is detected (visually or acoustically) entering or within the respective shutdown zone after pile driving has begun, the PSO or PAM operator must call for a shutdown of pile driving or drilling. If a marine mammal is detected entering or within the respective shutdown zone after pile driving or drilling has begun, LOA Holder must stop pile driving or drilling immediately unless shutdown is not practicable due to imminent risk of injury or loss of life to an individual or risk of damage to a vessel that creates risk of injury or loss of life for individuals, or the lead engineer determines there is pile refusal or pile instability. If pile driving or drilling is not shut down, LOA Holder must reduce hammer energy to the lowest level practicable and the reason(s) for not shutting down must be documented and reported to NMFS Office of Protected Resources within the applicable monitoring reports (*e.g.,* weekly, monthly) (see § 217.325(f));

(13) A visual observation or acoustic detection of a North Atlantic right whale at any distance by PSOs or an acoustic detection within the PAM monitoring zone triggers shutdown requirements under paragraph (c)(12) of this section. If pile driving or drilling has been shut down due to the presence of a North Atlantic right whale, pile driving or drilling may not restart until the North Atlantic right whale has neither been visually or acoustically detected by on-duty PSOs and PAM operators for 30 minutes;

(14) If pile driving or drilling has been shut down due to the presence of a marine mammal other than a North Atlantic right whale, pile driving or drilling must not restart until either the marine mammal(s) has voluntarily left the specific clearance zones and has been visually or acoustically confirmed beyond that clearance zone, or, when specific time periods have elapsed with no further sightings or acoustic detections have occurred. The specific time periods are 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other marine mammal species. In cases where these criteria are not met, pile driving may restart only if necessary to maintain pile stability at which time LOA Holder must use the lowest hammer energy practicable to maintain stability; and

(15) LOA Holder must conduct SFV during the following foundation installation activities in accordance with the following requirements:

(i) For the first construction year, Thorough SFV must be conducted for the first three monopiles installed with only an impact hammer (*i.e.,* impact pile driving); the first three monopiles installed with a vibratory hammer (*i.e.,* vibratory pile driving or setting) followed by an impact hammer; the first two jacket foundations (all piles) installed; the first foundation (regardless of type) where drilling is used; the first monopile and first jacket foundation (all piles) installed in December (winter sound speed profile); and, the first foundation for any foundation scenarios that were modeled for the exposure analysis (*e.g.,* rated hammer energy, number of strikes, representative location) that does not fall into one of the previously listed categories (*e.g.,* if the first two jacket foundation are installed with only an impact hammer, Thorough SFV would be required for the first jacket foundation installed with vibratory and impact pile driving);

(ii) For any subsequent construction year, Thorough SFV must be conducted on the first monopile and first jacket foundation (all piles) if there are no changes to the pile driving equipment (*e.g.,* same hammer, same Noise Attenuation System); Thorough SFV requirements for the first construction year apply if a revised Facilities Design Report and Fabrication and Installation Report (FDR/FIR) or other information is submitted to BOEM and Bureau of Safety and Environmental Enforcement (BSEE) that details changes to the equipment (*e.g.,* different hammer, different noise attenuation system); if any foundation type or technique included in the requirements for the first construction year that was not installed until a subsequent construction year (*e.g.,* if drilling is not used until year 2 or 3, the first foundation where relief drilling is used must have Thorough SFV);

(iii) During Thorough SFV, installation of the next foundation (of the same type/foundation method) may not proceed until LOA Holder has reviewed the initial results from the Thorough SFV and determined that there were no exceedances of any distances to the identified thresholds based on modeling assuming 10 dB attenuation. Subsequent SFV measurements are also required should larger piles be installed or if additional monopiles are driven that may produce louder sound fields than those previously measured (*e.g.,* higher hammer energy, greater number of strikes, *etc.*). If any of the Thorough SFV measurements from any pile indicate that the distance to any isopleth of concern for any species is greater than those modeled assuming 10 dB attenuation, LOA Holder must notify NMFS within 24 hours of reviewing the Thorough SFV measurements and must implement the following measures for the next pile of the same type/installation methodology, as applicable;

(iv) If any of the Thorough SFV measurements indicate that the distances to level A thresholds for marine mammals (peak or cumulative) are greater than the modeled distances (assuming 10 dB attenuation), the clearance and shutdown zones for subsequent piles of the same type (*e.g.,* if triggered by SFV results for a monopile, for the next monopile) must be increased so that they are at least the size of the distances to those thresholds as indicated by SFV. For every 1,500 m that a marine mammal clearance or shutdown zone is expanded, additional PSOs must be deployed from additional platforms/vessels to ensure adequate and complete monitoring of the

expanded shutdown and/or clearance zone; LOA Holder must deploy any additional PSOs consistent with the approved Marine Mammal Monitoring Plan in consideration of the size of the new zones and the species that must be monitored use of the expanded clearance and shutdown zones must continue for additional piles until LOA Holder requests and receives concurrence from NMFS Office of Protected Resources and Greater Atlantic Regional Fisheries Office (GARFO) to revert to the original clearance and shutdown zones. LOA Holder must identify one or more additional, modified, and/or alternative noise attenuation measure(s) and/or operational change(s) included in the approved SFV plan that is expected to reduce sound levels to the modeled distances and must implement that measure for the next pile of the same type and pile driving method that is installed (*e.g.,* if triggered by SFV results for a monopile installed with vibratory pile driving followed by impact pile driving, for the next monopile with vibratory pile driving followed by impact pile driving). Attenuation measures that could reduce sound levels to the modeled distances include but are not limited to adding a noise attenuation device, adjusting hammer operations, and adjusting or otherwise modifying the noise mitigation system. LOA Holder must provide written notification to NMFS Office of Protected Resources of the changes implemented within 24 hours of their implementation. Following installation of a pile with additional, alternative, or modified noise attenuation measures/operational changes if Thorough SFV results indicate that all isopleths of concern are within distances to isopleths of concern modeled assuming 10 dB attenuation, Thorough SFV must be conducted on two additional piles of the same type/installation method (for a total of at least three piles with consistent noise attenuation measures). If the Thorough SFV results from all three of those piles are within the distances to isopleths of concern modeled assuming 10 dB attenuation, then LOA Holder must continue to implement the approved additional, alternative, or modified noise attenuation measures/operational changes. LOA Holder can request concurrence from NMFS Office of Protected Resources to return to the original clearance and shutdown zones;

(v) In addition to this SFV monitoring, which will follow a specific comprehensive methodology described in the SFV Plan required in § 217.325(c)(8), LOA Holder also must conduct Abbreviated SFV for all other foundations, using at least one acoustic recorder for every foundation for which thorough SFV monitoring is not conducted. Abbreviated SFV consists of: SFV measurements made at a single acoustic recorder, consisting of a near-bottom and mid-water hydrophone, at approximately 750 m from the pile, in the direction of lowest modeled transmission loss, to record sounds throughout the duration of all pile driving (inclusive of relief drilling) of each foundation. If measured levels from Abbreviated SFV for any pile are greater than expected levels, LOA Holder must evaluate the available information from the pile installation to determine if there is an identifiable cause of the exceedance (*i.e.,* a failure of the noise attenuation system), identify and implement corrective action, and report this information to NMFS Office of Protected Resources within 48 hours of completion of the installation of the pile (inclusive of all pile driving and drilling), during which the exceedance occurred. If LOA Holder can demonstrate that the exceedance was the result of a failure of the noise attenuation system (*e.g.,* loss of a generator supporting a bubble curtain such that one bubble curtain failed during pile driving) that can be remedied in a way that returns the noise attenuation system to pre-failure conditions, LOA Holder can request concurrence from NMFS Office of Protected Resources to proceed without Thorough SFV monitoring that would otherwise be required within 72 hours. LOA Holder is required to remedy any such failure of the noise attenuation system prior to carrying out any additional pile driving or drilling.

(vi) Thorough SFV measurements must be made at a minimum of four distances from the pile(s) being driven, along a single transect, in the direction of lowest transmission loss (*i.e.,* projected lowest transmission loss coefficient), including, but not limited to, 750 m (2,460 ft) and three additional ranges, including at least, the modeled Level B harassment isopleth zones assuming 10 dB attenuation. At least one additional measurement at an azimuth 90 degrees from the array at 750 m must be made. At each location, there must be a near bottom and mid-water column hydrophone (measurement system).

(vii) The recordings must be continuous throughout the duration of all pile driving and drilling of each foundation.

(viii) The SFV measurement systems must have a sensitivity appropriate for the expected sound levels from pile driving and drilling received at the nominal ranges throughout the installation of the pile. The frequency range of SFV measurement systems must cover the range of at least 20 hertz (Hz) to 20 kilohertz (kHz); The SFV measurement systems must be designed to have omnidirectional sensitivity and so that the broadband received level of all pile driving and drilling activities exceeds the system noise floor by at least 10 dB. The dynamic range of the SFV measurement system must be sufficient such that at each location, and the signals avoid poor signal-to-noise ratios for low amplitude signals and avoid clipping, nonlinearity, and saturation for high amplitude signals.

(ix) All hydrophones used in SFV measurements systems are required to have undergone a full system, traceable laboratory calibration conforming to International Electrotechnical Commission (IEC) 60565, or an equivalent standard procedure, from a factory or accredited source to ensure the hydrophone receives accurate sound levels, at a date not to exceed 2 years before deployment. Additional in situ calibration checks using a pistonphone are required to be performed before and after each hydrophone deployment. If the measurement system employs filters via hardware or software (*e.g.,* high-pass, low-pass, *etc.*), which is not already accounted for by the calibration, the filter performance (*i.e.,* the filter's frequency response) must be known, reported, and the data corrected before analysis.

(x) LOA Holder must be prepared with additional equipment (hydrophones, recording devices, hydrophone calibrators, cables, batteries, *etc.*), which exceeds the amount of equipment necessary to perform the measurements, such that technical issues can be mitigated before measurement.

(xi) LOA Holder must submit interim reports within 48 hours after each foundation is measured with Thorough SFV (§ 217.325(10) for interim and final reporting requirements).

(xii) If any of the interim Thorough SFV reports submitted indicate that SFV measurements exceed the modeled distances to Level A harassment and Level B harassment thresholds assuming 10-dB attenuation, then LOA Holder must implement additional measures on all subsequent foundations to ensure the measured Level A and Level B harassment isopleths do not exceed those modeled for foundation installation, assuming 10dB attenuation. LOA Holder must also increase clearance and shutdown zone sizes to

those identified by NMFS until SFV measurements on at least three additional foundations demonstrate acoustic distances to harassment thresholds meet or are less than those modeled assuming 10-dB of attenuation. For every 1,500 m that a marine mammal clearance or shutdown zone is expanded, additional PSOs must be deployed from additional platforms/vessels to ensure adequate and complete monitoring of the expanded shutdown and/or clearance zone; LOA Holder must optimize the noise attenuation systems (*e.g.,* ensure hose maintenance, pressure testing, *etc.*) to, at least, meet noise levels modeled, assuming 10-dB attenuation, within three piles or else foundation installation activities must cease until NMFS and LOA Holder can evaluate the situation and ensure future piles will not exceed noise levels modeled assuming 10-dB attenuation.

