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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XG612

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Site Characterization Surveys off the Coast of North Carolina

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

ACTION: Notice; issuance of an incidental harassment authorization.

SUMMARY: In accordance with the regulations implementing the Marine Mammal Protection Act (MMPA) as amended, notification is hereby given that we have issued an incidental harassment authorization (IHA) to Avangrid Renewables, LLC (Avangrid) to take small numbers of marine mammals, by harassment, incidental to high-resolution geophysical (HRG) survey investigations associated with marine site characterization activities off the coast of North Carolina in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0508) (the Lease Area) and the coastal waters off North Carolina and Virginia where one or more cable route corridors will be established.

DATES: This authorization is effective from June 1, 2019, through May 31, 2020.

FOR FURTHER INFORMATION CONTACT: Rob Pauline, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the application and supporting documents, as well as the issued IHA, may be obtained online at: <https://www.fisheries.noaa.gov/permit/incidental->

take-authorizations-under-marine-mammal-protection-act. In case of problems accessing these documents, please call the contact listed above.

SUPPLEMENTARY INFORMATION:

Background

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

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

Summary of Request

On October 4, 2018, NMFS received a request from Avangrid for an IHA to take marine mammals incidental to HRG survey investigations off the coast of North Carolina in the OCS-A

0508 Lease Area and in the coastal waters of Virginia and North Carolina where one or more cable route corridors will be established to support the development of an offshore wind project. The application was deemed adequate and complete on February 21, 2019. Avangrid's request is for take of small numbers of nine species by Level B harassment only. Neither Avangrid nor NMFS expects serious injury or mortality to result from this activity and, therefore, an IHA is appropriate.

Description of the Specified Activity

Overview

The purpose of the marine site characterization survey is to support the siting, design, and deployment of up to three meteorological data buoy deployment areas and obtain a baseline assessment of seabed/sub-surface soil conditions in the Lease Area and cable route corridors to support the siting of a planned wind farm. Underwater sound resulting from use of HRG equipment for site characterization purposes can have the potential to result in incidental take of marine mammals. The survey area extends along the coast from near the mouth of the Chesapeake Bay to Currituck, North Carolina. Up to 37 days of active HRG survey operations are planned and could take place any time during the one year authorization period. The surveys are planned to take place during the summer months. The IHA would be effective for one year. Take of marine mammals is anticipated to be in the form of Level B harassment only; no serious injury or mortality is anticipated or authorized. The IHA is effective from June 1, 2019, through May 31, 2020.

A detailed description of the planned survey activities, including types of survey equipment planned for use, is provided in the **Federal Register** notice for the proposed IHA (84 FR 17384; April 25, 2019). Since that time, no changes have been made to the planned activities.

Therefore, a detailed description is not repeated here. Please refer to that **Federal Register** notice for the description of the specified activity.

Comments and Responses

A notice of NMFS' proposal to issue an IHA was published in the **Federal Register** on April 25, 2019 (84 FR 17384). During the 30-day public comment period, NMFS received a comment letter from the Marine Mammal Commission (Commission) and from a group of non-governmental organizations (NGOs) including Natural Resources Defense Council, National Wildlife Federation, Southern Environmental Law Center, North Carolina Wildlife Federation, Oceanic Preservation Society, Mass Audubon, Defenders of Wildlife, WDC North America, NY4WHALES, Gotham Whale, Ocean Conservation Research, Conservation Law Foundation, Inland Ocean Coalition, International Marine Mammal Project of the Earth Island Institute, and Sanctuary Education Advisory Specialists SEAS LLC. NMFS has posted the comments online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable>. The following is a summary of the public comments received and NMFS' responses.

Comment 1: The Commission recommended that, until the behavior thresholds are updated, NMFS require applicants to use the 120- rather than 160-dB re 1 μ Pa threshold for intermittent, non-impulsive sources (i.e., parametric SBPs, chirps, echosounders, and other sonars). The Commission stated that general Level B harassment thresholds currently relate only to impulsive and continuous sources and that NMFS's characterization of the parametric SBPs and chirps as impulsive sources for the purpose of estimating the extent of the Level B harassment thresholds is incorrect. The Commission related that these sources are neither impulsive nor continuous sources, but rather should be described as non-impulsive, intermittent

sources. Researchers have observed that various species of marine mammals, including harbor porpoises, respond to sound from sources with similar characteristics at received levels below 160 dB re 1 μ Pa. The Commission noted that the behavior thresholds currently used by NMFS do not reflect the current state of understanding regarding the temporal and spectral characteristics of various sound sources and their impacts on marine mammals. Therefore, NMFS should default to the more precautionary Level B harassment threshold of 120 dB re 1 μ Pa.

Response: NMFS has historically used generalized acoustic thresholds based on received levels to predict the occurrence of behavioral harassment, given the practical need to use a relatively simple threshold based on information that is available for most activities. Thresholds were selected in consideration largely of measured avoidance responses of mysticete whales to airgun signals and to industrial noise sources, such as drilling. The selected thresholds of 160 dB rms SPL and 120 dB rms SPL, respectively, have been extended for use since then for estimation of behavioral harassment associated with noise exposure from sources associated with other common activities as well.

Sound sources can be divided into broad categories based on various criteria or for various purposes. As discussed by Richardson *et al.* (1995), source characteristics include strength of signal amplitude, distribution of sound frequency and, importantly in context of these thresholds, variability over time. With regard to temporal properties, sounds are generally considered to be either continuous or transient (i.e., intermittent). Continuous sounds, which are produced by the industrial noise sources for which the 120-dB behavioral harassment threshold was selected, are simply those whose sound pressure level remains above ambient sound during the observation period (ANSI, 2005). Intermittent sounds are defined as sounds with interrupted

levels of low or no sound (NIOSH, 1998). Simply put, a continuous noise source produces a signal that continues over time, while an intermittent source produces signals of relatively short duration having an obvious start and end with predictable patterns of bursts of sound and silent periods (i.e., duty cycle) (Richardson and Malme, 1993). It is this fundamental temporal distinction that is most important for categorizing sound types in terms of their potential to cause a behavioral response. For example, Gomez *et al.* (2016) found a significant relationship between source type and marine mammal behavioral response when sources were split into continuous (e.g., shipping, icebreaking, drilling) versus intermittent (e.g., sonar, seismic, explosives) types. In addition, there have been various studies noting differences in responses to intermittent and continuous sound sources for other species (e.g., Neo *et al.*, 2014; Radford *et al.*, 2016; Nichols *et al.*, 2015).

Sound sources may also be categorized based on their potential to cause physical damage to auditory structures and/or result in threshold shifts. In contrast to the temporal distinction discussed above, the most important factor for understanding the differing potential for these outcomes across source types is simply whether the sound is impulsive or not. Impulsive sounds, such as those produced by airguns, are defined as sounds which are typically transient, brief (< 1 sec), broadband, and consist of a high peak pressure with rapid rise time and rapid decay (ANSI, 1986; NIOSH, 1998). These sounds are generally considered to have greater potential to cause auditory injury and/or result in threshold shifts. Non-impulsive sounds can be broadband, narrowband or tonal, brief or prolonged, continuous or intermittent, and typically do not have the high peak pressure with rapid rise/decay time that impulsive sounds do (ANSI, 1995; NIOSH, 1998). Because the selection of the 160-dB behavioral threshold was focused largely on airgun signals, it has historically been commonly referred to as the “impulse noise” threshold (including

by NMFS). However, this longstanding confusion in terminology—i.e., the erroneous impulsive/continuous dichotomy—presents a narrow view of the sound sources to which the thresholds apply, and inappropriately implies a limitation in scope of applicability for the 160-dB behavioral threshold in particular.

An impulsive sound is by definition intermittent; however, not all intermittent sounds are impulsive. Many sound sources for which it is generally appropriate to consider the authorization of incidental take are in fact either impulsive (and intermittent) (*e.g.*, impact pile driving) or continuous (and non-impulsive) (*e.g.*, vibratory pile driving). However, parametric SBPs and chirps present a less common case where the sound produced is considered intermittent but non-impulsive. Herein lies the crux of the Commission's argument, i.e., that because HRG equipment used in site characterization surveys are not impulsive sound sources, they must be assessed using the 120-dB behavioral threshold appropriate for continuous noise sources. However, given the existing paradigm—dichotomous thresholds appropriate for generic use in evaluating the potential for behavioral harassment resulting from exposure to continuous or intermittent sound sources—the Commission does not adequately explain why potential harassment from an intermittent sound source should be evaluated using a threshold developed for use with continuous sound sources. As we have stated in prior responses to this recommendation, consideration of the preceding factors leads to a conclusion that the 160-dB threshold is more appropriate for use than is the 120-dB threshold.

As noted above, the Commission first claims generically that we are using an incorrect threshold, because parametric SBPs and chirps do not produce impulse noise. However, in bridging the gap from this generic assertion to their specific recommendation that the 120-dB continuous noise threshold should be used, the Commission makes several leaps of logic that we

address here. The Commission's justification is in large part seemingly based on citation to examples in the literature of the most sensitive species responding at lower received levels to sources dissimilar to those considered here. There are three critical errors in this approach.

