



**BILLING CODE 3510-22-P**

**DEPARTMENT OF COMMERCE**

**National Oceanic and Atmospheric Administration**

**RIN 0648-XF984**

**Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Marine Site Characterization Surveys off of Rhode Island and Massachusetts**

**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 NMFS has issued an incidental harassment authorization (IHA) to Deepwater Wind New England, LLC (DWW), for authorization to take marine mammals incidental to marine site characterization surveys off the coast of Rhode Island and Massachusetts in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0486) and along potential submarine cable routes to a landfall location in Rhode Island, Massachusetts or New York.

**DATES:** This Authorization is valid for one year from the date of issuance.

**FOR FURTHER INFORMATION CONTACT:** Jordan Carduner, Office of Protected Resources, NMFS, (301) 427-8401. Electronic copies of the applications and supporting documents, as well as a list of the references cited in this document, may be obtained by visiting the Internet at: [www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-](http://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-)

*authorizations-other-energy-activities-renewable*. In case of problems accessing these documents, please call the contact listed above.

## **SUPPLEMENTARY INFORMATION:**

### **Background**

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 authorization is provided to the public for review.

An authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth.

NMFS has defined “negligible impact” in 50 CFR 216.103 as an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

The MMPA states that the term “take” means to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.

Except with respect to certain activities not pertinent here, 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).

### **Summary of Request**

On January 3, 2018, NMFS received a request from DWW for an IHA to take marine mammals incidental to marine site characterization surveys off the coast of Massachusetts and Rhode Island in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0486) and along potential submarine cable routes to a landfall location in either Rhode Island, Massachusetts or New York. A revised application was received on April 18, 2018. NMFS deemed that request to be adequate and complete. DWW's request is for take of 14 marine mammal species by Level B harassment. Neither DWW nor NMFS expects serious injury or mortality to result from this activity and the activity is expected to last no more than one year, therefore, an IHA is appropriate.

### **Description of the Proposed Activity**

#### *Overview*

DWW proposes to conduct marine site characterization surveys, including high-resolution geophysical (HRG) and geotechnical surveys, in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf #OCS-A 0486 (Lease Area) and along potential submarine cable routes to landfall locations in either Rhode Island, Massachusetts or Long Island, New York. The purpose of the marine site characterization surveys are to obtain a baseline assessment of seabed/sub-surface soil conditions in the Lease Area and cable route corridors to support the siting of potential future offshore wind projects. Underwater sound resulting from DWW's proposed site characterization surveys has

the potential to result in incidental take of marine mammals in the form of behavioral harassment.

DWW's survey activities would occur in the Northwest Atlantic Ocean within Federal waters. Surveys would occur within the Bureau of Ocean Energy Management (BOEM) Rhode Island–Massachusetts Wind Energy Area (RI-MA WEA) which is located east of Long Island, New York and south of Rhode Island and Massachusetts (see Figure 1 in the IHA application). Water depths in the Lease Area range from 26 to 48 meters (m) (85 to 157 feet (ft)). For the purpose of this IHA the Lease Area and submarine cable corridor are collectively termed the Project Area. Surveys would occur from approximately June 15, 2018 through December 31, 2018. The estimated duration of the geophysical survey is expected to be up to 200 days and the estimated duration of the geotechnical survey is expected to be up to 100 days.

Geotechnical surveys would entail the use of core penetration testing, deep boring cores and vibrocores. Geotechnical surveys are not expected to result in the take of marine mammals, as described in the Federal Register notice of the proposed IHA (83 FR 19711; May 4, 2018) and are not analyzed further in this document. Geophysical surveys would entail the use of a multibeam depth sounder, shallow penetration sub-bottom profiler (chirp), medium penetration sub-bottom profiler (boomer and sparker or bubble gun), sidescan sonar and marine magnetometer. The deployment of geophysical survey equipment, including the equipment planned for use during DWW's planned activity, produces sound in the marine environment that has the potential to result in harassment of marine mammals.

A detailed description of the planned survey activities, including types of survey equipment planned for use, is provided in the *Federal Register* notice of the proposed IHA (83 FR 19711; May 4, 2018). Since that time, no changes have been made to the planned activities.