(xiii) If SFV measurements collected during installation of foundation piles indicate ranges to the isopleths, corresponding to Level A harassment and Level B harassment thresholds, are greater than the ranges predicted by modeling (assuming 10 dB attenuation), LOA Holder must implement additional noise mitigation measures prior to installing the next foundation. Additional acoustic measurements must be taken after each modification.

(xiv) If, after additional measurements conducted pursuant to requirements of paragraph (c)(15)(i) and (ii) of this section, acoustic measurements indicate that ranges to isopleths corresponding to the Level A harassment and Level B harassment thresholds are less than the ranges predicted by modeling (assuming 10-dB attenuation), LOA Holder may request to NMFS Office of Protected Resources a modification of the clearance and shutdown zones. For NMFS Office of Protected Resources to consider a modification request for reduced zone sizes, LOA Holder must have conducted SFV measurements on an additional three foundations and ensure that subsequent foundations would be installed under conditions that are predicted to produce smaller harassment zones than those modeled assuming 10-dB of attenuation.

(xiv) LOA Holder must conduct SFV measurements during turbine operations to estimate turbine operational source levels and transmission loss rates, in accordance with a NMFS-approved SFV Plan.

(d) *UXO/MEC detonations.* The following requirements apply to Unexploded Ordnances and Munitions and Explosives of Concern (UXO/MEC) detonations:

(1) Upon encountering a UXO/MEC, LOA Holder must only resort to high-order removal (*i.e.,* detonation) if all other means of removal are impracticable (*i.e.,* As Low As Reasonably Practicable (ALARP) risk mitigation procedure)) and this determination must be documented and submitted to NMFS;

(i) LOA Holder may detonate a maximum of 10 UXO/MECs, of varying sizes but no larger than 1,000 pounds (lbs; 454 kilograms (kg)) charge weight (*i.e.,* E12), over the effective period of this rulemaking and LOA(s);

(ii) LOA Holder must provide NMFS Office of Protected Resources with notification of planned UXO/MEC detonation as soon as possible but at least 48 hours prior to the planned detonation, unless this 48-hour notification would create delays to the detonation that would result in imminent risk to human life or safety.

(2) UXO/MEC detonations must not occur from December 1 through May 31, annually; however, LOA Holder may detonate a UXO/MEC in December or May with NMFS' approval on a case-by-case basis;

(3) UXO/MEC detonations must only occur during daylight hours (1 hour after civil sunrise through 1.5 hours prior to civil sunset);

(4) No more than one detonation can occur within a 24-hour period;

(5) LOA Holder must deploy dual noise abatement systems during all UXO/MEC detonations and comply with the following requirements related to noise abatement:

(i) A single bubble curtain must not be used;

(ii) A big double bubble curtain may be used without being paired with another noise attenuation device;

(iii) The bubble curtain(s) must distribute air bubbles using an air flow rate of at least 0.5 $m^3/(min*m)$. The bubble curtain(s) must surround 100 percent of the UXO/MEC detonation perimeter throughout the full depth of the water column. In the unforeseen event of a single compressor malfunction, the offshore personnel operating the bubble curtain(s) must make appropriate adjustments to the air supply and operating pressure such that the maximum possible noise attenuation performance of the bubble curtain(s) is achieved;

(iv) The lowest bubble ring must be in contact with the seafloor for the full circumference of the ring, and the weights attached to the bottom ring must ensure 100-percent seafloor contact;

(v) No parts of the ring or other objects may prevent full seafloor contact;

(vi) Construction contractors must train personnel in the proper balancing of airflow to the ring. Construction contractors must submit an inspection/performance report for approval by LOA Holder within 72 hours following the performance test. LOA Holder must then submit that report to NMFS Office of Protected Resources;

(vii) Corrections to the bubble ring(s) to meet the performance standards in this paragraph (d)(5) must occur prior to UXO/MEC detonations. If LOA Holder uses a noise mitigation device in addition to the bubble curtain, LOA Holder must maintain similar quality control measures as described in this paragraph (d)(5); and

(viii) LOA Holder must inspect and carry out appropriate maintenance on the noise attenuation system prior to every foundation installation event (*i.e.,* for each pile driven foundation) and UXO/MEC detonation and prepare and submit a NAS inspection/performance report to NMFS Office of Protected Resources. For activities which Thorough SFV is carried out, this report must be submitted as soon as it is available, but no later than when the interim SFV report is submitted for the respective pile.

(6) LOA Holder must conduct SFV during all UXO/MEC detonations at a minimum of three locations (at two water depths at each location) from each detonation in a direction toward deeper water in accordance with the following requirements:

(i) LOA Holder must empirically determine source levels (peak and cumulative sound exposure level), the ranges to the isopleths corresponding to the Level A harassment and Level B harassment thresholds in meters, and the transmission loss coefficient(s). LOA Holder may estimate ranges to the Level A harassment and Level B harassment isopleths by extrapolating from in-situ measurements conducted at several distances from the detonation location monitored.

(ii) The SFV measurement systems must have a sensitivity appropriate for the expected sound levels from detonations received at the nominal ranges throughout the detonation; the frequency range of the SFV measurement systems must cover the range of at least 20 Hz to 20 kHz; and the SFV measurement systems will be designed to have omnidirectional sensitivity and will be designed so that the predicted broadband received level of all UXO/MEC detonations exceeds the system noise floor by at least 10 dB.

The dynamic range of the SFV measurement systems must be sufficient such that at each location, the signals avoid poor signal-to-noise ratios for low amplitude signals and the signals avoid clipping, nonlinearity, and saturation for high amplitude signals.

(iii) All hydrophones used in SFV measurements systems are required to have undergone a full system, traceable laboratory calibration conforming to IEC 60565, or an equivalent standard procedure, from a factory or accredited source to ensure the hydrophone receives accurate sound levels, at a date not to exceed 2 years before deployment. Additional in situ calibration checks using a pistonphone are required to be performed before and after each hydrophone deployment. If the measurement system employs filters via hardware or software (*e.g.,* high-pass, low-pass, *etc.*), which is not already accounted for by the calibration, the filter performance (*i.e.,* the filter's frequency response) must be known, reported, and the data corrected before analysis.

(iv) LOA Holder must be prepared with additional equipment (hydrophones, recording devices, hydrophone calibrators, cables, batteries, *etc.*), which exceeds the amount of equipment necessary to perform the measurements, such that technical issues can be mitigated before measurement.

(v) LOA Holder must submit interim reports within 48 hours after each UXO/MEC detonation is measured (see § 217.325(f)(10) for interim and final reporting requirements).

(vi) If SFV measurements collected during UXO/MEC detonation indicate ranges to the isopleths, corresponding to Level A harassment and Level B harassment thresholds, are greater than the ranges predicted by modeling (assuming 10 dB attenuation), LOA Holder must implement additional noise mitigation measures prior to the next UXO/MEC detonation. Additional acoustic measurements must be taken after each modification. LOA Holder must also increase the clearance zone size to reflect the results of SFV in collaboration with NMFS Office of Protected Resources. Use of the expanded clearance zone must continue for all additional detonations until LOA Holder requests and receives concurrence from NMFS Office of Protected Resources to revert to the original clearance zone. LOA Holder must provide written notification to NMFS Office of Protected Resources of the changes planned for the next detonation within 24 hours of implementation.

(vii) LOA Holder must optimize the noise attenuation systems (*e.g.,* ensure hose maintenance, pressure testing, *etc.*) to, at least, meet noise levels modeled, assuming 10-dB attenuation, UXO/MEC detonation activities must cease until NMFS and LOA Holder can evaluate the situation and ensure future detonations will not exceed noise levels modeled assuming 10-dB attenuation.

(viii) LOA Holder must identify one or more additional, modified, and/or alternative noise attenuation measures or other change to the detonation plans (included in the SFV Plan) that is expected to reduce sound levels to the modeled distances. These measures must be implemented for the next detonation.

(7) LOA Holder must establish and implement clearance zones for UXO/MEC detonation using both visual and acoustic monitoring, as described in the LOA;

(8) At least six on-duty PSOs must be actively observing marine mammals before, during, and after any UXO/MEC detonation. At least three on-duty PSOs must be stationed and observing on a vessel as close as safely possible to the detonation site and, in addition, at least three on-duty PSOs must be stationed on an additional PSO-dedicated vessel or aerial platform. Concurrently, at least one acoustic monitoring PSO (*i.e.,* passive acoustic monitoring (PAM) operator) must be actively monitoring for marine mammals with PAM before, during, and after detonation;

(i) Clearance zones must be increased to reflect the results of SFV. For every 1,500 m that a clearance zone is expanded, additional PSOs must be deployed from additional platforms/vessels to ensure adequate and complete monitoring of the expanded zone.

(ii) [Reserved]

(9) If the clearance zone is larger than 2 km (based on charge weight), LOA Holder must deploy an additional PSO-dedicated vessel or aircraft with at least three on-duty PSOs stationed on it and actively observing for marine mammals. If the clearance zone is larger than 5 km (based on charge weight), an aerial platform must be used unless LOA Holder is unable to secure an aerial platform(s) with the appropriately trained pilots and PSOs. In such a case, the LOA Holder must submit an alternative monitoring plan at least 90 days before any UXO/MEC detonation that would describe how they would effectively monitor clearance zones beyond 5 km, including an explanation of additional vessels/platforms and PSO deployments. This plan must be approved by NMFS before any UXO/MEC detonation may occur;

(i) If an aircraft is used, two on-duty PSOs must be used and located at the appropriate vantage point on the aircraft. These additional PSOs would maintain watch during the same time period as the PSOs on the primary monitoring vessel.

(10) At least one PAM operator must review data from at least 24 hours prior to a detonation and actively monitor hydrophones for 60 minutes prior to detonation. All clearance zones must be acoustically confirmed to be free of marine mammals for 60 minutes prior to commencing a detonation. PAM operators will continue to monitor for marine mammals at least 30 minutes after a detonation;

(11) All clearance zones must be visually confirmed to be free of marine mammals for 30 minutes before a detonation can occur. All on-duty PSOs must also maintain watch for 30 minutes after the detonation event;

(12) If a marine mammal is observed entering or within the relevant clearance zone prior to the initiation of a detonation, detonation must be delayed and must not begin until either the marine mammal(s) has voluntarily left the specific clearance zones and have been visually and acoustically confirmed beyond that clearance zone, or, when specific time periods have elapsed with no further sightings or acoustic detections. The specific time periods are 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other marine mammal species;

(13) For North Atlantic right whales, any visual observation or acoustic detection must trigger a delay to the detonation of a UXO/MEC. Any large whale sighting by a PSO or detected by a PAM operator that cannot be identified by species must be treated as if it were a North Atlantic right whale; and

(14) A pressure transducer must be used to monitor pressure levels during all UXO/MEC detonations.