First, the citation of examples of animals "responding to sound" does not equate to behavioral harassment, as defined by the MMPA. As noted above under "Background," the MMPA defines Level B harassment as acts with the potential to disturb a marine mammal by causing *disruption of behavioral patterns*. While it is possible that some animals do in fact experience Level B harassment upon exposure to intermittent sounds at received levels less than the 160-dB threshold, this is not in and of itself adequate justification for using a lower threshold. Implicit in the use of a step function for quantifying behavioral harassment is the realistic assumption, due to behavioral context and other factors, that some animals exposed to received levels below the threshold will in fact experience harassment, while others exposed to levels above the threshold will not. Moreover, a brief, transient behavioral response should not necessarily be considered as having the potential to disturb by disrupting behavioral patterns.

Many of the examples given by the Commission demonstrate mild responses, but not behavioral changes more likely to indicate Level B harassment. As an example, Kastelein *et al.* (2006a) describe the response of harbor porpoise to an experimental acoustic alarm (discussed below; power averaged source level of 145 dB), while also noting that a striped dolphin showed no reaction to the alarm, despite both species being able to clearly detect the signal.

Second, many of the cited studies do not present a relevant comparison. These studies discuss sources that are not appropriately or easily compared to the sources considered here and/or address responses of animals in experimental environments that are not appropriately compared to the likely exposure context here. For example, aside from the well-developed

literature concerning “acoustic harassment” or “acoustic deterrent” devices—which are obviously designed for the express purpose of harassing marine mammals (usually specific species or groups)—Kastelein *et al.* (2006b) describe harbor seal responses to signals used as part of an underwater data communication network. In this case, seals in a pool were exposed to signals of relatively long duration (1-2 seconds) and high duty cycle for 15 minutes, with experimental signals of continuously varying frequency, three different sound blocks, or frequency sweeps. These seals swam away from the sound (though they did not attempt to reduce exposure by putting their heads out of the water), but this result is of questionable relevance to understanding the likely response of seals in the wild that may be exposed to a 1-ms single-frequency signal from an echosounder moving past the seal as a transient stimulus.

Third, the Commission relies heavily on the use of examples pertaining to the most sensitive species, which does not support an argument that the 120-dB threshold should be applied to all species. NMFS has acknowledged that the scientific evidence indicates that certain species are, in general, more acoustically sensitive than others. In particular, harbor porpoise and beaked whales are considered to be behaviorally sensitive, and it may be appropriate to consider use of lower behavioral harassment thresholds for these species. NMFS is considering this issue in its current work of developing new guidelines for assessing behavioral harassment; however, until this work is completed and new guidelines are identified (if appropriate), the existing generic thresholds are retained. Moreover, as is discussed above for other reasons, the majority of examples cited by the Commission are of limited relevance in terms of comparison of sound sources. In support of their statement that numerous researchers have observed marine mammals responding to sound from sources claimed to be similar to those considered herein, the Commission indeed cites numerous studies; however, the vast majority of these address

responses of harbor porpoise or beaked whales to various types of acoustic alarms or deterrent devices.

We acknowledge that the Commission presents legitimate points in support of defining a threshold specific to non-impulsive, intermittent sources and that, among the large number of cited studies, there are a few that show relevant results of individual animals responding to exposure at lower received levels in ways that could be considered harassment. As noted in a previous comment response, NMFS is currently engaged in an ongoing effort towards developing updated guidance regarding the effects of anthropogenic sound on marine mammal behavior. However, prior to conclusion of this effort, NMFS will continue using the historical Level B harassment thresholds (or derivations thereof) and will appropriately evaluate behavioral harassment due to intermittent sound sources relative to the 160-dB threshold.

Comment 2: The Commission and NGOs expressed concern that the Renewal process discussed in the notice for the proposed IHA is inconsistent with the statutory requirements contained in section 101(a)(5)(D) of the MMPA. The NGOs asserted that IHAs can be valid for not more than one year and both commenters stated that 30 days for comment, including on Renewal IHAs, is required.

Response: NMFS' IHA Renewal process meets all statutory requirements. All IHAs issued, whether an initial IHA or a Renewal, are valid for a period of not more than one year. And the public has 30 days to comment on proposed IHAs, with a cumulative total of 45 days for IHA Renewals. One commenter characterized the agency's request for comments as seeking comment on the Renewal process and the proposed IHA, but the request for comments was not so limited. The *Request for Public Comments* section made clear that the agency was seeking comment on both the initial proposed IHA for this project and the potential issuance of a

Renewal. Because any Renewal (as explained in the *Request for Public Comments* section) is limited to another year of identical or nearly identical activities (as described in the *Description of Proposed Activity*) or the same activities that were not completed within the one-year period of the initial IHA, reviewers have the information needed to effectively comment on both the immediate proposed IHA and a possible one-year Renewal, should the IHA holder choose to request one in the coming months. Minor changes have been made to the description of the Renewal process to make this even clearer.

While there will be additional documents submitted with a Renewal request, for a qualifying Renewal these will be limited to documentation verifying that the activities are identical to those in the initial IHA, are nearly identical such that the changes would have either no effect on impacts to marine mammals or decrease those impacts, or are a subset of activities analyzed and authorized but not completed under the initial IHA. The Renewal request will also contain a preliminary monitoring report, but that is to verify that effects from the activities do not indicate impacts of a scale or nature not previously analyzed. An additional 15-day public comment period provides the public an opportunity to review these documents and any additional pertinent information and comment on whether they think the criteria for a Renewal have been met. Between the initial 30-day comment period on these same activities and the additional 15 days, the total comment period for a Renewal is 45 days.

Comment 3: The NGOs stated that NMFS should explain why applicants whose activities may result in incidental take of marine mammals over more than one year should not be required to apply for incidental take authorization under section 101(a)(5)(A), which provides for authorizations for up to five years.

Response: It is up to an applicant to decide which authorization process it wants to pursue. While it is correct that MMPA authorizations under section 101(a)(5)(A) can be issued for up to five years (seven years for military readiness activities), the agency cannot require an applicant to apply under this provision. An applicant whose activities qualify for an IHA has the right to choose that course of action, including requesting a second year of authorization if they meet all of the criteria for an IHA Renewal

Comment 4: The Commission and NGOs also argued that the 15-day comment period places a burden on reviewers, who will need to review the original authorization and numerous supporting documents and then formulate comments very quickly. The Commission stated that if proposed renewals are complex or occur frequently, reviewers who attempt to comment on all proposed authorizations and renewals would be hard pressed to do so within the 15-day comment period.

Response: NMFS has taken a number of steps to ensure the public has adequate notice, time, and information to be able to comment effectively on Renewal IHAs within the limitations of processing Renewal requests efficiently. Federal Register notices for proposed initial IHAs identify the conditions under which a one-year Renewal IHA could be appropriate. This information would have been presented in the *Request for Public Comments* section, which encouraged submission of comments on a potential one-year Renewal in addition to the initial IHA during the initial 30-day comment period. With this information about the Renewal process and the project-specific information provided in the Federal Register notice, reviewers have the information needed to provide information and comment on both the initial IHA and a potential Renewal for the project. Thus reviewers interested in submitting comments on a proposed Renewal will have already reviewed the activities and mitigation and monitoring measures,

which will not change from the IHA issued, and the anticipated effects of those activities on marine mammals and provided their comments during the initial 30-day comment period. When we receive a request for a Renewal IHA, we will publish notice of the proposed IHA Renewal in the Federal Register and provide an additional 15 days for public comment to allow review of the additional documents (preliminary monitoring report, Renewal request, and proposed Renewal), which should confirm that the activities have not changed (or only minor changes), commit to continue the same mitigation and monitoring measures, and document that monitoring does not indicate any impacts of a scale or nature not previously analyzed. In addition, to minimize any burden on reviewers, NMFS will directly contact all commenters on the initial IHA by email, phone, or, if the commenter did not provide email or phone information, by postal service to provide them direct notice about the opportunity to submit any additional comments on the proposed Renewal IHA.

Comment 5: The NGOs commented that NMFS apparently intends for the IHA Renewal process to become the rule rather than the exception. The Commission recommended that NMFS use the renewal process sparingly and limit its use to only those proposed IHAs that are expected to have the lowest levels of impacts to marine mammals and that require the least complex analyses.

Response: As described in the Federal Register notice for the proposed IHA and on NMFS' website where information on all MMPA incidental take authorization processes is provided, requests for Renewal IHAs are appropriate only in the limited circumstances described in the response to Comment 2. NMFS does not anticipate many projects that would meet all the criteria for a Renewal. Nonetheless, information about the Renewal process and the opportunity to comment on a potential Renewal is included in every notice of a proposed IHA because

NMFS cannot necessarily predetermine who may seek or qualify for a Renewal. NMFS has also explained that the possibility of a Renewal must be included in the notice of the initial proposed IHA for the agency to consider a Renewal request, for the purpose of providing adequate opportunity for public comment as discussed in the response above. Where the commenter has likely already reviewed and commented on the initial proposed IHA and a potential Renewal for these same activities, the abbreviated additional comment period is sufficient for consideration of the results of the preliminary monitoring report and new information (if any) from the past months.

NMFS' purpose in providing for Renewals is two-fold. First and foremost, the efficiencies in dealing with these simple, low-impact projects (which have already been fully described and analyzed in the initial IHA) frees up limited staff resources to increase focus on more complex and impactful projects, creating opportunities for increased conservation value and even better utilization of new science and evolving technologies. In addition, while the agency has always striven for efficiency in regulatory processes, recent directives have called for agencies to put processes in place that reduce regulatory timelines and the regulatory burden on the public. The Renewal process reduces the effort needed by both applicants and NMFS staff for simple, relatively low impact projects with little to no uncertainty regarding effects that have already been analyzed by the agency and considered by the public – with no reduction in protection to marine mammals.