Therefore, a detailed description is not repeated here. We note, however, that one type of survey equipment was described incorrectly in the proposed IHA: the frequencies listed for the Edgetech 4125 sidescan sonar were incorrectly listed as 105 and 410 kilohertz (kHz); correct frequencies for the Edgetech 4125 are 400/900 kHz or 600/1600 kHz. Please refer to the *Federal Register* notice of the proposed IHA (83 FR 19711; May 4, 2018) for a detailed description of the specific activity.

### **Comments and Responses**

NMFS published a notice of proposed IHA in the *Federal Register* on May 4, 2018 (83 FR 19711). During the 30-day public comment period, NMFS received comment letters from the Marine Mammal Commission (Commission) and from a group of non-governmental organizations (NGOs) including Natural Resources Defense Council, the National Wildlife Federation, the Conservation Law Foundation, Defenders of Wildlife, Southern Environmental Law Center, Surfrider Foundation, Sierra Club, and the International Fund for Animal Welfare. NMFS has posted the comments online at: [www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable](http://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 expressed concern that the method used to estimate the numbers of takes, which summed fractions of takes for each species across project days, does not account for and negates the intent of NMFS' 24 hour reset policy and recommended that NMFS share the rounding criteria with the Commission in a timely manner.

*NMFS Response:* NMFS appreciates the Commission's ongoing concern in this matter. Calculating predicted takes is not an exact science, and there are arguments for taking different mathematical approaches in different situations and for making qualitative adjustments in other

situations. We believe, however, that the methodology used for take calculation in this IHA remains appropriate and is not at odds with the 24 hour reset policy the Commission references. We look forward to continued discussion with the Commission on this matter and will share draft guidance on this issue as soon as possible with the Commission.

*Comment 2:* The Commission recommended that, until behavioral thresholds are updated, NMFS require applicants to use the 120-decibel (dB) re 1 micropascal ( $\mu\text{Pa}$ ), rather than 160- dB re  $1\mu\text{Pa}$ , threshold for acoustic, non-impulsive sources (*e.g.*, sub-bottom profilers / chirps, echosounders, and other sonars including side-scan and fish-finding).

*NMFS Response:* Certain sub-bottom profiling systems are appropriately considered to be impulsive sources (*e.g.*, boomers, sparkers); therefore, the threshold of 160 dB re  $1\mu\text{Pa}$  will continue to be used for those sources. Other source types referenced by the Commission (*e.g.*, chirp sub-bottom profilers, echosounders, and other sonars including side-scan and fish-finding) produce signals that are not necessarily strictly impulsive; however, NMFS finds that the 160-dB root mean square (rms) threshold is most appropriate for use in evaluating potential behavioral impacts to marine mammals because the temporal characteristics (*i.e.*, intermittency) of these sources are better captured by this threshold. The 120-dB threshold is associated with continuous sources and was derived based on studies examining behavioral responses to drilling and dredging. Continuous sounds are those whose sound pressure level remains above that of the ambient sound, with negligibly small fluctuations in level (NIOSH, 1998; ANSI, 2005). Examples of sounds that NMFS would categorize as continuous are those associated with drilling or vibratory pile driving activities. Intermittent sounds are defined as sounds with interrupted levels of low or no sound (NIOSH, 1998). Thus, signals produced by these source types are not continuous but rather intermittent sounds. With regard to behavioral thresholds, we

consider the temporal and spectral characteristics of signals produced by these source types to more closely resemble those of an impulse sound rather than a continuous sound. The threshold of 160 dB re 1 $\mu$ Pa is typically associated with impulsive sources, which are inherently intermittent. Therefore, the 160 dB threshold (typically associated with impulsive sources) is more appropriate than the 120 dB threshold (typically associated with continuous sources) for estimating takes by behavioral harassment incidental to use of such sources.