(e) *HRG surveys.* The following requirements apply to HRG surveys operating sub-bottom profilers (SBPs) (*i.e.,* boomers, sparkers):

(1) SBPs (hereinafter referred to as ''acoustic sources'') must be deactivated when not acquiring data or preparing to acquire data, except as necessary for testing. Acoustic sources must be used at the lowest practicable source level to meet the survey objective, when in use, and must be turned off when they are not necessary for the survey;

(2) LOA Holder is required to have at least one PSO on active duty per HRG vessel during HRG surveys that are conducted during daylight hours (*i.e.,*

from 30 minutes prior to civil sunrise through 30 minutes following civil sunset) and at least two PSOs on active duty per vessel during HRG surveys that are conducted during nighttime hours;

(3) LOA Holder is required to ramp-up SBPs prior to commencing full power, unless the equipment operates on a binary on/off switch, and ensure visual clearance zones are fully visible (*e.g.,* not obscured by darkness, rain, fog, *etc.*) and clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to the initiation of survey activities using acoustic sources specified in the LOA;

(4) Ramp-ups must be scheduled so as to minimize the time spent with the source activated. Prior to a ramp-up procedure starting or activating acoustic sources, the acoustic source operator (operator) must notify a designated PSO of the planned start of ramp-up as agreed upon with the Lead PSO. The notification time should not be less than 60 minutes prior to the planned ramp-up or activation in order to allow the PSOs time to monitor the clearance zone(s) for 30 minutes prior to the initiation of ramp-up or activation (pre-start clearance). During this 30-minute pre-start clearance period, the entire applicable clearance zones must be visible. Ramp-up may occur at times of poor visibility, including nighttime, only if appropriate visual monitoring has occurred with no detections of marine mammals in the 30 minutes prior to beginning ramp-up;

(i) A PSO conducting pre-start clearance observations must be notified again immediately prior to reinitiating ramp-up procedures and the operator must receive confirmation from the PSO to proceed.

(ii) [Reserved]

(5) Prior to starting the survey and after receiving confirmation from the PSOs that the clearance zone is clear of any marine mammals, LOA Holder is required to ramp-up acoustic sources to half power for 5 minutes prior to commencing full power, unless the source operates on a binary on/off switch (in which case ramp-up is not required). LOA Holder must also ensure visual clearance zones are fully visible (*e.g.,* not obscured by darkness, rain, fog, *etc.*) and clear of marine mammals, as determined by the Lead PSO, for at least 30 minutes immediately prior to the initiation of survey activities using acoustic sources; Ramp-up and activation must be delayed if a marine mammal(s) enters its respective shutdown zone. Ramp-up and activation may only be reinitiated if the animal(s) has been observed exiting its respective shutdown zone or until 15 minutes for small odontocetes and pinnipeds, and 30 minutes for all other species, has elapsed with no further sightings;

(6) LOA Holder must establish and implement clearance and shutdown zones for HRG surveys using visual monitoring; LOA Holder must implement a 30-minute clearance period of the clearance zones immediately prior to the commencing of the survey or when there is more than a 30 minute break in survey activities or PSO monitoring. A clearance period is a period when no marine mammals are detected in the relevant zone;

(7) If a marine mammal is observed within a clearance zone during the clearance period, ramp-up or acoustic surveys may not begin until the animal(s) has been observed voluntarily exiting its respective clearance zone or until a specific time period has elapsed with no further sighting. The specific time period is 15 minutes for small odontocetes and pinnipeds, and 30 minutes for all other species;

(8) Any large whale sighted by a PSO within 1 km of the acoustic source(s) that cannot be identified by species must be treated as if it were a North Atlantic right whale and LOA Holder must apply the mitigation measure applicable to this species;

(9) In any case when the clearance process has begun in conditions with good visibility, including via the use of night vision equipment (infrared (IR)/thermal camera), and the Lead PSO has determined that the clearance zones are clear of marine mammals, survey operations may commence (*i.e.,* no delay is required) despite periods of inclement weather and/or loss of daylight.

(10) Once the survey has commenced, LOA Holder must shut down acoustic sources if a marine mammal enters a respective shutdown zone, except in cases when the shutdown zones become obscured for brief periods due to inclement weather, survey operations may continue (*i.e.,* no shutdown is required) so long as no marine mammals have been detected. The shutdown requirement does not apply to small delphinids of the following genera: *Delphinus, Stenella, Lagenorhynchus,* and *Tursiops.* If there is uncertainty regarding the identification of a marine mammal species (*i.e.,* whether the observed marine mammal belongs to one of the delphinid genera for which shutdown is waived), the PSOs must use their best professional judgment in making the decision to call for a shutdown. Shutdown is required if a delphinid that belongs to a genus other than those specified in this paragraph (e)(10) is detected in the shutdown zone;

(11) If an acoustic source has been shut down due to the presence of a marine mammal, the use of an acoustic source may not commence or resume until the animal(s) has been confirmed to have left the Level B harassment zone or until a full 15 minutes for small odontocetes and pinnipeds and 30 minutes for all other marine mammals have elapsed with no further sighting;

(12) LOA Holder must immediately shutdown any acoustic source if a marine mammal is sighted entering or within its respective shutdown zones. If there is uncertainty regarding the identification of a marine mammal species (*i.e.,* whether the observed marine mammal belongs to one of the delphinid genera for which shutdown is waived), the PSOs must use their best professional judgment in making the decision to call for a shutdown. Shutdown is required if a delphinid that belongs to a genus other than those specified in paragraph (e)(10) of this section is detected in the shutdown zone;

(13) If an acoustic source is shut down for a period longer than 30 minutes, all clearance and ramp-up procedures must be initiated. If an acoustic source is shut down for reasons other than mitigation (*e.g.,* mechanical difficulty) for less than 30 minutes, acoustic sources may be activated again without ramp-up only if PSOs have maintained constant observation and no additional detections of any marine mammal occurred within the respective shutdown zones; and

(14) If multiple HRG vessels are operating concurrently, any observations of marine mammals must be communicated to PSOs on all nearby survey vessels.

(f) *Fisheries monitoring surveys.* The following measures apply to fishery monitoring surveys:

(1) All captains and crew conducting fishery surveys must be trained in marine mammal detection and identification. Marine mammal monitoring will be conducted by the captain and/or a member of the scientific crew before within 1 nautical mile (nmi) (1.85 km; 1.2 mi) and 15 minutes prior to deploying gear), during, and for 15 minutes after haul back;

(2) Survey gear will be deployed as soon as possible once the vessel arrives on station. Gear must not be deployed if there is a risk of interaction with marine mammals. Gear may be deployed after 15 minutes of no marine mammal sightings within 1 nmi (1.85 km; 1.2 mi) of the sampling station;

(3) LOA Holder and/or its cooperating institutions, contracted vessels, or commercially-hired captains must implement the following ''move-on'' rule: If marine mammals are sighted within 1 nmi (1.2 mi) of the planned location and 15 minutes before gear deployment, then LOA Holder and/or its cooperating institutions, contracted vessels, or commercially-hired captains, as appropriate, must move the vessel away from the marine mammal to a different section of the sampling area. If, after moving on, marine mammals are still visible from the vessel, LOA Holder and its cooperating institutions, contracted vessels, or commercially-hired captains must move again or skip the station;

(4) If a marine mammal is at risk of interacting with deployed gear, all gear must be immediately removed from the water. If marine mammals are sighted before the gear is fully removed from the water, the vessel must slow its speed and maneuver the vessel away from the animals to minimize potential interactions with the observed animal;

(5) LOA Holder must maintain visual marine mammal monitoring effort during the entire period of time that gear is in the water (*i.e.,* throughout gear deployment, fishing, and retrieval). If marine mammals are sighted before the gear is fully removed from the water, LOA Holder must take the most appropriate action to avoid marine mammal interaction;

(6) All fisheries monitoring gear must be fully cleaned and repaired (if damaged) before each use/deployment;

(7) LOA Holder's fixed gear must comply with the Atlantic Large Whale Take Reduction Plan regulations at 50 CFR 229.32 during fisheries monitoring surveys;

(8) Trawl tows will be limited to a maximum of a 20-minute trawl time and must not exceed 3.0 kn (3.45 mph);

(9) All gear must be emptied as close to the deck/sorting area and as quickly as possible after retrieval;

(10) During trawl surveys, vessel crew must open the codend of the trawl net close to the deck in order to avoid injury to animals that may be caught in the gear;

(11) During any survey that uses vertical lines, buoy lines will be weighted and will not float at the surface of the water and all groundlines will consist of sinking line. All groundlines must be composed entirely of sinking line. Buoy lines must utilize weak links. Weak links must break cleanly leaving behind the bitter end of the line. The bitter end of the line must be free of any knots when the weak link breaks. Splices are not considered to be knots. The attachment of buoys, toggles, or other floatation devices to groundlines is prohibited;

(12) All in-water survey gear, including buoys, must be properly labeled with the scientific permit number or identification as LOA Holder-related research gear. All labels and markings on the gear, buoys, and buoy lines must also be compliant with the applicable regulations, and all buoy markings must comply with instructions received by the NOAA GARFO Protected Resources Division;

(13) All survey gear must be removed from the water whenever not in active survey use (*i.e.,* no wet storage);

(14) All reasonable efforts, that do not compromise human safety, must be undertaken to recover gear; and

(15) All lost gear associated with the fishery surveys must be reported to NOAA GARFO Protected Resources Division (*nmfs.gar.incidental-take@noaa.gov*) within 24 hours of the documented time of missing or lost gear. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear.

§ 217.325 Monitoring and reporting requirements.

LOA Holder must implement the following monitoring and reporting requirements when conducting the specified activities:

(a) *Protected species observer (PSO) and passive acoustic monitoring (PAM) operator qualifications.* LOA Holder must implement the following measures applicable to PSOs and PAM operators:

(1) LOA Holder must use independent, NMFS-approved PSOs and PAM operators meaning that the PSOs and PAM operators must be employed by a third-party observer provider, must have no tasks other than to conduct observational effort, collect data, and communicate with and instruct relevant crew with regard to the presence of protected species and mitigation requirements;

(2) All PSOs and PAM operators must have successfully attained a bachelor's degree from an accredited college or university with a major in one of the natural sciences, a minimum of 30 semester hours or equivalent in the biological sciences, and at least one undergraduate course in math or statistics. The educational requirements may be waived if the PSO or PAM operator has acquired the relevant skills through a suitable amount of alternate experience. Requests for such a waiver must be submitted to NMFS Office of Protected Resources and must include written justification containing alternative experience. Alternate experience that may be considered includes but is not limited to: previous work experience conducting academic, commercial, or government sponsored marine mammal visual and/or acoustic surveys; or previous work experience as a PSO/PAM operator. All PSO's and PAM operators should demonstrate good standing and consistently good performance of all assigned duties;

(3) All PSOs and PAM operators must successfully complete a required training course within the last 5 years, including obtaining a certificate of course completion;

(4) PSOs must have visual acuity in both eyes (with correction of vision being permissible) sufficient enough to discern moving targets on the water's surface with the ability to estimate the target size and distance (binocular use is allowable); ability to conduct field observations and collect data according to the assigned protocols; sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations; writing skills sufficient to document observations, including but not limited to, the number and species of marine mammals observed, the dates and times of when in-water construction activities were conducted, the dates and time when in-water construction activities were suspended to avoid potential incidental take of marine mammals from construction noise within a defined shutdown zone, and marine mammal behavior; and the ability to communicate orally, by radio, or in-person, with project personnel to provide real-time information on marine mammals observed in the area;