Comment 6: The Commission recommended that, in the future, NMFS take all steps necessary to ensure that it publishes and finalizes proposed incidental harassment authorizations far enough in advance of the planned start date of the proposed activities to ensure full consideration is given to any and all comments received.

Response: NMFS encourages all applicants to submit applications for IHAs five to eight months in advance of the intended project start date and for rulemakings/LOAs at least nine months, and preferably 15 months, in advance of the intended project start date. More generally, NMFS publishes FR notices for proposed IHAs as quickly as possible once the application is received and aims to allow more time on the back end of the comment period, but there are situations where the length of processing times are driven by the exigency of an applicant's activity start date or by the need to work with applicants to ensure we have the necessary information to deem an application adequate and complete. Here, NMFS provided the required 30-day notice for public comment, and has adequately considered the comments received in making the necessary findings for this IHA.

Comment 7: The NGOs recommended that NMFS impose a restriction on site assessment and characterization activities that have the potential to harass the North Atlantic right whale from November 1st to April 30 in case of delay of planned surveys beyond summer.

Response: In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, 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; and (2) the practicability of the measures for applicant implementation, which may consider such things as relative cost and impact on operations.

Avangrid determined the planned duration of the survey based on their data acquisition needs, which are largely driven by the Bureau of Ocean Energy Management's (BOEM) data acquisition requirements prior to required submission of a construction and operations plan

(COP). Even though Avangrid plans to conduct the survey during summer of 2019, unexpected delays may occur. Our analysis of the potential impacts of the survey on right whales does not indicate that such closures are warranted, as we do not anticipate any potential impacts to right whales from the survey activities during any time of the year particularly with the mitigation requirements. No behavioral disturbance or injury to right whales is expected and none is authorized in the IHA. Therefore, NMFS has determined that time and area restrictions are not warranted in this case. Existing mitigation measures, including exclusion zones, ramp-up of survey equipment, and vessel strike avoidance measures, are sufficiently protective to ensure the least practicable adverse impact on species or stocks and their habitat.

Comment 8: The NGOs recommended that geophysical surveys should commence, with ramp up, during daylight hours only to maximize the probability that marine mammals are detected and confirmed clear of the exclusion zone (“EZ”). They state that if a right whale is detected in the EZ at night and the survey shuts down, the survey should not resume until daylight hours.

Response: We acknowledge the limitations inherent in detection of marine mammals at night. However, similar to the discussion above regarding time closures, restricting the ability of the applicant to ramp-up surveys only during daylight hours would have the potential to result in lengthy shutdowns of the survey equipment, which could result in the applicant failing to collect the data they have determined is necessary, which could result in the need to conduct additional surveys the following year. This would result in significantly increased costs incurred by the applicant. Thus the restriction suggested by the commenters would not be practicable for the applicant to implement. In addition, potential impacts to marine mammals authorized for take would be limited to short-term behavioral responses. Restricting surveys in the manner suggested

by the commenters may reduce marine mammal exposures by some degree in the short term, but would not result in any significant reduction in either intensity or duration of noise exposure. No injury is expected to result even in the absence of mitigation, given the very small estimated Level A harassment zones. In the event that NMFS imposed the restriction suggested by the commenters, vessels would potentially be on the water for an extended time introducing noise into the marine environment. Therefore, in addition to practicability concerns for the applicant, the restrictions recommended by the commenters could result in the surveys spending increased time on the water, which may result in greater overall exposure to sound for marine mammals; thus the commenters have not demonstrated that such a requirement would result in a net benefit. Furthermore, it is not anticipated that right whales would be exposed to sound levels that would result in take by Level A or Level B harassment. Therefore, in consideration of potential effectiveness of the recommended measure and its practicability for the applicant, NMFS has determined that restricting survey start-ups to daylight hours is not warranted in this case.

Comment 9: The NGOs recommended that NMFS encourage developers to partner with scientists to collect data that would increase the understanding of the effectiveness of night vision and infrared technologies off North Carolina, Virginia, and the broader mid-Atlantic region, with a view towards greater reliance on these technologies to commence surveys during nighttime hours in the future

Response: NMFS agrees with the NGOs that improved data on relative effectiveness of night vision and infra-red technologies would be beneficial and could help to inform future efforts at detection of marine mammals during nighttime activities. The commenters have not provided us with any specific recommendations to evaluate beyond a broad recommendation.

However, we will encourage coordination and communication between offshore wind developers and researchers on effectiveness of night vision and infra-red technologies, to the extent possible.

Comment 10: The NGOs recommended that NMFS require a 500 m EZ for marine mammals and that protected species observers (PSOs) monitor to an extended 1,000 m EZ for North Atlantic right whales. Another comment from the NGOs suggested that survey activity should be shut down upon the visual detection of a North Atlantic right whale, presumably at any distance.

Response: Regarding the recommendation for a 1,000 m EZ specifically for North Atlantic right whales, we have determined that the 500 m EZ, as required in the IHA, is sufficiently protective. We note that the 500 m EZ exceeds by two times the modeled distance to the largest Level B harassment isopleth (200 m). Thus for North Atlantic right whales detected by PSOs this EZ would be expected to effectively minimize potential instances of injury and behavioral harassment. For the same reason we are not requiring shutdown if a right whale is observed beyond 500 m. Similarly, the recommended 500 m EZ for other species is overly conservative when a 200 m isopleth has been modeled for behavioral harassment.

Comment 11: PSOs should adhere to a shift schedule of two-on/two-off to ensure no individual PSO is responsible for monitoring more than 180° of the EZ at any one time;

Response: Previous IHAs issued for HRG surveys have required that a single PSO must be stationed at the highest vantage point and engaged in general 360-degree scanning during daylight hours. A number of marine mammal monitoring reports submitted to NMFS have effectively employed this approach. NMFS sees no reason to deviate from this practice at the present time.

Comment 12: The NGOs recommended that a combination of visual monitoring by PSOs and passive acoustic monitoring should be used at all times.

Response: We do not think the use of PAM is necessarily warranted for surveys using the sound sources proposed for use by Avangrid, due to relatively small areas that are expected to be ensonified to the Level A harassment threshold. Given that the effects to marine mammals from the types of surveys authorized in this IHA are expected to be limited to behavioral harassment even in the absence of mitigation, we have determined the current requirements for visual monitoring are sufficient to ensure the EZs and monitoring zones are adequately monitored for this particular activity.

Comment 13: The NGOs recommended that all vessels operating within the survey area, including support vessels, should maintain a speed of 10 knots or less during the entire survey period. If site characterization and assessment activities are delayed into the fall and winter, a 10-knot speed restriction on all project-associated vessels transiting to/from the survey area from November 1 through April 30 should also be required.

Response: NMFS has analyzed the potential for ship strike resulting from Avangrid's activity and has determined that the mitigation measures specific to ship strike avoidance are sufficient to avoid the potential for ship strike. These include: A requirement that all vessel operators comply with 10 knot (18.5 kilometer (km)/hour) or less speed restrictions in any SMA or Dynamic Management Area (DMA); a requirement that all vessel operators reduce vessel speed to 10 knots (18.5 km/hour) or less when any large whale, any mother/calf pairs, pods, or large assemblages of non-delphinoid cetaceans are observed within 100 m of an underway vessel; a requirement that all survey vessels maintain a separation distance of 500 m or greater from any sighted North Atlantic right whale; a requirement that, if underway, vessels must steer

a course away from any sighted North Atlantic right whale at 10 knots or less until the 500 m minimum separation distance has been established; and a requirement that, if a North Atlantic right whale is sighted in a vessel's path, or within 500 m of an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. Additional measures to prevent the potential for ship strike are discussed in more detail below (see the Mitigation section). We have determined that the ship strike avoidance measures are sufficient to ensure the least practicable adverse impact on species or stocks and their habitat. We also note that vessel strike during surveys is extremely unlikely based on the low vessel speed of approximately 4 knots (7.4 km/hour) while transiting survey lines.

Comment 14: The NGOs recommended that NMFS account for the potential for indirect ship strike risk resulting from habitat displacement.

Response: NMFS determined that habitat displacement was not an expected outcome of the specified activity, therefore an analysis of potential impacts to marine mammals from habitat displacement is not warranted in this case.

Comment 15: The NGOs commented that Lease Area lies to the west of the Cape Hatteras Special Research Area (CHSRA) which is a highly diverse and biologically productive marine ecosystem. Therefore, it is crucial that that NMFS afford special attention to the general importance of the waters off North Carolina to marine mammals when permitting offshore wind development activities in this region, and requires strong mitigation measures capable of protecting multiple species in the Lease Area and cable route corridors.

Response: NMFS is requiring mitigation measures as part of the IHA which do protect multiple marine mammal species.

Comment 16: The NGOs expressed concern regarding the marine mammal density estimates used to calculate take. Specifically, they commented that the density maps produced by Roberts *et al.* do not fully reflect the abundance, distribution, and density of marine mammals, including North Atlantic right whales, for the U.S. East Coast and therefore should not be the only information source relied upon when estimating take.