*Comment 3:* The Commission requested clarification regarding certain issues associated with NMFS' notice that one-year renewals could be issued in certain limited circumstances and expressed concern that the process would bypass the public notice and comment requirements. The Commission also suggested that NMFS should discuss the possibility of renewals through a more general route, such as a rulemaking, instead of notice in a specific authorization. The Commission further recommended that if NMFS did not pursue a more general route, that the agency provide the Commission and the public with a legal analysis supporting our conclusion that this process is consistent with the requirements of section 101(a)(5)(D) of the MMPA.

*NMFS Response:* The process of issuing a renewal IHA does not bypass the public notice and comment requirements of the MMPA. The notice of the proposed IHA expressly notifies the public that under certain, limited conditions an applicant could seek a renewal IHA for an additional year. The notice describes the conditions under which such a renewal request could be considered and expressly seeks public comment in the event such a renewal is sought. Importantly, such renewals would be limited to circumstances where: the activities are identical or nearly identical to those analyzed in the proposed IHA; monitoring does not indicate impacts that were not previously analyzed and authorized; and, the mitigation and monitoring requirements remain the same, all of which allow the public to comment on the appropriateness

and effects of a renewal at the same time the public provides comments on the initial IHA. NMFS has, however, modified the language for future proposed IHAs to clarify that all IHAs, including renewal IHAs, are valid for no more than one year and that the agency would consider only one renewal for a project at this time. In addition, notice of issuance or denial of a renewal IHA would be published in the *Federal Register*, as they are for all IHAs. The option for issuing renewal IHAs has been in NMFS's incidental take regulations since 1996. We will provide any additional information to the Commission and consider posting a description of the renewal process on our website before any renewal is issued utilizing this process.

*Comment 4:* The Commission recommended that NMFS increase the number of common dolphin takes and sperm whale takes, based on an assumption that the number proposed for authorization is insufficient for DWW's proposed survey, and that NMFS authorize at least 20 Level B harassment takes of Risso's dolphins, based on observations of Risso's dolphins during HRG surveys conducted by Deepwater Wind in the RI-MA WEA in 2017 (AIS Inc., 2017). The Commission further recommended that NMFS better evaluate the numbers of Level A and B harassment takes it plans to propose.

*NMFS Response:* NMFS considered the Commission's recommendations with regard to take numbers authorized for common dolphins, sperm whales and Risso's dolphins. The Commission noted that five sperm whales were observed during HRG surveys conducted by Deepwater Wind in the RI-MA WEA in 2017 and two were taken by Level B harassment, and expressed concern that the 2018 survey may be forced to shut down upon visual detection of sperm whales if the number of authorized takes of sperm whales is exceeded. However, results of the monitoring report from the 2017 IHA indicate that the majority of sperm whale detections during the 2017 survey were via passive acoustic monitoring (PAM), with only one confirmed



visual detection which was outside the Level B zone at a distance of approximately 1,400 m from the vessel; both “takes” reported in the monitoring report were not based on visual detections but were instead based on acoustic detections that were localized within the Level B harassment zone (AIS Inc., 2017). However, for the IHA issued for 2017 surveys and for this IHA, NMFS does not consider animals detected acoustically but not confirmed visually by PSOs to have been taken by harassment. . As the number of sperm whale takes in this IHA were based on the best available density data (e.g., Roberts et al. (2016)), and as shutdown of survey equipment based on PAM detection alone is not required for sperm whales in this IHA, we have concluded the number of sperm whale takes authorized is appropriate. The Commission noted that common dolphins were the most regularly observed marine mammal species during Deepwater Wind’s 2017 HRG surveys in the RI-MA WEA, with 2,677 common dolphins observed (AIS Inc., 2017) and expressed concern that the 2018 survey may be forced to shut down upon visual detection of common dolphins if the number of authorized takes of common dolphins is exceeded. NMFS agrees that common dolphins are likely to be prevalent during DWW’s survey activities; however, we note that while 2,677 common dolphins were observed during 2017 surveys, 346 common dolphins were taken by Level B harassment (AIS Inc., 2017). NMFS is authorizing nearly 3 times the number of takes of common dolphins in this IHA (910) compared to the number of takes of common dolphins that occurred during 2017 surveys (346). As the number of common dolphin takes in this IHA were based on the best available density data (e.g., Roberts et al. (2016)) and as this IHA authorizes nearly 3 times as many takes by Level B harassment of common dolphins compared to the number taken during Deepwater Wind’s HRG surveys in 2017 (NMFS, 2017), we have concluded the number of common dolphin takes authorized is appropriate. The Commission noted that the monitoring report from