(5) PSOs and PAM operators are responsible for obtaining NMFS' approval. NMFS may approve PSOs and PAM operators as conditional or unconditional. A conditionally-approved PSO or PAM operator may be one who has completed training in the last 5 years but has not yet attained the requisite field experience. An unconditionally approved PSO or PAM operator is one who has completed training within the last 5 years and attained the necessary experience (*i.e.,* demonstrate experience with monitoring for marine mammals at clearance and shutdown zone sizes similar to those produced during the respective activity). Lead PSO(s) and Lead PAM operator(s) must be unconditionally approved and have a minimum of 90 days in a northwestern Atlantic Ocean offshore environment performing the role (either visual or acoustic), with the conclusion of the most recent relevant experience not

more than 18 months previous. A conditionally approved PSO or PAM operator must be paired with an unconditionally approved PSO or PAM operator;

(i) PSOs for HRG surveys may be unconditionally or conditionally approved. PSOs and PAM operators for foundation installation and UXO/MEC detonation must be unconditionally approved;

(ii) LOA Holder must submit NMFS previously approved PSOs and PAM operators to NMFS Office of Protected Resources for review and confirmation of their approval for specific roles at least 30 days prior to commencement of the activities requiring PSOs/PAM operators or 15 days prior to when new PSOs/PAM operators are required after activities have commenced;

(iii) For prospective PSOs and PAM operators not previously approved, or for PSOs and PAM operators whose approval is not current, LOA Holder must submit resumes for approval at least 60 days prior to PSO and PAM operator use. Resumes must include information related to relevant education, experience, and training, including dates, duration, location, and description of prior PSO or PAM operator experience. Resumes must be accompanied by relevant documentation of successful completion of necessary training and include which specific roles and activities the PSOs/PAM operators are being requested for. PAM operator experience must also include the information described in paragraph (a)(5)(iv) of this section;

(iv) PAM operators are responsible for obtaining NMFS approval. To be approved as a PAM operator, the person must meet the following qualifications: The PAM operator must demonstrate that they have prior large whale PAM experience with real-time acoustic detection systems and/or have completed specialized training for operating PAM systems that will be used for the Project; PAM operators must demonstrate that they are able to detect and identify Atlantic Ocean marine mammals sounds, in particular: North Atlantic right whale sounds, humpback whale sounds, and that they are able to deconflict humpback whale sounds from similar North Atlantic right whale sounds, and other co-occurring species' sounds in the area including sperm whales; must be able to distinguish between whether a marine mammal or other species sound is detected, possibly detected, or not detected and similar terminology must be used across companies/projects; where localization of sounds or deriving bearings and distance are possible, the PAM operators must have demonstrated experience in the localization of sounds or deriving bearings and distance; PAM operators must be independent observers (*i.e.,* not construction personnel); PAM operators must demonstrate experience with relevant acoustic software and equipment; PAM operators must have the qualifications and relevant experience/training to safely deploy and retrieve equipment and program the software, as necessary; PAM operators must be able to test software and hardware functionality prior to operation; and PAM operators must have evaluated their acoustic detection software using the PAM Atlantic baleen whale annotated data set available at National Centers for Environmental Information (NCEI) and provide evaluation/performance metric;

(6) All PSOs must be trained in northwestern Atlantic Ocean marine mammal identification and behaviors and must be able to conduct field observations and collect data according to assigned protocols. Additionally, PSOs must have the ability to work with all required and relevant software and equipment necessary during observations (as described in paragraphs (b)(5) and (6) of this section);

(7) At least one on-duty PSO and PAM operator, where applicable, for each activity (*i.e.,* foundation installation, UXO/MEC detonation activities, and HRG surveys) must be designated as the Lead PSO. The Lead PSO must be unconditionally approved; and

(8) PSOs may work as PAM operators and vice versa, pending NMFS-approval; however, they may only perform one role at any one time and must not exceed work time restrictions, which will be tallied cumulatively.

(b) *General PSO and PAM operator requirements.* The following measures apply to PSOs and PAM operators and must be implemented by LOA Holder:

(1) PSOs must monitor for marine mammals prior to, during, and following pile driving, drilling, UXO/MEC detonation activities, and HRG surveys that use sub- bottom profilers (with specific monitoring durations and needs described in paragraphs (c) through (f) of this section, respectively). Monitoring must be done while free from distractions and in a consistent, systematic, and diligent manner;

(2) PAM operator(s) must acoustically monitor for marine mammals prior to, during, and following all pile driving, drilling, and UXO/MEC detonation activities. PAM operators may be located on a vessel or remotely on-shore but must have the appropriate equipment (*i.e.,* computer station equipped with a data collection software system available wherever they are stationed) and be in real-time communication with PSOs and transiting vessel captains;

(3) All PSOs must be located at the best vantage point(s) on any platform, as determined by the Lead PSO, in order to obtain 360-degree visual coverage of the entire clearance and shutdown zones around the activity area, and as much of the Level B harassment zone as possible, PAM operators may be located on a vessel or remotely on-shore. The PAM operator(s) must assist PSOs in ensuring full coverage of the clearance and shutdown zones;

(4) All on-duty visual PSOs must remain in real-time contact with the on-duty PAM operator(s). PAM operators must immediately communicate all acoustic detections of marine mammals to PSOs, including any determination regarding species identification, distance, and bearing (where relevant) relative to the pile being driven and the degree of confidence (*e.g.,* detected, possibly detected, not detected) in the determination. All on-duty Lead PSOs and PAM operator(s) must remain in contact with the on-duty construction personnel responsible for implementing mitigations (*e.g.,* delay to pile driving or UXO/MEC detonation) to ensure communication on marine mammal observations can easily, quickly, and consistently occur between all on-duty PSOs, PAM operator(s), and on-water Project personnel.

(i) The on-duty PAM operator(s) must inform the on-duty Lead PSO(s) of animal detections approaching or within applicable ranges of interest to the activity occurring via the data collection software system, (*e.g.,* Mysticetus or similar system) who must be responsible for requesting that the designated crewmember implement the necessary mitigation procedures (*i.e.,* delay, shutdown); and

(ii) Any visual observations of marine mammals by any Project personnel must be communicated immediately to on-duty PSOs and vessel captains associated with other Project vessels to increase situational awareness.

(5) PSOs must use high magnification (25x) binoculars, standard handheld (7x) binoculars, and the naked eye to search continuously for marine mammals. During pile driving and drilling, at least the PSOs on the pile driving and drilling platform(s) and any dedicated PSO vessel that may be used must be equipped with functional Big Eye binoculars (*e.g.,* 25 x 150; 2.7 view angle; individual ocular focus; height control). These must be pedestal mounted on the deck at the best vantage

point that provides for optimal sea surface observation and PSO safety. A minimum of three on-duty PSOs must be active on a dedicated PSO vessel. PAM operators must have the appropriate equipment (*i.e.,* a computer station equipped with a data collection software system available wherever they are stationed) in accordance with a NMFS-approved PAM Plan;

(6) During all acoustic monitoring periods during the Project, PAM operators must use PAM systems approved by NMFS;

(7) During periods of low visibility (*e.g.,* darkness, rain, fog, poor weather conditions, *etc.*), PSOs must use alternative technology (*e.g.,* infrared or thermal cameras) to monitor the clearance and shutdown zones as approved by NMFS;

(8) PSOs and PAM operators must not exceed 4 consecutive watch hours on duty at any time, must have a 2-hour (minimum) break between watches, and must not exceed a combined watch schedule of more than 12 hours in a 24-hour period;

(9) Any PSO or PAM operator has the authority to call for a delay or shutdown of project activities;

(10) PSOs must remain in real-time contact with the PAM operators and construction personnel responsible for implementing mitigation (*e.g.,* delay to pile driving or UXO/MEC detonation) to ensure communication on marine mammal observations can easily, quickly, and consistently occur between all on-duty PSOs, PAM operator(s), and on-water Project personnel; and

(11) LOA Holder is required to use available sources of information on North Atlantic right whale presence to aid in monitoring efforts. These include daily monitoring of the Right Whale Sightings Advisory System, consulting of the WhaleAlert app, and monitoring of the Coast Guard's VHF Channel 16 throughout the day to receive notifications of any sightings and information associated with any DMA, to plan construction activities and vessel routes, if practicable, to minimize the potential for co-occurrence with North Atlantic right whales.

(c) *PSO and PAM operator requirements during WTG and ESP foundation installation.* The following measures apply to PSOs and PAM operators during WTG and ESP foundation installation and must be implemented by LOA Holder:

(1) PSOs and PAM operator(s) must monitor for marine mammals 60 minutes prior to, during, and 30 minutes following all pile-driving and drilling. If PSOs cannot visually monitor the minimum visibility zone prior to pile driving and drilling at all times using the equipment described in paragraphs (b)(5) and (7) of this section, pile driving and drilling operations must not commence or must shutdown if they are currently active;

(2) All PSOs and PAM operators must begin monitoring 60 minutes prior to pile driving and drilling, during, and for 30 minutes after the activity. Pile driving and drilling must only commence when the minimum visibility zone is fully visible (*e.g.,* not obscured by darkness, rain, fog, *etc.*) and the clearance zones are clear of marine mammals for at least 30 minutes, as determined by the Lead PSO, immediately prior to the initiation of pile driving or drilling. PAM operators must assist the visual PSOs in monitoring by conducting PAM activities 60 minutes prior to any pile driving or drilling, during, and after for 30 minutes for the appropriate size PAM clearance zone (dependent on season). The entire minimum visibility zone must be clear for at least 30 minutes, with no marine mammal detections within the visual or PAM clearance zones prior to the start of pile driving or drilling;

(3) LOA Holder must conduct PAM for at least 24 hours immediately prior to pile driving and drilling activities, The PAM operator must review all detections from the previous 24-hour period immediately prior to pile driving or drilling.