Response: NMFS has determined that the data provided by Roberts *et al.* represents the best available information concerning marine mammal density in the survey area and has used it accordingly. NMFS has considered other available information, including that cited by the commenters, and determined that it does not contradict the information provided by Roberts *et al.* (2016). Furthermore, the information discussed by the commenters does not provide data in a format that is directly usable in an acoustic exposure analysis, and the commenters make no useful recommendation regarding how to do so.

Comment 17: The NGOs recommended that NMFS' top priority should be to consider any initial data from State monitoring efforts, passive acoustic monitoring data, opportunistic marine mammal sightings data, and other data sources, and to take steps now to develop a dataset that more accurately reflects marine mammal presence so that it is in hand for future IHA authorizations and other work.

Response: As noted above, we will review any recommended data sources and will continue to use the best available information. We welcome future input, even outside the comment period for this particular IHA, from interested parties on data sources that may be of use in analyzing the potential presence and movement patterns of marine mammals, including North Atlantic right whales, in the mid-Atlantic area.

Comment 18: The NGOs stated that NMFS should not adjust take numbers for endangered whales based on the effectiveness of mitigation measures. NMFS' assumptions regarding mitigation effectiveness are unfounded according to the NGOs. They also do not believe it is possible to mitigate all potential for Level B harassment through implementation of an EZ for right whales or fin whales.

Response: NMFS reduced authorized take for these whale species to zero down for right whale and fin whale. The NGOs' arguments against reduction are: (i) the agency's reliance on a 160 dB threshold for behavioral harassment is not supported by best available scientific information and (ii) the monitoring protocols the agency prescribes for the EZ are under-protective. NMFS addressed the first item in the response to *Comment 1* and the second item is addressed in responses to *Comment 8* and *Comment 9*.

Additionally, NMFS referenced monitoring reports from previous HRG action to justify the effectiveness of mitigation measures and reduction of right and fin whale take numbers. We acknowledge that visual monitoring may not capture all of the animals that enter into a harassment zone, especially during nighttime operations and adverse weather conditions. Nevertheless, we believe it provides a reasonably accurate depiction of observed take levels and supports the efficacy of required mitigation measures. Also, note that the 200 m Level B harassment isopleth is considered to be conservative based on sound source verification testing. As such, NMFS has determined that given the density of these species in the area and the size of the Level B harassment zone (resulting in a very low likelihood of exposure absent mitigation) combined with the likely effectiveness of the mitigation should an unexpected encounter with either of these species occur - it is reasonable to expect that Level B harassment of right and fin whales will not occur.

Comment 19: The NGOs recommended that NMFS acknowledge the potential for Level A harassment take on small cetaceans and reconsider its analysis of Level A harassment take on harbor porpoise and other acoustically sensitive species.

Response: Small cetaceans and harbor porpoises are highly mobile species existing in an environment where HRG sound sources are non-stationary. We find it unlikely that these marine mammals would remain within the small injury zones long enough such that their cumulative exposure would result in permanent threshold shift (PTS) as defined in NMFS' Technical Guidance (2018).

Comment 20: The NGOs stated that is incumbent upon the agency to address potential impacts to other endangered and protected whale species, particularly in light of the UMEs declared for right whales, humpback whales and minke whales, as well as the several strategic and/or depleted stocks of small cetaceans that inhabit the region

Response: We discuss the potential impacts of HRG surveys on species experiencing UMEs and for which take is authorized (i.e. humpback whale, minke whale) in the *Negligible Impact Determination* section. Please refer to that discussion.

Comment 21: The NGOs recommended NMFS: 1) fund analyses of recently collected sighting and acoustic data for all data-holders; and 2) continue to fund and expand surveys and studies to improve our understanding of distribution and habitat use of marine mammals in the mid-Atlantic region.

Response: We agree with the NGOs that analyses of recently collected sighting and acoustic data, as well as continued marine mammal surveys, are warranted, and we welcome the opportunity to participate in fora where implications of such data for potential mitigation measures would be discussed; however, we have no statutory authority or ability to require

funding of such analyses and surveys. Additionally, NMFS will fund pertinent surveys in the mid-Atlantic region based on agency priorities and budgetary considerations.

Description of Marine Mammals in the Area of Specified Activities

Sections 3 and 4 of the application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS's Stock Assessment Reports (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 1 lists species with expected potential for take in the survey area and summarizes information related to the population or stock, including regulatory status under the MMPA and ESA and potential biological removal (PBR), where known. For taxonomy, we follow Committee on Taxonomy (2018). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS's SARs). While no mortality or serious injury is anticipated or authorized here, PBR and annual serious injury and mortality from anthropogenic sources are included here as gross indicators of the status of the species and other threats.

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

For some species, this geographic area may extend beyond U.S. waters. All managed stocks in this region are assessed in NMFS' U.S. Atlantic SARs (e.g., Hayes *et al.*, 2018). All values presented in Table 1 are the most recent available at the time of publication and are available in the 2017 SARs (Hayes *et al.*, 2018) and draft 2018 SARs (available online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/draft-marine-mammal-stock-assessment-reports>).

Table 1. Marine Mammal Species that May Occur Near the Survey Area.

Common name	Scientific name	Stock	ESA/MMPA status; Strategic (Y/N) ¹	Stock abundance (CV, N _{min} , most recent abundance survey) ²	PBR	Annual M/SI ³
Order Cetartiodactyla – Cetacea – Superfamily Mysticeti (baleen whales)						
Family Balaenidae						
North Atlantic Right whale	<i>Eubalaena glacialis</i>	Western North Atlantic (WNA)	E/D; Y	451 (0; 445; 2017)	0.9	5.56
Family Balaenopteridae (rorquals)						
Humpback whale	<i>Megaptera novaeangliae</i>	Gulf of Maine	-/-; N	896 (0; 896; 2012)	14.6	9.8
Fin whale	<i>Balaenoptera physalus</i>	WNA	E/D; Y	1,618 (0.33; 1,234; 2011)	2.5	2.5
Sei whale	<i>Balaenoptera borealis</i>	Nova Scotia	E/D; Y	357 (0.52; 236)	0.5	0.6
Minke whale	<i>Balaenoptera acutorostrata</i>	Canadian East Coast	-/-; N	2,591 (0.81; 1,425)	14	7.5
Superfamily Odontoceti (toothed whales, dolphins, and porpoises)						
Family Delphinidae						
Short-finned pilot whale	<i>Globicephala macrorhynchus</i>	WNA	-/-; Y	21,515 (0.37; 15,913; 2011)	159	192
Long-finned pilot whale	<i>Globicephala melas</i>	WNA	-/-; Y	5,636 (0.63; 3,464)	35	38
Bottlenose dolphin	<i>Tursiops spp.</i>	WNA Offshore	-/-; N	77,532 (0.40; 56053; 2016)	561	39.4
		WNA Southern Migratory Coastal	-/-; Y	3,751 (0.060; 2,353; 2017)	23	0-12.3
Short beaked common dolphin	<i>Delphinus delphis</i>	WNA	-/-; N	70,184 (0.28; 55,690; 2011)	557	406
Atlantic white-sided dolphin	<i>Lagenorhynchus acutus</i>	WNA	-/-; N	48,819 (0.61; 30,403; 2011)	304	30

Atlantic spotted dolphin	<i>Stenella frontalis</i>	WNA	-/-; N	44,715 (0.43; 31,610; 2013)	316	0
Risso's dolphin	<i>Grampus griseus</i>	WNA	-/-; N	18,250 (0.5; 12,619; 2011)	126	49.7
Family Phocoenidae (porpoises)						
Harbor porpoise	<i>Phocoena phocoena</i>	Gulf of Maine/Bay of Fundy	-/-; N	79,833 (0.32; 61,415; 2011)	706	255

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

2- NMFS marine mammal stock assessment reports online at: <https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region/>. CV is coefficient of variation; Nmin is the minimum estimate of stock abundance. In some cases, CV is not applicable

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

A detailed description of the species likely to be affected by Avangrid's survey, including brief introductions to the species and relevant stocks as well as available information regarding population trends and threats, and information regarding local occurrence, were provided in the **Federal Register** notice for the proposed IHA (84 FR 17384; April 25, 2019) since that time, we are not aware of any changes in the status of these species and stocks; therefore, detailed descriptions are not repeated here. Please refer to the **Federal Register** notice for the proposed IHA for descriptions of other species. Please also refer to NMFS' website (<https://www.fisheries.noaa.gov/find-species>) for generalized species accounts.

Potential Effects of Specified Activities on Marine Mammals and their Habitat

The effects of underwater noise from Avangrid's survey activities have the potential to result in take of marine mammals by harassment in the vicinity of the survey area. The *Federal Register* notice for the proposed IHA (84 FR 17384; April 25, 2019) included a discussion of the effects of anthropogenic noise on marine mammals and their habitat, and that information is not repeated here. No instances of serious injury or mortality are expected as a result of the planned activities.