the 2017 IHA issued to Deepwater Wind for HRG surveys in the RI-MA WEA indicated that eight Risso's dolphins were observed at 400 m from the source during Deepwater Wind's 2017 surveys and that the vessel had to avoid the Risso's dolphins to prevent unauthorized takes (AIS Inc., 2017). We agree with the Commission that, based on monitoring data from the 2017 IHA issued to Deepwater Wind for HRG surveys in the RI-MA WEA (AIS Inc., 2017), the planned survey may encounter Risso's dolphins, and, thus authorization for the take of Risso's dolphins is warranted in this IHA. We have therefore authorized takes of Risso's dolphins in this IHA (Table 6). NMFS carefully evaluates the number of Level A and Level B harassment takes it proposes to authorize, as illustrated by the Level of analysis incorporated in our notices of proposed IHAs, and we will continue to do so.

*Comment 5:* The NGOs expressed concern regarding the marine mammal density estimates used to calculate take. Specifically, the commenters stated the estimates derived from models presented in Roberts *et al.* (2016) may underrepresent density and seasonal presence of large whales in the survey area, and recommended that NMFS consider additional data sources in density modeling in future analyses of estimated take, including initial data from state monitoring efforts, existing passive acoustic monitoring data, opportunistic marine mammal sightings data, and other data sources.

*NMFS Response:* NMFS has determined that the data provided by Roberts *et al.* (2016) 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). 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. We will review the data sources recommended by the commenters and will consider their suitability for inclusion in future analyses, as requested by the commenters.

*Comment 6:* Regarding mitigation measures, the NGOs recommended 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 May 14th.

*NMFS 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.

DWW 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). Any effort on the part of NMFS to restrict the months during which the survey could operate would likely have the effect of forcing the applicant to conduct additional months of surveys the following year, resulting in increased costs incurred by the applicant and additional time on the water with associated additional production of underwater noise which could have further potential impacts to marine mammals. Thus the time and area restrictions recommended by the commenters would not be practicable for the applicant to implement and would to some degree offset the benefit of the recommended measure. In addition, our analysis of the potential

impacts of the survey on right whales does not indicate that such closures are warranted, as potential impacts to right whales from the survey activities would be limited to short-term behavioral responses; no marine mammal injury is expected as a result of the survey, nor is injury authorized in the IHA. We also note that the majority of the survey is already scheduled to occur outside the time frame recommended for closure by the commenters; the survey is planned to occur from June 15 through December 31, while the commenters recommend a seasonal closure from November 1 through May 14. Thus, in consideration of the limited potential benefits of time and area restrictions, in concert with the impracticability and increased cost on the part of the applicant that would result from such restrictions, 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 7:* Regarding mitigation measures, the NGOs recommended that NMFS require that geophysical surveys commence, with ramp-up, during daylight hours only to maximize the probability that North Atlantic right whales are detected and confirmed clear of the exclusion zone, and that, if a right whale were detected in the exclusion zone during nighttime hours and the survey is shut down, developers should be required to wait until daylight hours for ramp-up to commence.

*NMFS Response:* We acknowledge the limitations inherent in detection of marine mammals at night. However, similar to the discussion above regarding time and area 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, as described above, potential impacts to marine mammals from the survey activities 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, potentially resulting in a second season of surveys required for the applicant, vessels would be on the water introducing noise into the marine environment for an extended period of time. 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 failed to demonstrate that such a requirement would result in a net benefit for affected marine mammals. 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.

However, in recognition of the concerns raised by the commenters, we have added a mitigation requirement to the IHA that shutdown of geophysical survey equipment is required upon confirmed PAM detection of a North Atlantic right whale at night, even in the absence of visual confirmation, except in cases where the acoustic detection can be localized and the right

whale can be confirmed as being beyond the 500 m exclusion zone (EZ); equipment may be re-started no sooner than 30 minutes after the last confirmed acoustic detection.