(4) During use of any real-time PAM system, at least one PAM operator must be designated to monitor each system by viewing data or data products that would be streamed in real-time or in near real-time to a computer workstation and monitor;

(5) The PAM operator must inform the Lead PSO(s) on duty of animal detections approaching or within applicable ranges of interest to the pile driving activity via the data collection software system (*i.e.,* Mysticetus or similar system) who will be responsible for requesting that the designated crewmember implement the necessary mitigation procedures (*i.e.,* delay or shutdown);

(6) All monitoring and reporting measures required for or applicable to jacket foundations are required for bottom-frame foundations that utilize pile foundations;

(7) LOA Holder must prepare and submit a Marine Mammal Monitoring Plan to NMFS Office of Protected Resources for review and approval at least 180 days before the planned start of any pile driving or drilling and abide by the plan if approved. LOA Holder must obtain both NMFS Office of Protected Resources and NMFS Greater Atlantic Regional Fisheries Office Protected Resources Division's concurrence with this plan prior to the start of any pile driving or drilling. The plan must include final foundation project design (*e.g.,* number and type of piles, hammer type, noise abatement systems, anticipated start date, *etc.*) and all information related to PAM and PSO monitoring protocols for foundation installation activities. No foundation pile installation can occur without NMFS' approval of the plan;

(8) LOA Holder must submit an SFV plan to NMFS Office of Protected Resources for review and approval at least 180 days prior to planned start of foundation installation activities and abide by the plan if approved. At minimum, the SFV Plan must describe how LOA Holder would ensure that the required foundation installation sites selected for SFV measurements are representative of the rest of the installation sites such that future pile installation events are anticipated to produce similar sound levels to those piles measured. In the case that these sites/scenarios are not determined to be representative of all other pile installation sites, LOA Holder must include information in the SFV Plan on how additional sites/scenarios would be selected for SFV measurements. This SFV Plan must also include methodology for collecting, analyzing, and preparing SFV measurement data for submission to NMFS Office of Protected Resources and describe how the effectiveness of the noise attenuation methodology would be evaluated based on the results. SFV for pile driving and drilling must not occur until NMFS approves the SFV Plan for this activity;

(9) LOA Holder must submit a Passive Acoustic Monitoring Plan (PAM Plan) to NMFS Office of Protected Resources for review and approval at least 180 days prior to the planned start of foundation installation activities and abide by the plan if approved. The PAM Plan must include a description of all proposed PAM equipment, address how the proposed passive acoustic monitoring must follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind. The plan must describe all proposed PAM equipment, procedures, and protocols including proof that vocalizing North Atlantic right whales will be detected within the PAM Monitoring Zone. No pile installation can occur if LOA Holder's PAM Plan does not receive approval from NMFS Office of Protected Resources and NMFS

GARFO Protected Resources Division; and

(10) LOA Holder must submit a Nighttime Monitoring Plan for foundation installation if LOA Holder intends to pile drive or drill outside the daily restriction in § 217.324(c). This plan must be submitted to NMFS Office of Protected Resources at least 180 calendar days before foundation installation is planned to begin. This plan(s) must contain a thorough description of how LOA Holder will monitor foundation installation activities (drilling, vibratory and impact pile driving) and at night, including proof of the efficacy of monitoring devices (*e.g.,* mounted thermal/infrared camera systems, hand-held or wearable NVDs, spotlights) in detecting marine mammals over the full extent of the required clearance and shutdown zones, including demonstration that the full extent of the minimum visibility zones can be effectively and reliably monitored. The plan must identify the efficacy of the technology at detecting marine mammals and sea turtles in the clearance and shutdown zones under all the various conditions anticipated during construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. If the plan does not include a full description of the proposed technology, monitoring methodology, and data demonstrating to NMFS' satisfaction that marine mammals can reliably and effectively be detected within the clearance and shutdown zones for monopiles and jacket foundations before and during foundation installation (drilling, vibratory and impact pile driving), nighttime foundation installation must not occur; the only exception would be if safety necessitates continuing pile installation after dark for a foundation that was initiated 1.5 hours prior to civil sunset, in which case the Low Visibility components of the Monitoring Plan would be implemented.

(d) *PSO requirements during UXO/MEC detonations.* The following measures apply to PSOs UXO/MEC detonations and must be implemented by LOA Holder:

(1) All on-duty visual PSOs must remain in contact with the on-duty PAM operator, who would monitor the PAM systems for acoustic detections of marine mammals in the area, regarding any animal detection that might be approaching or found within the applicable zones no matter where the PAM operator is stationed (*e.g.,* onshore or on a vessel);

(2) If PSOs cannot visually monitor the clearance zone at all times using the equipment described in paragraphs (b)(5) and (7) of this section; UXO/MEC operations must not commence or must shutdown if they are currently active;

(3) All PSOs must begin monitoring 60 minutes prior to UXO/MEC detonation, during, and for 30 minutes after the activity. UXO/MEC detonation must only commence when the minimum visibility zone is fully visible (*e.g.,* not obscured by darkness, rain, fog, *etc.*) and the clearance zones are clear of marine mammals for at least 30 minutes, as determined by the Lead PSO, immediately prior to the initiation of detonation. PAM operators must assist the visual PSOs in monitoring by conducting PAM activities 60 minutes prior to any UXO/MEC detonation, during, and after for 30 minutes for the appropriate size PAM clearance zone. The entire clearance zone must be clear for at least 30 minutes, with no marine mammal detections within the visual or PAM clearance zones prior to the initiation of detonation;

(4) For North Atlantic right whales, any visual or acoustic detection must trigger a delay to the commencement of UXO/MEC detonation. In the event that a large whale is sighted or acoustically detected that cannot be confirmed by species, it must be treated as if it were a North Atlantic right whale;

(5) LOA Holder must conduct PAM for at least 24 hours immediately prior to foundation installation and UXO/MEC detonation activities;

(6) During use of any real-time PAM system, at least one PAM operator must be designated to monitor each system by viewing data or data products that would be streamed in real-time or in near real-time to a computer workstation and monitor;

(7) LOA Holder must use a minimum of one PAM operator to actively monitor for marine mammals before, during, and after UXO/MEC detonation. The PAM operator must assist visual PSOs in ensuring full coverage of the clearance and shutdown zones. The PAM operator must inform the Lead PSO(s) on duty of animal detections approaching or within applicable ranges of interest to the activity occurring via the data collection software system (*i.e.,* Mysticetus or similar system) who will be responsible for requesting that the designated crewmember implement the necessary mitigation procedures (*i.e.,* delay or shutdown);

(8) PSOs and PAM operators must be on watch for a maximum of 4 consecutive hours, followed by a break of at least 2 hours between watches, and may not exceed a combined watch schedule of more than 12 hours in a single 24-hour period;

(9) LOA Holder must prepare and submit a Marine Mammal Monitoring Plan to NMFS Office of Protected Resources for review and approval at least 180 days before the start of any detonation and abide by the plan if approved. LOA Holder must obtain both NMFS Office of Protected Resources and NMFS Greater Atlantic Regional Fisheries Office Protected Resources Division's concurrence with this Plan prior to the start of any UXO/MEC detonation. The plan must include a description of how all relevant mitigation and monitoring requirements contained in the LOA and those included as part of the action will be implemented; a pile driving installation summary and sequence of events; a description of all monitoring equipment and evidence (*i.e.,* manufacturer's specifications, reports, testing) that it can be used to effectively monitor and detect marine mammals in the identified clearance and shutdown zones (*i.e.,* field data demonstrating reliable and consistent ability to detect large whales at the relevant distances in the conditions planned for use); communications and reporting details; final UXO/MEC detonation project design (*e.g.,* number and type of UXO/MECs, removal method(s), charge weight(s), anticipated start date, *etc.*) and all information related to PAM and PSO monitoring protocols (including number and location of PSOs) for UXO/MEC activities. The Plan(s) must demonstrate sufficient PSO and PAM Operator staffing (in accordance with watch shifts), PSO and PAM Operator schedules, and contingency plans for instances if additional PSOs and PAM Operators are required including any expansion of clearance and/or shutdown zones that may be required as a result of SFV. The plan(s) must contain a thorough description of how LOA Holder will monitor foundation installation activities (drilling, vibratory and impact pile driving) during reduced visibility conditions (*e.g.* rain, fog) and in other low visibility conditions, including proof of the efficacy of monitoring devices (*e.g.,* mounted thermal/infrared camera systems, hand-held or wearable NVDs, spotlights) in detecting marine mammals over the full extent of the required clearance and shutdown zones, including demonstration that the full extent of the minimum visibility zones can be effectively and reliably monitored. The plan must identify the efficacy of the technology at detecting marine mammals in the clearance and shutdown zones under all the various conditions anticipated during

construction, including varying weather conditions, sea states, and in consideration of the use of artificial lighting. The plan must contain a thorough description of how LOA Holder will monitor foundation installation activities during daytime when unexpected changes to lighting or weather occur during pile driving that prevent visual monitoring of the full extent of the clearance and shutdown zones. No UXO/MEC detonation can occur without NMFS' approval of the Plan;

(10) A Passive Acoustic Monitoring Plan (''PAM Plan'') must be submitted to NMFS Office of Protected Resources for review and approval at least 180 days prior to the planned start of foundation installation and prior to the start of any UXO/MEC detonation(s). The authorization to take marine mammals would be contingent upon NMFS Office of Protected Resources approval of the PAM Plan. The Plan must include a description of all proposed PAM equipment and hardware, the calibration data, bandwidth capability and sensitivity of hydrophones, and address how the proposed passive acoustic monitoring will follow standardized measurement, processing methods, reporting metrics, and metadata standards for offshore wind (Van Parijs *et al.,* 2021). The Plan must describe and include all procedures, documentation, and protocols including information (*i.e.,* testing, reports, equipment specifications) to support that it will be able to detect vocalizing whales within the clearance and shutdown zones, including deployment locations, procedures, detection review methodology, and protocols; hydrophone detection ranges with and without foundation installation activities and data supporting those ranges; communication time between call and detection, and data transmission rates between PAM Operator and PSOs on the pile driving vessel; where PAM Operators will be stationed relative to hydrophones and PSOs on pile driving vessel calling for delay/shutdowns; and a full description of all proposed software, call detectors, and filters. The Plan must also incorporate the requirements relative to North Atlantic right whale reporting. No UXO/MEC detonation can occur if LOA Holder's PAM Plan does not receive approval from NMFS Office of Protected Resources and NMFS GARFO Protected Resources Division; and

(11) LOA Holder must submit an SFV plan to NMFS Office of Protected Resources for review and approval at least 180 days prior to planned UXO/MEC detonation activities and abide by the plan if approved. LOA Holder must obtain both NMFS Office of Protected Resources and NMFS GARFO Protected Resources Division's concurrence with this Plan prior to the start of any UXO/MEC detonations. At minimum, the SFV Plan must include methodology for collecting, analyzing, and preparing SFV measurement data for submission to NMFS Office of Protected Resources and describe how the effectiveness of the noise attenuation methodology would be evaluated based on the results. SFV for UXO/MEC detonation must not occur until NMFS approves the SFV Plan for this activity.

(e) *PSO requirements during HRG surveys.* The following measures apply to PSOs during HRG surveys using boomers, and sparkers and must be implemented by LOA Holder:

(1) Between four and six PSOs must be present on every 24-hour survey vessel and two to three PSOs must be present on every 12-hour survey vessel;

(2) At least one PSO must be on active duty monitoring during HRG surveys conducted during daylight (*i.e.,* from 30 minutes prior to civil sunrise through 30 minutes following civil sunset) and at least two PSOs must be on activity duty monitoring during HRG surveys conducted at night;

(3) PSOs on HRG vessels must begin monitoring 30 minutes prior to activating acoustic sources, during the use of these acoustic sources, and for 30 minutes after use of these acoustic sources has ceased. Any observations of marine mammals must be communicated to PSOs on all nearby survey vessels during concurrent HRG surveys; and

(4) During daylight hours when survey equipment is not operating, LOA Holder must ensure that visual PSOs conduct, as rotation schedules allow, observations for comparison of sighting rates and behavior with and without use of the specified acoustic sources. Off-effort PSO monitoring must be reflected in the monthly PSO monitoring reports.