Estimated Take

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

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

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

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

Acoustic Thresholds

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

Level B Harassment for non-explosive sources – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the source (*e.g.*, frequency, predictability, duty cycle), the environment (*e.g.*, bathymetry), and the receiving animals (hearing, motivation, experience, demography, behavioral context) and can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.*, 2012). Based on what the available science indicates and the practical need to use a threshold based on a factor that is both predictable and measurable for most activities, NMFS uses a generalized acoustic threshold based on received level to estimate the onset of behavioral harassment. NMFS predicts that marine mammals are likely to be behaviorally harassed in a manner we consider Level B harassment when exposed to underwater anthropogenic noise above received levels of 160 dB re 1 μ Pa (rms) for non-explosive impulsive (*e.g.*, seismic airguns) or intermittent (*e.g.*, scientific sonar) sources. Avangrid's activity includes the use of impulsive and/or intermittent sources (HRG equipment) and, therefore, the 160 dB re 1 μ Pa (rms) is applicable.

Level A harassment for non-explosive sources - NMFS' Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (Version 2.0) (NMFS, 2018) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). Avangrid's activity includes

the use of impulsive sources (medium penetration sub-bottom profiler) and non-impulsive sources (shallow penetration sub-bottom profiler).

These thresholds are provided in Table 2. 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 2. Thresholds identifying the onset of Permanent Threshold Shift.

Hearing Group	PTS Onset Acoustic Thresholds* (Received Level)	
	Impulsive	Non-impulsive
Low-Frequency (LF) Cetaceans	<i>Cell 1</i> $L_{pk,flat}$: 219 dB $L_{E,LF,24h}$: 183 dB	<i>Cell 2</i> $L_{E,LF,24h}$: 199 dB
Mid-Frequency (MF) Cetaceans	<i>Cell 3</i> $L_{pk,flat}$: 230 dB $L_{E,MF,24h}$: 185 dB	<i>Cell 4</i> $L_{E,MF,24h}$: 198 dB
High-Frequency (HF) Cetaceans	<i>Cell 5</i> $L_{pk,flat}$: 202 dB $L_{E,HF,24h}$: 155 dB	<i>Cell 6</i> $L_{E,HF,24h}$: 173 dB
Phocid Pinnipeds (PW) (Underwater)	<i>Cell 7</i> $L_{pk,flat}$: 218 dB $L_{E,PW,24h}$: 185 dB	<i>Cell 8</i> $L_{E,PW,24h}$: 201 dB
Otariid Pinnipeds (OW) (Underwater)	<i>Cell 9</i> $L_{pk,flat}$: 232 dB $L_{E,OW,24h}$: 203 dB	<i>Cell 10</i> $L_{E,OW,24h}$: 219 dB

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

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

Ensonified Area

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

Previously we explained that auditory injury of marine mammals is unlikely given the higher level of sound and/or longer durations of exposure necessary to cause PTS and the small zone within which sound levels would exceed criteria for onset of PTS. The information provided in Tables 4 and 5 support this position and demonstrate that the mitigation measures are based on a highly conservative evaluation of potential acoustic impacts.

When the NMFS Technical Guidance was first published in 2016, in recognition of the fact that ensonified area/volume could be more technically challenging to predict because of the duration component in the new thresholds, we developed a User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to help predict takes. We note that because of some of the assumptions included in the methods used for these tools, we anticipate that isopleths produced are typically going to be overestimates of some degree, which may result in some degree of overestimate of Level A harassment take. However, these tools offer the best way to predict appropriate isopleths when more sophisticated 3D modeling methods are not available. NMFS continues to develop ways to quantitatively refine these tools, and will qualitatively address the output where appropriate. For mobile sources, including the HRG survey equipment, the User Spreadsheet predicts the closest distance at which a stationary animal would not incur PTS if the sound source traveled by the animal in a straight line at a constant speed. Note however, that use of the spreadsheet is generally not appropriate for use in assessing potential for Level A harassment for very highly

directional sources, such as the Innomar SES-2000, for reasons explained below. Inputs used in the User Spreadsheet and the resulting isopleths are reported in Table 3.

Table 3. User Spreadsheet Input Parameters Used for Calculating Harassment Isopleths.

Spreadsheet Tab Used	USBL	Shallow Penetration SBP	Medium Penetration SBP
	D: MOBILE SOURCE: Non-Impulsive, Intermittent	D: MOBILE SOURCE: Non-Impulsive, Intermittent	F: MOBILE SOURCE: Impulsive, Intermittent
Source Level (dB)	188 RMS SPL	179 RMS SPL	206 RMS SPL
Weighting Factor Adjustment (kHz)	26.5	2.6	1.4
Source Velocity (m/s)	2.058	2.058	2.058
Pulse Duration (seconds)	0.016	0.0658	0.008
1/Repetition rate^ (seconds)	0.33	0.25	0.25
Source Level (PK SPL)	---	---	215
Propagation (xLogR)	20	20	20

Note that the Innomar SES-2000 is a specialized type of HRG sub-bottom profiler that uses the principle of “parametric” or “nonlinear” acoustics to generate short narrow-beam sound pulses. As no field data currently exists for the Innomar sub-bottom profiler acoustic modeling was completed using a version of the U.S. Naval Research Laboratory's Range-dependent Acoustic Model (RAM) and BELLHOP Gaussian beam ray-trace propagation model (Porter and Liu 1994). Calculations of the ensonified area are conservative due to the directionality of the sound sources. Due to the short sound pulses and the highly directional sound pulse transmission (1° beamwidth) of parametric sub-bottom profilers, the volume of area affected is much lower than using conventional (linear) acoustics devices such as sparker and chirp systems. Level A harassment zones of less than 5 meters (Table 4) for HF cetaceans were calculated for this HRG equipment in the planned survey area while Level B harassment isopleths were found to range from 120 to 135 meters (Table 5).

Table 4. Maximum Distances to Level A Harassment Thresholds by Equipment Category.

Representative HRG Survey Equipment	Marine Mammal Group	PTS Onset	Lateral Distance (m)
USBL/GAPS Positioning Systems			
Sonardyne Ranger 2 USBL HPT 5/7000	LF cetaceans	199 dB SEL _{cum}	---
	MF cetaceans	198 dB SEL _{cum}	---
	HF cetaceans	173 dB SEL _{cum}	3
Shallow Sub-bottom Profiler			
Edgetech 512i	LF cetaceans	199 dB SEL _{cum}	---
	MF cetaceans	198 dB SEL _{cum}	---
	HF cetaceans	173 dB SEL _{cum}	---
Shallow Parametric Sub-bottom Profiler			
Innomar SES-2000 Standard Parametric Sub-bottom Profiler	LF cetaceans	199 dB SEL _{cum}	N/A
	MF cetaceans	198 dB SEL _{cum}	---
	HF cetaceans	173 dB SEL _{cum}	< 5
Medium Penetration Sub-bottom Profiler			
SIG ELC 820 Sparker	LF cetaceans	219 dBpeak, 183 dB SEL _{cum}	---, 10
	MF cetaceans	230 dBpeak, 185 dB SEL _{cum}	---,---
	HF cetaceans	202 dBpeak, 155 dB SEL _{cum}	5, 4
<p>Notes:</p> <p>The peak SPL criterion is un-weighted (i.e., flat weighted), whereas the cumulative SEL criterion is weighted for the given marine mammal functional hearing group.</p> <p>The calculated sound levels and results are based on NMFS Technical Guidance's companion User Spreadsheet except as indicated.</p> <p>--- indicates that no injury was predicted for the given HRG equipment noise profile.</p> <p>N/A indicates not applicable as the HRG sound source operates outside the effective marine mammal hearing range</p>			

Distances to Level B harassment noise thresholds were calculated using the conservative practical spreading model (transmission loss (TL) equation: $TL = 15\log_{10}r$), with the exception of the Innomar SES-2000 described previously. The Sig ELC 820 Sparker was calculated to have the largest Level B harassment isopleth of 200 m (656.2 ft). To account for some of the potential variation of operating conditions, the maximum distance of 200 m to the harassment thresholds

is used to determine estimated exposure. The 200 m distance to the medium penetration sub-bottom profiler represents the largest distance and is likely a very conservative estimate based on sound source field verification assessments of similar sparker electrode equipment.

The 200 m distance to the medium penetration sub-bottom profiler represents the largest distance and is likely a very conservative estimate based on sound source field verification assessments of similar sparker electrode equipment.

Table 5. Distances to Level B Harassment Thresholds (160 dB_{RMS}).

Survey Equipment	Marine Mammal Level B Harassment 160 dB _{RMS} re 1 µPa (m)
USBL	
Sonardyne Ranger 2 USBL	25
Shallow penetration sub-bottom profiler	
EdgeTech 512i	10
Innomar parametric SES-2000 Standard	120-135
Medium penetration sub-bottom profiler	
SIG ELC 820 Sparker	200

Marine Mammal Occurrence

In this section we provide the information about the presence, density, or group dynamics of marine mammals that will inform the take calculations. The data used as the basis for estimating cetacean density (“D”) for the survey area are sightings per unit effort (SPUE) derived by Duke University (Roberts *et al.* 2016a), updated with new modeling results (Roberts *et al.* 2016b; 2017; 2018). SPUE (or, the relative abundance of species) is derived by using a measure of survey effort and number of individual cetaceans sighted. SPUE allows for comparison between discrete units of time (i.e. seasons) and space within a project area (Shoop and Kenney,

1992). The Duke University (Roberts *et al.* 2016) cetacean density data represent models derived from aggregating line-transect surveys conducted over 23 years by five institutions (NOAA NMFS Northeast Fisheries Science Center, New Jersey Department of Environmental Protection, NOAA NMFS Southeast Fisheries Science Center, University of North Carolina Wilmington, and Virginia Aquarium & Marine Science Center). Model versions discussed in Roberts *et al.* (2016a) are freely available online at the Ocean Biogeographic Information System Spatial Ecological Analysis of Megavertebrate Populations (OBISSEAMAP) repository. Monthly mean density values within the survey area were averaged by season (Winter (December, January, February), Spring (March, April, May), Summer (June, July, August), Fall (September, October, November)) to provide seasonal density estimates for those taxa for which monthly model results are available. The highest seasonal density estimates during the duration of the survey were used to estimate take (i.e., summer or fall). (2016b; 2017; 2018).

Take Calculation and Estimation

Here we describe how the information provided above is brought together to produce a quantitative take estimate. In order to estimate the number of marine mammals predicted to be exposed to sound levels that would result in harassment, radial distances to predicted isopleths corresponding to harassment thresholds are calculated, as described above. Those distances are then used to calculate the area(s) around the HRG survey equipment predicted to be ensonified to sound levels that exceed harassment thresholds. The area estimated to be ensonified to relevant thresholds in a single day of the survey is then calculated, based on areas predicted to be ensonified around the HRG survey equipment and the estimated survey vessel trackline distance traveled per day.

The survey activities that have the potential to cause Level B harassment ($160 \text{ dB}_{\text{RMS}}$ re $1 \mu\text{Pa}$) are listed in Table 5. Based on the results of this assessment, the furthest distance to the Level B harassment criteria is 200 m from the use of the SIG ELC 820 Sparker. As a conservative measure to account for some of the potential variation of operating conditions, the maximum distance of 200 m to the Level B harassment isopleth for the SIG ELC 820 Sparker is used to determine estimated exposure for the entire HRG survey.

The estimated distance of the daily vessel trackline was determined using the estimated average speed of the vessel (4 knots) and the 24-hour operational period. Using the maximum distance to the Level B harassment threshold of 200 m (656 ft) and estimated daily vessel track of approximately 177.8 km (110.5 mi), estimates of take by survey equipment has been based on an ensonified area around the survey equipment of 71.2 km^2 (27.5 mi^2) per day over a projected survey period for each survey segment as shown in Table 6.

Table 6. Survey Segment Distances and Level B Harassment Zones.

Survey Segment	# Active Survey Days	Estimated Distances per Day (km)	Estimated Total line Distance	Calculated Level B Harassment Zone per Day (km^2)
Lease Area	29	177.8	5,156	71.2
Cable Route Corridor	8	177.8	1,422	71.2

The parameters in Table 6 were used to estimate the potential take by incidental harassment for each segment of the HRG survey. Density data from Roberts *et al.* (2016b; 2017; 2018) were mapped within the boundary of the survey area for each segment (Figure 1 in application) using geographic information systems. For both survey segments, species densities, as reported by Roberts *et al.* (2016) within the maximum survey area, were averaged by season (spring and summer) based on the planned HRG survey schedule (commencing no earlier than

June 1, 2019). Potential take calculations were then based on the maximum average seasonal species density (between spring and summer) within the maximum survey area, given the survey start date and duration. Results of the take calculations by survey segment are provided in Table 7.

Table 7. Marine Mammal Density and Estimated Take by Level B Harassment.

Species	Lease Area		Cable Route	Corridor	Totals	
	Maximum Average Seasonal Density ¹ (No./100 km ²)	Calculated Take (No.)	Maximum Average Seasonal Density ¹ (No./100 km ²)	Calculated Take (No.)	Total Take Authorization (No.)	Percent of Population
North Atlantic right whale	0.051	1.063	0.051	0.288	0 ³	--
Humpback whale	0.466	9.631	0.102	0.581	10	1.11
Fin whale	0.328	6.773	0.128	0.729	0 ³	--
Sei whale	0.020	0.406	0.003	0.018	0	--
Minke whale	0.757	15.643	0.171	0.9722	17	0.65
Pilot whale	0.100	2.073	0.034	0.195	10 ^{4,5}	<0.01
Harbor porpoise	1.252	25.874	0.690	3.931	30	<0.01
Bottlenose dolphin (WNA southern migratory coastal) ²	0.000	0.000	49.102	104.944	105	2.8
Bottlenose dolphin (offshore) ²	6.409	132.413	49.102	174.906	307	<0.01
Short beaked common dolphin	5.241	108.275	2.144	12.221	120	0.17
Atlantic white-sided dolphin	2.482	51.288	0.320	1.826	53	0.11
Atlantic spotted dolphin	8.895	183.772	3.493	19.910	204	0.46
Risso's dolphin	0.074	1.525	0.074	0.421	40 ⁴	0.21

¹Density values from Duke University (Roberts *et al.* 2016b; 2017; 2018)

²Estimates split based on bottlenose dolphin stock preferred water depths (Reeves *et al.* 2002; Waring *et al.* 2016).

³No take authorized, as discussed below.

⁴Adjusted for group size.

⁵For short-finned and long-finned pilot whales, percentage of stock taken is <0.01 percent both species if all 10 takes are allocated separately to each species

Since the calculated take value for pilot whales (2) is less than the mean group size (9.4), NMFS assumed that take of at least one group of pilot whales could occur (Silva *et al.*, 2014). For bottlenose dolphin densities, Roberts *et al.* (2016b; 2017; 2018) does not differentiate by individual stock. Given the southern coastal migratory stock's propensity to be found in waters shallower than the 20 m depth isobath north of Cape Hatteras (Reeves *et al.*, 2002; Waring *et al.*, 2016), the Export Cable Corridor segment was roughly divided along the 20 m depth isobath. The Lease Area is located within depths exceeding 20 m, where the southern coastal migratory stock would be unlikely to occur. Roughly 40 percent of the Export Cable Corridor is 20 m or less in depth. Given the Export Cable Corridor area is estimated to take 8 days to complete survey activity, 3 days have been estimated for depths shallower than 20 m. Therefore, to account for the potential for mixed stocks within the Export Cable Corridor, 3 days has been applied to the take estimation equation for the southern coastal migratory stock and the remaining applied to the offshore stock (5 days). The offshore stock is the only stock of bottlenose dolphins that may occur in the lease area; therefore bottlenose dolphin densities within the Lease Area have been considered part of the offshore stock only for purposes of take estimation.

For Risso's dolphins, NMFS adjusted the calculated take number to account for group size. These dolphins are usually seen in groups of 12 to 40, but loose aggregations of 100 to 200 or more are seen occasionally (Reeves *et al.*, 2002). NMFS conservatively assumed that a group of 40 or several smaller groups not exceeding a total of 40 takes by Level B harassment.

The three ESA-listed large whales that could potentially be present in the survey area occur at very low densities, and the calculated numbers of potential acoustic exposures above the 160-dB threshold are small, *i.e.*, one right whale exposure, zero sei whale exposures, and eight fin whale exposures. In addition, Avangrid will implement a 500 m (1,640 ft) exclusion zone for the right whale and a 200 m (656 ft) exclusion zone for sei and fin whales. Both of these measures are incorporated into the issued IHA. These exclusion zones exceed (in the case of right whales) or equal (in the case of sei and fin whales) the distance to the conservatively calculated Level B harassment isopleths. Given the low likelihood of exposure in context of the mitigation requirements (with relatively high detection probabilities for large whales at these distances during good visibility), we do not believe that there is a reasonably anticipated potential for the specified activity to cause the disruption of behavioral patterns for these species. Therefore, we did not authorize take by Level B harassment for these species.

Mitigation

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

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

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

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

Avangrid's application included a list of proposed mitigation measures during site characterization surveys utilizing HRG survey equipment. NMFS required the additional measure of establishing an exclusion zone of 200 m for sei and fin whales. The mitigation measures outlined in this section are based on protocols and procedures that have been successfully implemented and previously approved by NMFS (DONG Energy, 2016, ESS, 2013; Dominion, 2013 and 2014).

Visual Monitoring

Visual monitoring of designated exclusion and Level B harassment zones will ensure that 1) Any take of ESA-listed species would be limited; 2) exposure to underwater noise does not result in injury (Level A harassment), and 3) the number of instances of take does not exceed the

authorized amounts. PSOs will coordinate to ensure 360° visual coverage around the vessel and conduct visual observations while free from distractions and in a consistent, systematic, and diligent manner. Visual PSOs shall immediately communicate all observations of marine mammals to the on-duty acoustic PSO(s), including any determination by the PSO regarding species identification, distance, and bearing and the degree of confidence in the determination. Any observations of marine mammal species by crew members aboard any vessel associated with the survey shall be relayed to the PSO team.

PSOs will establish and monitor applicable exclusion zones. During use of HRG acoustic sources (i.e., anytime the acoustic source is active,), occurrences of marine mammal species approaching the relevant exclusion zone will be communicated to the operator to prepare for the potential shutdown of the acoustic source. Exclusion zones are defined, depending on the species and context, below:

- 500 m (1,640 ft) exclusion zone for North Atlantic right whales;
- 200 m (656 ft) exclusion zone for sei and fin whales; and
- 100 m (328 ft) exclusion zone for other large cetaceans (i.e. humpback whale, minke whale, pilot whale, Risso's dolphin).

The Level B harassment zone represents the zone within which marine mammals would be considered taken by Level B harassment and will encompass a distance of 200 m (656 ft) from survey equipment for all marine mammal species.