(f) *Reporting.* LOA Holder must comply with the following reporting measures:

(1) Prior to initiation of the specified activities, LOA Holder must demonstrate in a report submitted to NMFS Office of Protected Resources that all required training for LOA Holder personnel (including the vessel crews, vessel captains, PSOs, and PAM operators) has been completed;

(2) LOA Holder must use a standardized reporting system during the effective period of the LOA. All data collected related to the Project must be recorded using industry-standard software that is installed on field laptops and/or tablets. Unless stated otherwise, all reports must be submitted to NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*), dates must be in MM/DD/YYYY format, and location information must be provided in Decimal Degrees and with the coordinate system information (*e.g.,* NAD83, WGS84, *etc.*);

(3) For all monitoring efforts and marine mammal sightings, the following information must be collected and reported to NMFS Office of Protected Resources: Date and time that monitored activity begins or ends; the construction activities occurring during each observation period; the watch status (*i.e.,* sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform); the PSO who sighted the animal; the time of sighting; the weather parameters (*e.g.,* wind speed, percent cloud cover, visibility); the water conditions (*e.g.,* Beaufort sea state, tide state, water depth); all marine mammal sightings, regardless of distance from the construction activity; species (or lowest possible taxonomic level possible); the pace of the animal(s); the estimated number of animals (minimum/maximum/high/low/best); the estimated number of animals by cohort (*e.g.,* adults, yearlings, juveniles, calves, group composition, *etc.*); the description (*i.e.,* as many distinguishing features as possible of each individual seen, including length, shape, color, pattern, scars or markings, shape and size of dorsal fin, shape of head, and blow characteristics); the description of any marine mammal behavioral observations (*e.g.,* observed behaviors such as feeding or traveling) and observed changes in behavior, including an assessment of behavioral responses thought to have resulted from the specific activity; the animal's closest distance and bearing from the pile being driven or specified HRG equipment and estimated time entered or spent within the Level A harassment and/or Level B harassment zone(s); the activity at time of sighting (*e.g.,* vibratory installation/removal, impact pile driving, construction survey), use of any noise attenuation device(s), and specific phase of activity (*e.g.,* ramp-up of HRG equipment, HRG acoustic source on/off, soft-start for pile driving, active pile driving, *etc.*); the marine mammal occurrence in Level A harassment or Level B harassment zones; the description of any mitigation-related action implemented, or mitigation-related actions called for but not implemented, in response to the sighting (*e.g.,* delay, shutdown, *etc.*) and

time and location of the action; and other human activity in the area, and; other applicable information, as required in any LOA issued under the final rule;

(4) If a marine mammal is acoustically detected during PAM monitoring, the following information must be recorded and reported to NMFS Office of Protected Resources: Location of hydrophone (latitude & longitude; in Decimal Degrees) and site name; bottom depth and depth of recording unit (in meters); recorder (model & manufacturer) and platform type (*i.e.,* bottom-mounted, electric glider, *etc.*), and instrument ID of the hydrophone and recording platform (if applicable); time zone for sound files and recorded date/times in data and metadata (in relation to Universal Coordinated Time (UTC); *i.e.,* Eastern Standard Time (EST) time zone is UTC–5); duration of recordings (start/end dates and times; in International Organization for Standardization (ISO) 8601 format, yyyy-mm-ddTHH:MM:SS.sssZ); deployment/retrieval dates and times (in ISO 8601 format); recording schedule (must be continuous); hydrophone and recorder sensitivity (in dB re 1 microPascal (μPa)); calibration curve for each recorder; bandwidth/ sampling rate (in Hz); sample bit-rate of recordings; and, detection range of equipment for relevant frequency bands (in meters);

(5) For each detection, the following information must be noted:

(i) Species identification (if possible); call type and number of calls (if known); temporal aspects of vocalization (date, time, duration, *etc.;* date times in ISO 8601 format); confidence of detection (detected, or possibly detected); comparison with any concurrent visual sightings; location and/or directionality of call (if determined) relative to acoustic recorder or construction activities; location of recorder and construction activities at time of call; name and version of detection or sound analysis software used, with protocol reference; minimum and maximum frequencies viewed/monitored/used in detection (in Hz); and name of PAM operator(s) on duty.

(ii) [Reserved]

(6) LOA Holder must compile and submit weekly reports to NMFS Office of Protected Resources that document the daily start and stop of all pile driving, drilling, UXO/MEC detonations, and HRG survey associated with the Project; the foundation/pile ID, type of pile, pile diameter, start and finish time of each drilling and pile driving event, hammer log (number of strikes, max hammer energy, duration of piling) per pile, any changes to noise attenuation systems and/or hammer schedule, the start and stop of associated observation periods by PSOs and PAM operators; details on the deployment of PSOs and PAM operators; a record of all detections of marine mammals (acoustic and visual) including time (UTC) of sighting/ detection, species ID, behavior, distance (meters) from vessel to animal at time of sighting/detection (meters), animal distance (meters) from pile installation vessel and UXO/MEC detonation site, vessel/project activity at time of sighting/detection, platform/vessel name, and mitigation measures taken (if any) and reason. Sightings/detections during pile driving, drilling, and UXO/ MEC activities (clearance, active pile driving and drilling, post-pile driving and drilling and detonation) and all other (transit, opportunistic, *etc.*) sightings/detection must be reported and identified as such; any mitigation actions (or if mitigation actions could not be taken, provide reasons why); and details on the noise attenuation system(s) used and its performance. Weekly reports are due on Wednesday for the previous week (Sunday—Saturday), can consist of Quality Assurance/Quality Compliance (QA/ QC) reviewed data, and must include the information required under this section. The weekly report must also identify which turbines become operational and when (a map must be provided). This weekly report must also identify when, what charge weight size, and where UXO/MECs are detonated (a map must also be provided). The weekly reports must also confirm that the required SFV was carried out for each pile and UXO/MEC detonation and that results were reviewed on the required timelines. Abbreviated SFV reports must be appended to the weekly report. Once all foundation pile installation and UXO/MEC detonations are completed, weekly reports are no longer required by LOA Holder;

(7) LOA Holder must compile and submit monthly reports to NMFS Office of Protected Resources that include a summary of all information in the weekly reports, including project activities carried out in the previous month, including dates and location of any fisheries surveys carried out, vessel transits (number, type of vessel, MMIS number, number of transits, vessel activity, and route (origin and destination, including transits from all ports, foreign and domestic)), cable installation activities (including sea to shore transition),number of piles installed and pile IDs, UXO/MEC detonation, all detections of marine mammals (sightings/detections must include species ID, time, date, initial detection distance, vessel/platform name, vessel activity, vessel speed, bearing to animal, project activity), and any mitigative action taken (or if mitigation actions could not be taken, provide reasons why). Monthly reports are due on the 15th of the month for the previous month. The monthly report must also identify which turbines become operational and when (a map must be provided). This weekly report must also identify when, what charge weight size, and where UXO/MECs are detonated (a map must also be provided);

(8) LOA Holder must submit a draft annual report to NMFS Office of Protected Resources no later than 90 days following the end of a given calendar year. LOA Holder must provide a final report within 30 days following resolution of NMFS's comments on the draft report. The draft and final reports must detail the following:

(i) A summary of all activities conducted, the dates and locations of all fisheries surveys, including location and duration for all trawl surveys summarized by month, number of vessel transits inclusive of port of origin and destination, and a summary table of any observations and captures of Endangered Species Act (ESA) listed species during these surveys. The report must also summarize all acoustic telemetry and benthic monitoring activities that occurred, inclusive of vessel transits. Each annual report is due by February 15 (*e.g.,* the report for 2024 activities is due by February 15, 2025). The total number of marine mammals of each species/stock detected and how many were within the designated Level A harassment and Level B harassment zone(s) with comparison to authorized take of marine mammals for the associated activity type; marine mammal detections and behavioral observations before, during, and after each activity; what mitigation measures were implemented (*i.e.,* number of shutdowns or clearance zone delays, *etc.*) or, if no mitigative actions was taken, why not; operational details (*i.e.,* days and duration of impact and vibratory pile driving, days and duration of drilling, days and number of UXO/MEC detonations, days and amount of HRG survey effort, *etc.*); any PAM systems used; The results, effectiveness, and which noise attenuation systems were used during relevant activities (*i.e.,* impact and vibratory pile driving, drilling, and UXO/MEC detonations); summarized

information related to situational reporting; and any other important information relevant to the Project, including additional information that may be identified through the adaptive management process. The final annual report must be prepared and submitted within 30 calendar days following the receipt of any comments from NMFS Office of Protected Resources on the draft report. If no comments are received from NMFS Office of Protected Resources within 60 calendar days of NMFS Office of Protected Resources' receipt of the draft report, the report must be considered final.

(ii) [Reserved]

(9) LOA Holder must submit its draft final report to NMFS Office of Protected Resources on all visual and acoustic monitoring conducted within 90 calendar days of the completion of the specified activities. A 5-year report must be prepared and submitted within 60 calendar days following receipt of any NMFS Office of Protected Resources comments on the draft report. If no comments are received from NMFS Office of Protected Resources within 60 calendar days of NMFS Office of Protected Resources receipt of the draft report, the report shall be considered final. The draft and final 5-year report must include, but is not limited to: the total number (annually and across all 5 years) of marine mammals of each species/stock detected and how many were detected within the designated Level A harassment and Level B harassment zone(s) with comparison to authorized take of marine mammals for the associated activity; a summary table(s) indicating the amount of each activity type (*e.g.,* pile installation, UXO/MEC detonations, HRG) completed in each of the 5 years and total; Geographic Information System (GIS) shapefile(s) of the final location of all piles, cable routes, and other permanent structures including an indication of what year installed and began operating; GIS shapefile of all North Atlantic right whale sightings, including dates and group sizes; a 5-year summary and evaluation of all SFV data collected; a 5-year summary and evaluation of all PAM data collected; a 5-year summary and evaluation of marine mammal behavioral observations; a 5-year summary and evaluation of mitigation and monitoring implementation and effectiveness; and a list of recommendations to inform environmental compliance assessments for future offshore wind actions;

(10) LOA Holder must submit a SFV plan at least 180 days prior to the planned start of vibratory and impact pile driving, drilling, and UXO/MEC detonations. The plan must detail all plans and procedures for noise attenuation, including procedures for adjusting and optimizing the noise attenuation system(s), maintenance procedures and timelines, and detail the available contingency noise attenuation measures/systems if distances to modeled isopleths of concern are exceeded (as documented during SFV). At minimum, the plan must describe how LOA Holder would ensure that the first three monopile and two jacket (using pin piles) foundation installation sites selected for SFV are representative of the rest of the monopile and pin pile installation sites. LOA Holder must provide justification for why these locations are representative of the scenario modeled. The plan must describe how LOA Holder will conduct the required Abbreviated SFV, inclusive of requirements to review results within 24 hours and triggers for Thorough SFV. The plan must provide a table of the identification number and coordinates of each foundation location, and specify the underwater acoustics analysis model scenario against which each foundation location's SFV results will be compared. The plan(s) must also include the piling schedule and sequence of events, communication and reporting protocols, and methodology for collecting, analyzing, and preparing SFV data for submission to NMFS, including instrument deployment, locations of all hydrophones (including direction and distance from the pile), hydrophone sensitivity, recorder/measurement layout, and analysis methods. The plan must also identify the number and distance of relative location of hydrophones for Thorough and Abbreviated SFV. The plan must include a template of the interim report to be submitted and describe all the information that will be reported in the SFV Interim Reports including the number, location, depth, distance, and predicted and actual isopleth distances that will be included in the final report(s). The plan must describe how the interim SFV report results will be evaluated against the modeled results, including which modeled scenario the results will be reported against, and include a decision tree of what happens if measured values exceed predicted values. The plan must address how LOA Holder will implement the measures associated with the required SFV which includes, but is not limited to, identifying additional or modified noise attenuation measures (*e.g.,* additional noise attenuation device, adjust hammer operations, adjust or modify the noise mitigation system) that will be applied to reduce sound levels if measured distances are greater than those modeled as well as implementation of any expanded clearance or shutdown zones, including deployment of additional PSOs. In the case that these sites/scenarios are not determined to be representative of all other monopile/pin pile installation sites, LOA Holder must include information on how additional sites/scenarios would be selected for SFV. The plan must also include methodology for collecting, analyzing, and preparing SFV data for submission to NMFS Office of Protected Resources. The plan must describe how the effectiveness of the noise attenuation methodology would be evaluated based on the results.