Pre-clearance

Avangrid will implement a 30-minute clearance period of the exclusion zones. This will help ensure marine mammals are not in the exclusion zones prior to startup of HRG equipment. During this period the exclusion zones will be monitored by the PSOs, using the appropriate

visual technology for a 30-minute period. The intent of pre-clearance observation is to ensure no marine mammal species are observed within the exclusion zones prior to the beginning of operation of HRG equipment. A PSO conducting pre-clearance observations must be notified immediately prior to initiating start of HRG equipment and the operator must receive confirmation from the PSO to proceed.

Activation of HRG equipment may not be initiated if any marine mammal is observed within the applicable exclusion zones as described above. If a marine mammal is observed within the applicable exclusion zone during the 30 minute pre-clearance period, activation of HRG equipment may not begin until the animal(s) has been observed exiting the zones or until an additional time period has elapsed with no further sightings (15 minutes for small delphinoid cetaceans and 30 minutes for all other species). Activation of HRG equipment may occur at times of poor visibility, including nighttime, if continuous visual observation and has occurred with no detections of marine mammals in the 30 minutes prior to beginning of start-up.

Shutdown Procedures

An immediate shutdown of the HRG survey equipment will be required if a marine mammal is sighted at or within its respective exclusion zone to minimize or avoid behavioral impacts to ESA-listed species. The vessel operator must comply immediately with any call for shutdown by the lead PSO. The operator must establish and maintain clear lines of communication directly between PSOs on duty and crew controlling the acoustic source to ensure that shutdown commands are conveyed swiftly while allowing PSOs to maintain watch. When shutdown is called for by a PSO, the acoustic source must be immediately deactivated and any dispute resolved only following deactivation.

Should there be any uncertainty regarding identification of a marine mammal species (i.e., whether the observed marine mammal(s) belongs to one of the delphinid genera for which shutdown is waived or one of the species with a larger exclusion zone), visual PSOs may use best professional judgment in making the decision to call for a shutdown. If a species for which authorization has not been granted, or, a species for which authorization has been granted but the authorized number of takes have been met, approaches or is observed within the 200 m Level B harassment zone, shutdown must occur.

Subsequent restart of the survey equipment can be initiated if the animal has been observed exiting its respective exclusion zone within 30 minutes of the shutdown or an additional time period has elapsed with no further sighting (i.e., 15 minutes for small odontocetes and 30 minutes for all other species).

If the acoustic source is shut down for reasons other than mitigation (e.g., mechanical difficulty) for less than 30 minutes, it may be activated again without pre-clearance protocols, if PSOs have maintained constant observation and no detections of any marine mammal have occurred within the respective exclusion zones.

Vessel Strike Avoidance

In order to avoid striking animals, vessel operators and crews must maintain a vigilant watch for all marine mammal species and slow down, stop their vessel, or alter course, as appropriate and regardless of vessel size. A visual observer aboard the vessel must monitor a vessel strike avoidance zone around the vessel (distances stated below). Visual observers monitoring the vessel strike avoidance zone may be third-party observers (i.e., PSOs) or crew members, but crew members responsible for these duties must be provided sufficient training to distinguish marine mammal species from other phenomena and broadly to identify a marine

mammal as a right whale, other whale (defined in this context as sperm whales or baleen whales other than right whales), or other marine mammal. Vessel strike avoidance measures will include the following:

- All vessels (e.g., source vessels, chase vessels, supply vessels), regardless of size, must observe a 10-knot speed restriction in specific areas designated by NMFS for the protection of North Atlantic right whales from vessel strikes: any Dynamic Management Areas (DMA) when in effect, and the Mid-Atlantic Seasonal Management Areas (SMA) (from November 1 through April 30). See 50 CFR 224.105 and www.fisheries.noaa.gov/national/endangered-species-conservation/reducing-ship-strikes-north-atlantic-right-whales for specific detail regarding these areas.

- Vessel speeds must also be reduced to 10 knots or less, regardless of location, when mother/calf pairs, pods, or large assemblages of cetaceans are observed near a vessel;

- All vessels must maintain a minimum separation distance of 500 m from right whales. If a whale is observed but cannot be confirmed as a species other than a right whale, the vessel operator must assume that it is a right whale and take appropriate action;

- All vessels must maintain a minimum separation distance of 100 m from all other baleen whales and sperm whales;

- All vessels must, to the maximum extent practicable, attempt to maintain a minimum separation distance of 50 m from all other marine mammals, with an understanding that at times this may not be possible (e.g., for animals that approach the vessel);

- When marine mammals are sighted while a vessel is underway, the vessel shall take action as necessary to avoid violating the relevant separation distance, e.g., attempt to remain parallel to the animal's course, avoid excessive speed or abrupt changes in direction until

the animal has left the area. If marine mammals are sighted within the relevant separation distance, the vessel must reduce speed and shift the engine to neutral, not engaging the engines until animals are clear of the area. This does not apply to any vessel towing gear or any vessel that is navigationally constrained; and

- These requirements do not apply in any case where compliance would create an imminent and serious threat to a person or vessel or to the extent that a vessel is restricted in its ability to maneuver and, because of the restriction, cannot comply.

Based on our evaluation of the applicant's measures, as well as other measures considered by NMFS, we have determined that the mitigation measures provide the means effecting the least practicable impact on the affected species or stocks and their habitat, paying particular attention to rookeries, mating grounds, and areas of similar significance.

Monitoring and Reporting

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

Monitoring and reporting requirements prescribed by NMFS should contribute to improved understanding of one or more of the following:

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

Visual Monitoring

Visual monitoring shall be conducted by NMFS-approved PSOs. PSO resumes shall be provided to NMFS for approval prior to commencement of the survey. Avangrid must use independent, dedicated, trained PSOs, meaning that the PSOs 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 vessel crew with regard to the presence of marine mammals and mitigation requirements (including brief alerts regarding maritime hazards),

Observations shall take place from the highest available vantage point on the survey vessel. General 360-degree scanning shall occur during the monitoring periods, and target scanning by the PSO shall occur when alerted of a marine mammal presence. An observer team comprising a minimum of four NMFS-approved PSOs, operating in shifts, will be stationed aboard the survey vessel. PSO's will work in shifts such that no one monitor will work more than 4 consecutive hours without a 2-hour break or longer than 12 hours during any 24-hour period. During daylight hours the PSOs will rotate in shifts of 1 on and 3 off, and during nighttime operations PSOs will work in pairs.

PSOs must have all equipment (including backup equipment) needed to adequately perform necessary tasks, including accurate determination of distance and bearing to observed marine mammals. PSOs will be equipped with binoculars and have the ability to estimate distances to marine mammals located in proximity to their established zones using range finders. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the siting and monitoring of marine species. Cameras of appropriate quality will be used for photographs and video to record sightings and verify species identification. Each PSO must have a camera and backup cameras should be available. During night operations, night-vision equipment (night-vision goggles with thermal clip-ons) and infrared technology will be used. Position data will be recorded using hand-held or vessel global positioning system (GPS) units for each sighting. Radios for each PSO are required in order to communicate among vessel crew and PSOs. PSO must also have compasses and any other tools necessary to perform other PSO tasks.

PSOs shall be responsible for visually monitoring and identifying marine mammals approaching or entering the established monitoring zones as well as beyond the monitoring zones

to the maximum extent possible. PSOs will record animals both within and beyond the monitoring zones during survey activities.

Data on all PSO observations must be recorded based on standard PSO collection requirements. PSOs must use standardized data forms, whether hard copy or electronic. This shall include the following:

- Vessel names (source vessel and other vessels associated with survey), vessel size and type, maximum speed capability of vessel, port of origin, and call signs;
- PSO names and affiliations;
- Dates of departures and returns to port with port name;
- Date and participants of PSO briefings;
- Dates and times (Greenwich Mean Time) of survey effort and times corresponding with PSO effort;
- Vessel location (latitude/longitude) when survey effort begins and ends; vessel location at beginning and end of visual PSO duty shifts;
- Vessel heading and speed at beginning and end of visual PSO duty shifts and upon any line change;
- Environmental conditions while on visual survey (at beginning and end of PSO shift and whenever conditions change significantly), including wind speed and direction, Beaufort sea state, Beaufort wind force, swell height, weather conditions, cloud cover, sun glare, and overall visibility to the horizon;
- Factors that may be contributing to impaired observations during each PSO shift change or as needed as environmental conditions change (e.g., vessel traffic, equipment malfunctions);

- Survey activity information, such as acoustic source power output while in operation, and any other notes of significance (i.e., pre-ramp-up survey, ramp-up, shutdown, testing, ramp-up completion, end of operations, etc.);
- If a marine mammal is sighted, the following information should be reported:
 - a) Watch status (sighting made by PSO on/off effort, opportunistic, crew, alternate vessel/platform);
 - b) PSO who sighted the animal;
 - c) Time of sighting;
 - d) Vessel location at time of sighting;
 - e) Water depth;
 - f) Direction of vessel's travel (compass direction);
 - g) Direction of animal's travel relative to the vessel;
 - h) Pace of the animal;
 - i) Estimated distance to the animal and its heading relative to vessel at initial sighting;
 - j) Identification of the animal (e.g., genus/species, lowest possible taxonomic level, or unidentified); also note the composition of the group if there is a mix of species;
 - k) Estimated number of animals (high/low/best);
 - l) Estimated number of animals by cohort (adults, yearlings, juveniles, calves, group composition, etc.);
 - m) Description (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);

- n) Detailed behavior observations (e.g., number of blows, number of surfaces, breaching, spyhopping, diving, feeding, traveling; as explicit and detailed as possible; note any observed changes in behavior);
- o) Animal's closest point of approach and/or closest distance from the center point of the acoustic source;
- p) Platform activity at time of sighting (e.g. , deploying, recovering, testing, data acquisition, other); and
- q) Description of any actions implemented in response to the sighting (e.g., delays, shutdown, ramp-up, speed or course alteration, etc.) and time and location of the action.