(i) LOA Holder must also provide, as soon as they are available but no later than 48 hours after each installation, the initial results of the SFV measurements to NMFS Office of Protected Resources in an interim report after each monopile for the first three piles, after two jacket foundation using pin piles are installed, and after each UXO/MEC detonation; The plan must describe how LOA Holder will conduct the required Thorough SFV for all planned UXO/MEC detonations. Thorough SFV consists of: SFV measurements made at a minimum of four distances from the detonation, along a single transect, in the direction of lowest transmission loss (*i.e.,* projected lowest transmission loss coefficient), including, but not limited to, 750 m and three additional ranges selected such that measurement of identified isopleths are accurate, feasible, and avoid extrapolation. At least one additional measurement at an azimuth 90 degrees from the array at approximately 750 m must be made. At each location, there must be a near bottom and mid-water column hydrophone (measurement systems). The plan must describe how the interim SFV report results will be evaluated against the modeled results and decision tree of what happens if measured values exceed predicted values. The plan must address how LOA Holder will implement the measures associated with the required SFV which includes, but is not limited to, identifying additional or modified noise attenuation measures (*e.g.,* additional noise attenuation device, adjust hammer operations, adjust or modify the noise mitigation system) that will be applied to reduce sound levels if measured distances are greater than those modeled as well as implementation of any expanded clearance or shutdown zones, including deployment of additional PSOs;

(ii) The interim report must include data from hydrophones identified for interim reporting in the SFV Plan and include a summary of pile installation activities (pile diameter, pile weight, pile length, water depth, sediment type, hammer type, total strikes, total installation time (start time, end time), duration of pile driving, max single strike energy, NAS deployments), pile location, recorder locations, modeled and measured distances to thresholds, received levels (rms, peak, and sound exposure level (SEL)) results from Conductivity, Temperature, and Depth (CTD) casts/sound velocity profiles, signal and kurtosis rise times, pile driving plots, activity logs, weather conditions. Additionally, any important noise attenuation device malfunctions (suspected or definite), must be summarized and substantiated with data (*e.g.* photos, positions, environmental data, directions, *etc.*). Such malfunctions include gaps in the bubble curtain, significant drifting of the bubble curtain, and any other issues which may indicate sub-optimal mitigation performance or are used by LOA Holder to explain performance issues;

(iii) The SFV plan must also include how operational noise would be monitored. LOA Holder must estimate source levels (at 10 m from the operating foundation) based on received levels measured at distances described in a NMFS-approved SFV plan for operations. These data must be used to identify estimated transmission loss rates. Operational parameters (*e.g.,* direct drive/gearbox information, turbine rotation rate) as well as sea state conditions and information on nearby anthropogenic activities (*e.g.,* vessels transiting or operating in the area) must be reported;

(iv) For those foundations and UXO/MEC detonations requiring Thorough SFV measurements, LOA Holder must provide the initial results of the SFV measurements to NMFS Office of Protected Resources in an interim report after each foundation installation event as soon as they are available and prior to any subsequent foundation installation, but no later than 48 hours after each completed foundation installation event. The report must include hammer energies/schedule used during pile driving or UXO/MEC weight (including donor charge weight), the model-estimated acoustic ranges (R95%) to compare with the real-world sound field measurements, estimated source levels at 1 m and/or 10 m, peak sound pressure level (SPLpk) and median, mean, maximum, and minimum root-mean-square sound pressure level that contains 90 percent of the acoustic energy (SPLrms) and sound exposure level (SEL, in single strike for pile driving (SELs-s) and SELcum) for each hydrophone, including at least the maximum, arithmetic mean, minimum, median (L50) and L5 (95 percent exceedance) statistics for each metric; estimated marine mammal Level A harassment and Level B harassment acoustic isopleths, calculated using the maximum-over-depth L5 (95 percent exceedance level, maximum of both hydrophones) of the associated sound metric; comparison of modeled results assuming 10-dB attenuation against the measured marine mammal Level A harassment and Level B harassment acoustic isopleths; estimated transmission loss coefficients; pile identifier name, location of the pile and each hydrophone array in latitude/longitude; depths of each hydrophone; one-third-octave band single strike SEL spectra; if filtering is applied, full filter characteristics must be reported; and hydrophone specifications including the type, model, and sensitivity. LOA Holder must also report any immediate observations which are suspected to have a significant impact on the results including but not limited to: observed noise mitigation system issues, obstructions along the measurement transect, and technical issues with hydrophones or recording devices. If any in situ calibration checks for hydrophones reveal a calibration drift greater than 0.75 dB, pistonphone calibration checks are inconclusive, or calibration checks are otherwise not effectively performed, LOA Holder must indicate full details of the calibration procedure, results, and any associated issues in the 48-hour interim reports;

(v) All results from Abbreviated SFV must be included in the weekly reports. The report must include estimated source levels at 1 m or 10 m and the measured SELcum noise levels at distance. Any indications that distances to the identified Level A harassment and Level B harassment thresholds for marine mammals were exceeded must be addressed by LOA Holder, including an explanation of factors that contributed to the exceedance and corrective actions that were taken to avoid exceedance on subsequent piles;

(vi) The final results of all SFV measurements from each foundation installation and UXO/MEC detonations must be submitted as soon as possible, but no later than within 90 days following completion of each event's SFV measurements. The final results of Thorough SFV for UXO/MEC detonations must be submitted as soon as possible, but no later than within 90 days following completion of each UXO/MEC detonation. Within 60 days of the end of each construction season, LOA Holder must compile and submit all final Abbreviated SFV reports. The final reports must include all details included in the interim report and descriptions of any notable occurrences, explanations for results that were not anticipated, or actions taken during foundation installation. The final report must also include at least the maximum, mean, minimum, median (L50) and L5 (95 percent exceedance) statistics for each metric; the SEL and SPL power spectral density and/or one-third octave band levels (usually calculated as decidecade band levels) at the receiver locations should be reported; range of transmission loss coefficients; the local environmental conditions, such as wind speed, transmission loss data collected on-site (or the sound velocity profile); baseline pre- and post-activity ambient sound levels (broadband and/or within frequencies of concern); a description of depth and sediment type, as documented in the Construction and Operation Plan (COP), at the recording and foundation installation and UXO/MEC detonation locations; the extents of the measured Level A harassment and Level B harassment zone(s); hammer energies required for pile installation and the number of strikes per pile; and charge weights and other relevant characteristics of UXO/MEC detonations; the hydrophone equipment and methods (*i.e.,* recording device, bandwidth/sampling rate, distance from the monopile/pin pile and/or UXO/MEC where recordings were made; depth of recording device(s)); a description of the SFV measurement hardware and software, including software version used, calibration data, bandwidth capability and sensitivity of hydrophone(s), any filters used in hardware or software, any limitations with the equipment, and other relevant information; the spatial configuration of the noise attenuation device(s) relative to the pile and/or UXO/MEC charge; a description of the noise abatement system and operational parameters (*e.g.,* bubble flow rate, distance deployed from the pile and/or UXO/MEC, *etc.*) and any action taken to adjust the noise abatement system. A discussion which includes any observations which are suspected to have a significant impact on the results including but not limited to: observed noise mitigation system issues, obstructions along the measurement transect, and technical issues with hydrophones or recording devices. LOA Holder must submit a revised report within 30 days following

receipt of NMFS' comments on the draft final report;

(vii) LOA Holder must submit SFV results from UXO/MEC detonation monitoring in a report prior to detonating a subsequent UXO/MEC or within the relevant weekly report, whichever comes first. The report must include, at minimum, the size of UXO/MEC detonated and donor charge weight, why detonation was necessary, current speeds, SELcum, a description of the noise abatement system and operational parameters (*e.g.,* bubble flow rate, distance deployed from the detonation, *etc.*) and any action taken to adjust the noise abatement system, modeled and SFV-based estimated ranges to all relevant NMFS explosive thresholds (including those from pressure transducer measurements); and

(viii) If at any time during the project LOA Holder becomes aware of any issue or issues which may (to any reasonable subject-matter expert, including the persons performing the measurements and analysis) call into question the validity of any measured Level A harassment or Level B harassment isopleths to a significant degree, which were previously transmitted or communicated to NMFS Office of Protected Resources, LOA Holder must inform NMFS Office of Protected Resources within 1 business day of becoming aware of this issue or before the next pile is driven, whichever comes first.

(11) If a North Atlantic right whale is acoustically detected at any time by a project-related PAM system, LOA Holder must ensure the detection is reported as soon as possible to NMFS, but no longer than 24 hours after the detection via the 24-hour North Atlantic right whale Detection Template (*https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates*). Calling the hotline is not necessary when reporting PAM detections via the template. Full detection data, metadata, and location of recorders (or GPS tracks, if applicable) from all real-time hydrophones used for monitoring during construction must be submitted within 90 calendar days following completion of activities requiring PAM for mitigation via the ISO standard metadata forms available on the NMFS Passive Acoustic Reporting System website (*https://www.fisheries.noaa.gov/resource/document/passive-acoustic-reporting-system-templates*). Submit the completed data templates to *nmfs.nec.pacmdata@noaa.gov.* The full acoustic recordings from real-time systems must also be sent to the NCEI for archiving within 90 days following completion of activities requiring PAM for mitigation. Submission details can be found at: *https://www.ncei.noaa.gov/products/passive-acoustic-data;*

(12) LOA Holder must submit situational reports if the following circumstances occur, including all instances wherein an exemption is taken must be reported to NMFS Office of Protected Resources within 24 hours, in specific circumstances, including but not limited to the following:

(i) All sightings of North Atlantic right whale must be reported immediately (no later than 24 hours). If a North Atlantic right whale is sighted with no visible injuries or entanglement at any time by project PSOs or project personnel, LOA Holder must immediately report the sighting to NMFS. If immediate reporting is not possible, the report must be submitted as soon as possible but no later than 24 hours after the initial sighting. All North Atlantic right whale acoustic detections within a 24-hour period should be collated into one spreadsheet and reported to NMFS as soon as possible but no later than 24 hours.