Reporting Measures

Within 90 days after completion of survey activities, a final report will be provided to NMFS that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, estimates the number of marine mammals estimated to have been taken during survey activities, and provides an interpretation of the results and effectiveness of all mitigation and monitoring. All raw observational data shall be made available to NMFS. The draft report must be accompanied by a certification from the lead PSO as to the accuracy of the report, and the lead PSO may submit directly to NMFS a statement concerning implementation and effectiveness of the required mitigation and monitoring. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS. A final report must be submitted within 30 days following resolution of any comments on the draft report.

Notification of Injured or Dead Marine Mammals

In the unanticipated event that the specified HRG activities lead to an injury of a marine mammal (Level A harassment) or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement), Avangrid would immediately cease the specified activities and report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources and the NMFS Southeast Regional Stranding Coordinator. The report would include the following information:

- Time, date, and location (latitude/longitude) of the incident;
- Name and type of vessel involved;
- Vessel's speed during and leading up to the incident;
- Description of the incident;
- Status of all sound source use in the 24 hours preceding the incident;
- Water depth;
- Environmental conditions (*e.g.*, wind speed and direction, Beaufort sea state, cloud cover, and visibility);
- Description of all marine mammal observations in the 24 hours preceding the incident;
- Species identification or description of the animal(s) involved;
- Fate of the animal(s); and
- Photographs or video footage of the animal(s) (if equipment is available).

Activities would not resume until NMFS is able to review the circumstances of the event. NMFS would work with Avangrid to minimize reoccurrence of such an event in the future. Avangrid would not resume activities until notified by NMFS.

In the event that Avangrid discovers an injured or dead marine mammal and determines that the cause of the injury or death is unknown and the death is relatively recent (*i.e.*, in less than a moderate state of decomposition), Avangrid would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources and the NMFS Southeast Regional Stranding Coordinator. The report would include the same information identified in the paragraph above. Activities would be able to continue while NMFS reviews the circumstances of the incident. NMFS would work with Avangrid to determine if modifications in the activities are appropriate.

In the event that Avangrid discovers an injured or dead marine mammal and determines that the injury or death is not associated with or related to the activities authorized in the IHA (*e.g.*, previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), Avangrid would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, and the NMFS Southeast Regional Stranding Coordinator, within 24 hours of the discovery. Avangrid would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS. Avangrid may continue its operations under such a case.

Negligible Impact Analysis and Determination

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

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

To avoid repetition, this introductory discussion of our analyses applies to all the species listed in Table 7, given that many of the anticipated effects of this project on different marine mammal stocks are expected to be relatively similar in nature. Where there are meaningful differences between species or stocks, or groups of species, in anticipated individual responses to activities, impact of expected take on the population due to differences in population status, or impacts on habitat, they are described independently in the analysis below.

As explained in the *Federal Register* notice of proposed IHA (84 FR 17384; April 25, 2019), PTS, masking, non-auditory physical effects, and vessel strike are not expected to occur. Marine mammal habitat may be impacted by elevated sound levels but these impacts would be short term. Feeding behavior is not likely to be significantly impacted. Prey species are mobile, and are broadly distributed throughout the survey area; therefore, marine mammals that may be temporarily displaced within the comparatively small ensonified area during survey activities are expected to be able to resume foraging once they have moved away from areas with disturbing

levels of underwater noise. Because of the availability of similar habitat and resources in the surrounding area, and the lack of important or unique marine mammal habitat, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations. Additionally, there are no feeding areas or mating grounds known to be biologically important to marine mammals within the project area with the exception of a migratory BIA for North Atlantic right whales described below.

Biologically Important Areas (BIA)

The survey area overlaps with a biologically important migratory area for North Atlantic right whales (effective March-April and November-December) that extends from Massachusetts to Florida (LaBrecque, *et al.*, 2015). As previously noted, no take of North Atlantic right whales has been authorized, and HRG survey operations will be required to shut down at 500 m to further minimize any potential effects to this species. The fact that the spatial acoustic footprint of the survey is very small relative to the spatial extent of the available migratory habitat, combined with the fact that no takes of right whales are anticipated, leads us to expect that right whale migration will not be impacted by the survey.

Unusual Mortality Events (UME)

A UME is defined under the MMPA as a stranding that is unexpected; involves a significant die-off of any marine mammal population; and demands immediate response. Two UMEs are ongoing and under investigation relevant to the HRG survey area for species for which take has been authorized. These involve humpback whales and minke whales. There is currently no direct connection between the UMEs, as there is no evident cause of stranding or death that is common across the species involved in the UMEs. Additionally, strandings across

the two species are not clustering in space or time. We are authorizing take of only limited numbers of humpback (10) and minke whale (17) by Level B harassment in the form of minor, short-term behavioral modifications that are unlikely to directly or indirectly result in strandings or mortality.

Based on the foregoing information, direct physical interactions (ship strikes and entanglements) appear to be responsible for many of the UME mortalities recorded. The planned HRG survey with the required mitigation and monitoring is not likely to result in any mortalities, nor combine with the effects of the ongoing UMEs to result in any additional impacts not analyzed here. Fishing gear and in-water lines will not be employed by the survey vessel, and ship speed and avoidance mitigation measures will minimize risk of ship strikes.

The required mitigation measures are expected to reduce the number and/or severity of takes by giving animals the opportunity to move away from the sound source before HRG survey equipment reaches full energy and preventing animals from being exposed to sound levels that have the potential to cause injury (Level A harassment) and more severe Level B harassment during HRG survey activities. Vessel strike avoidance requirements will further mitigate potential impacts to marine mammals during vessel transit to and within the survey area.

Avangrid did not request, and NMFS is not authorizing, take of marine mammals by serious injury or mortality. NMFS expects that most takes would primarily consist of short-term Level B behavioral harassment in the form of temporary vacating of the area or decreased foraging (if such activity were occurring). These reactions are considered to be of low severity and with no lasting biological consequences (*e.g.*, Southall *et al.*, 2007). Since the source is mobile, a specified area would be ensonified by sound levels that could result in take for only a

short period. Additionally, required mitigation measures would reduce exposure to sound that could result in more severe forms of harassment.

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

- No mortality or injury is anticipated or authorized;
- Take is anticipated to be by Level B behavioral harassment only, consisting of brief startling reactions and/or temporary avoidance of the survey area;
-
- Foraging success is not likely to be significantly impacted as effects on species that serve as prey species for marine mammals from the survey are expected to be minimal and the project area does not overlap any known important feeding areas;
- The availability of alternate areas of similar habitat value will allow marine mammals to temporarily vacate the survey area to avoid exposure to sounds generated by operation of HRG equipment.
- While the survey area is within areas noted as biologically important for migration of the North Atlantic right whale, migration would not be affected since project activities would occur in such a comparatively small area and no takes of right whales are expected or authorized. In addition, mitigation measures will be required to shut down sound sources at 500 m to further minimize any potential for effects to this species; and
- The mitigation measures, including visual monitoring and shutdowns, are expected to minimize potential impacts to marine mammals, particularly in light of the small size of the take zones.

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 monitoring and mitigation measures, NMFS finds that the total marine mammal take from the activity will have a negligible impact on all affected marine mammal species or stocks.

Small Numbers

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

The numbers of marine mammals that we have authorized for take, for all species and stocks, would be considered small relative to the relevant stocks or populations (less than 3 percent for the bottlenose dolphin Western North Atlantic, southern migratory coastal stock and less than one percent for all other species and stocks proposed for authorization). See Table 7. Based on the analysis contained herein of the activity (including the mitigation and monitoring measures) and the anticipated take of marine mammals, NMFS finds that small numbers of marine mammals will be taken relative to the population sizes of the affected species or stocks.

Unmitigable Adverse Impact Analysis and Determination

There are no relevant subsistence uses of marine mammals 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.

National Environmental Policy Act

To comply with the National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 et seq.) and NOAA Administrative Order (NAO) 216-6A, NMFS must review our action (*i.e.*, the issuance of an incidental harassment authorization) with respect to potential impacts on the human environment. Accordingly, NMFS prepared an Environmental Assessment (EA) and analyzed the potential impacts to marine mammals that would result from the project. A Finding of No Significant Impact (FONSI) was signed in May 2019. A copy of the EA and FONSI is available <https://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable>.

Endangered Species Act (ESA)

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

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

Authorization

NMFS has issued an IHA to Avangrid for conducting marine site characterization surveys off the Coast of Virginia and North Carolina from June 1, 2019, through May 31, 2020,

provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: June 25, 2019.

Catherine Marzin,

Acting Director, Office of Protected Resources,

National Marine Fisheries Service.

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