(A) To report sightings and acoustic detections, download and complete the Real-Time North Atlantic Right Whale Reporting Template spreadsheet found here: *https://www.fisheries.noaa.gov/resource/document/template-datasheet-real-time-north-atlantic-right-whale-acoustic-and-visual.* Save the completed spreadsheet as a .csv file and email it to NMFS Northeast Fisheries Science Center Protected Species Division (NEFSC–PSD) (*ne.rw.survey@noaa.gov*), NMFS GARFO Protected Species Division (PRD) (*nmfs.gar.incidental-take@noaa.gov*), and NMFS Office of Protected Resources (*pr.itp.monitoringreports@noaa.gov*). If the sighting is in the Southeast (North Carolina through Florida), report via the template and to the Southeast Hotline 877–WHALE–HELP (877–942–5343) with the observation information provided below (PAM detections are not reported to the Hotline). If unable to report a sighting through the spreadsheet within 24 hours, call the relevant regional hotline (Greater Atlantic Region [Maine through Virginia] Hotline 866–755–6622; Southeast Hotline 877–WHALE–HELP) with the observation information provided below (PAM detections are not reported to the Hotline).

(B) The following information must be reported: the time (note time format), date (MM/DD/YYYY), location (latitude/longitude in decimal degrees; coordinate system used) of the observation, number of whales, animal description/certainty of observation (follow up with photos/video if taken), reporter's contact information, and lease area number/project name, PSO/personnel name who made the observation, and PSO provider company (if applicable) (PAM detections are not reported to the Hotline). If unable to report via the template or the regional hotline, enter the sighting via the WhaleAlert app (*http://www.whalealert.org/*). If this is not possible, report the sighting to the U.S. Coast Guard via channel 16. The report to the Coast Guard must include the same information as would be reported to the Hotline (see above). PAM detections are not reported to WhaleAlert or the U.S. Coast Guard.

(C) If a large whale species is observed that is not a North Atlantic right whale, LOA Holder must report the sighting via the WhaleAlert app (*http://www.whalealert.org/*) as soon as possible but within 24 hours.

(ii) In the event that personnel involved in the Project discover a stranded, entangled, injured, or dead marine mammal, LOA Holder must immediately report the observation to NMFS. If in the Greater Atlantic Region (Maine through Virginia), call the NMFS Greater Atlantic Stranding Hotline (866–755–6622), and if in the Southeast Region (North Carolina through Florida) call the NMFS Southeast Stranding Hotline (877–WHALE–HELP (877–942–5343)). Separately, LOA Holder must report, within 24 hours, the incident to NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*) and, if in the Greater Atlantic Region to the NMFS GARFO (*nmfs.gar.incidental-take@noaa.gov*) or if in the Southeast Region, to the NMFS Southeast Regional Office (SERO; *secmammalreports@noaa.gov*). Note, the stranding hotline may request the report be sent to the local stranding network response team. The report must include contact information (*e.g.,* name, phone number, *etc.*); time, date, and location (*i.e.,* specify coordinate system) of the first discovery (and updated location information, if known and applicable); species identification (if known) or description of the animal(s) involved; condition of the animal(s) (including carcass condition if the animal is dead); observed behaviors of the animal(s) (if alive); photographs or video footage of the animal(s) (if available); and general circumstances under which the animal was discovered.

(iii) In the event of a suspected or confirmed vessel strike of a marine mammal by any vessel associated with the Project or other means by which Project activities caused a non-auditory injury or death of a marine mammal,

LOA Holder must immediately report the incident to NMFS. If in the Greater Atlantic Region (Maine through Virginia), call the NMFS Greater Atlantic Stranding Hotline (866–755–6622), and if in the Southeast Region (North Carolina through Florida) call the NMFS Southeast Stranding Hotline (877–WHALE–HELP (877–942–5343)). Separately, LOA Holder must immediately report the incident to NMFS Office of Protected Resources (*PR.ITP.MonitoringReports@noaa.gov*) and, if in the Greater Atlantic Region to the NMFS GARFO (*nmfs.gar.incidental-take@noaa.gov*) or if in the Southeast Region, to the NMFS SERO (*secmammalreports@noaa.gov*). The report must include time, date, and location (*i.e.,* specify coordinate system)) of the incident; species identification (if known) or description of the animal(s) involved (*i.e.,* identifiable features including animal color, presence of dorsal fin, body shape and size, *etc.*); vessel strike reporter information (name, affiliation, email for person completing the report); vessel strike witness (if different than reporter) information (*e.g.,* name, affiliation, phone number, platform for person witnessing the event, *etc.*); vessel name and/or MMSI number; vessel size and motor configuration (inboard, outboard, jet propulsion); vessel's speed leading up to and during the incident; vessel's course/heading and what operations were being conducted (if applicable); part of vessel that struck marine mammal (if known); vessel damage notes; status of all sound sources in use at the time of the strike; if the marine mammal was seen before the strike event; description of behavior of the marine mammal before the strike event (if seen) and behavior immediately following the strike; description of avoidance measures/requirements that were in place at the time of the strike and what additional measures were taken, if any, to avoid strike; environmental conditions (*e.g.,* wind speed and direction, Beaufort sea state, cloud cover, visibility, *etc.*) immediately preceding the strike; estimated (or actual, if known) size and length of marine mammal that was struck; if available, description of the presence and behavior of any other marine mammals immediately preceding the strike; other animal-specific details if known (*e.g.,* length, sex, age class); behavior or estimated fate of the marine mammal post-strike (*e.g.,* dead, injured but alive, injured and moving, external visible wounds (linear wounds, propeller wounds, non-cutting blunt-force trauma wounds), blood or tissue observed in the water, status unknown, disappeared); to the extent practicable, any photographs or video footage of the marine mammal(s); and, any additional notes the witness may have from the interaction. For any numerical values provided (*i.e.,* location, animal length, vessel length, *etc.*), please provide if values are actual or estimated. LOA Holder must immediately cease activities until the NMFS Office of Protected Resources 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 LOA(s). NMFS Office of Protected Resources may impose additional measures to minimize the likelihood of further prohibited take and ensure MMPA compliance. LOA Holder must not resume their activities until notified by NMFS Office of Protected Resources.

(13) LOA Holder must report any lost gear associated with the fishery surveys to the NOAA GARFO–PRD (*nmfs.gar.incidental-take@noaa.gov*) as soon as possible or within 24 hours of the documented time of missing or lost gear. This report must include information on any markings on the gear and any efforts undertaken or planned to recover the gear;

(14) LOA Holder must provide NMFS Office of Protected Resources with notification of planned UXO/MEC detonation as soon as possible but at least 48 hours prior to the planned detonation, unless this 48-hour notification would create delays to the detonation that would result in imminent risk of human life or safety. This notification must include the coordinates of the planned detonation, the estimated charge size, and any other information available on the characteristics of the UXO/MEC. If an UXO/MEC detonation occurs, within 72 hours after a detonation but before the next detonation, whichever is sooner, LOA Holder must report to NMFS Office of Protected Resources the time, date, location (latitude/longitude Decimal Degrees), charge weight size, justification on why detonation was necessary and other means of removal or avoidance could not occur, all detections of marine mammals within the UXO/MEC zones, and any mitigative action taken; and

(15) Performance reports for piles with SFV must be submitted by LOA Holder with the weekly pile driving reports. For UXO/MEC detonations, the report must be submitted as soon as it is available, but no later than when the interim SFV report is submitted for the UXO/MEC detonation.

(16) Performance reports for each bubble curtain deployed must include water depth, current speed and direction, wind speed and direction, bubble curtain deployment/retrieval date and time, bubble curtain hose length, bubble curtain radius (distance from pile), diameter of holes and hole spacing, air supply hose length, compressor type (including rated Cubic Feet per Minute (CFM) and model number), number of operational compressors, performance data from each compressor (including Revolutions Per Minute (RPM), pressure, start times, and stop times), free air delivery (m^3/min), total hose air volume (m^3/(min m)), schematic of GPS waypoints during hose laying, maintenance procedures performed (pressure tests, inspections, flushing, re-drilling, and any other hose or system maintenance) before and after installation and timing of those tests, and the length of time the bubble curtain was on the seafloor prior to foundation installation.

(i) The report must include any important observations regarding performance (before, during, and after pile installation or UXO/MEC detonation), such as any observed weak areas of low pressure. The report may also include any relevant video and/or photographs of the bubble curtain(s) operating during pile driving (inclusive of relief drilling) and UXO/MEC detonation.

(ii) [Reserved].

§ 217.326 Letter of Authorization.

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

(b) A LOA, unless suspended or revoked, may be effective for a period of time not to exceed March 26, 2030, the expiration date of this subpart.

(c) In the event of projected changes to the activity or to mitigation and monitoring measures required by an LOA, LOA Holder must apply for and obtain a modification of the LOA as described in § 217.327.

(d) The LOA must set forth:

(1) Permissible methods of incidental taking;

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

(3) Requirements for monitoring and reporting.

(e) Issuance of the LOA must be based on a determination that the level of taking must be consistent with the findings made for the total taking

allowable under the regulations of this subpart.

(f) Notice of issuance or denial of an LOA must be published in the **Federal Register** within 30 days of a determination.

§ 217.327 Modifications of Letter of Authorization.

(a) A LOA issued under §§ 217.322 and 217.326 or this section for the activity identified in § 217.320(c) shall be modified, upon request by LOA Holder, provided that:

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

(2) NMFS determines that the mitigation, monitoring, or reporting measures required by the previous LOA under this subpart were implemented.

(b) For a LOA modification request by the applicant that includes changes to the activity or the mitigation, monitoring, or reporting measures (excluding changes made pursuant to the adaptive management provision in paragraph (c)(1) of this section), the LOA shall be modified, provided that:

(1) NMFS determines that the changes to the activity or the mitigation, monitoring, or reporting do not change the findings made for the regulations in this subpart and do not result in more than a minor change in the total estimated number of takes (or distribution by species or years), and

(2) NMFS may publish a notice of proposed modified LOA in the **Federal Register**, including the associated analysis of the change, and solicit public comment before issuing the LOA.

(c) A LOA issued under §§ 217.322 and 217.326 or this section for the activities identified in § 217.320(a) may be modified by NMFS Office of Protected Resources under the following circumstances:

(1) Through adaptive management, NMFS may modify (including remove, revise, or add to) the existing mitigation, monitoring, or reporting measures after consulting with LOA Holder regarding the practicability of the modifications, if doing so creates a reasonable likelihood of more effectively accomplishing the goals of the mitigation and monitoring measures set forth in this subpart;

(i) Possible sources of data that could contribute to the decision to modify the mitigation, monitoring, or reporting measures in an LOA include, but are not limited to:

(A) Results from LOA Holder's monitoring;

(B) Results from other marine mammals 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 this subpart or subsequent LOA.

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

(2) If the NMFS Office of Protected Resources determines that an emergency exists that poses a significant risk to the well-being of the species or stocks of marine mammals specified in the LOA issued pursuant to §§ 217.322 and 217.326 or this section, a LOA may be modified without prior notice or opportunity for public comment. Notice would be published in the **Federal Register** within 30 days of the action.

§§ 217.328–217.329 [Reserved]

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