*Comment 8:* The NGOs recommended that NMFS require a 500 m EZ for marine mammals (with the exception of dolphins that voluntarily approach the vessel). Additionally, the NGOs recommended that protected species observers (PSOs) monitor to an extended 1,000 m EZ for North Atlantic right whales.

*NMFS 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 the modeled distance to the Level B harassment isopleth (447 m), thus for North Atlantic right whales detected by PSOs this EZ would be expected to effectively minimize potential instances of injury and harassment.

Regarding the commenters' recommendation to require a 500 m EZ for all marine mammals (except dolphins that approach the vessel) we have determined the EZs as currently required in the IHA (described in Mitigation Measures, below) are sufficient to ensure the least practicable adverse impact on species or stocks and their habitat. The EZs would prevent all potential instances of marine mammal injury (though in this instance, injury would not be an expected outcome even in the absence of mitigation due to very small predicted isopleths corresponding to the Level A harassment threshold (Table 5) and would further prevent some instances of behavioral harassment, as well as limiting the intensity and/or duration of behavioral harassment that does occur. As NMFS has determined the EZs currently required in the IHA to be sufficiently protective, we do not think expanded EZs, beyond what is required in the IHA, are warranted.

*Comment 9:* The NGOs recommended that a combination of visual monitoring by PSOs and PAM should be required 24 hours per day.

*NMFS Response:* The PAM requirement has been included in the IHA because PAM was proposed by the applicant, and PAM is required in BOEM lease stipulations. We do not think the use of PAM is necessarily warranted for surveys using the sound sources proposed for use by DWW, due to relatively small areas that are expected to be ensonified to the Level A harassment threshold (Table 5). As we are not convinced that PAM is necessarily warranted for this type of survey, we do not think a requirement to expand the use of PAM to 24 hours a day during the survey is warranted. Expanding the PAM requirement to 24 hours a day may also result in increased costs on the part of the applicant. When the potential benefits of a 24 hour PAM requirement are considered in concert with the potential increased costs on the part of the applicant that would result from such a requirement, we determined a requirement for 24 hour PAM operation is not warranted in this case. Given 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 and acoustic monitoring are sufficient to ensure the EZs and Watch Zone are adequately monitored for this particular activity.

*Comment 10:* The NGOs recommended that NMFS require a 10 knot speed restriction on all project-related vessels transiting to/from the survey area from November 1 through April 30 in New York state waters and the adjacent Block Island Seasonal Management Area (SMA) for North Atlantic right whales, and from February 1 to May 14 in Rhode Island and Massachusetts state waters outside of the Block Island SMA, and that all project vessels operating within the

survey area should be required to maintain a speed of 10 knots or less during the entire survey period.

*NMFS Response:* NMFS has analyzed the potential for ship strike resulting from DWW'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; the survey vessel would maintain a speed of approximately 4 knots (7.4 km/hour) while transiting survey lines.

*Comment 11:* The NGOs recommended that NMFS account for the potential for indirect ship strike risk resulting from habitat displacement in our analyses.



*NMFS 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 12:* The NGOs recommended that NMFS consider any existing siting and acoustic data and any new information that improves our understanding of marine mammal distribution and habitat use in the region in order to inform seasonal restrictions and mitigation measures in time for the November 2018 North Atlantic right whale migration period.

*NMFS Response:* We base our analyses on the best available information to inform mitigation measures in incidental take authorizations, and will continue to do so. Beyond a broad recommendation, the commenters have not provided us with any specific recommendations regarding data sources to consider, but we welcome future input, 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 North Atlantic right whales.

*Comment 13:* The NGOs recommended that NMFS encourage offshore wind developers to partner with scientists to collect data that would increase the understanding of the effectiveness of night vision and infra-red technologies off Rhode Island, Massachusetts, and the broader region, with a view towards greater reliance on these technologies to commence surveys during nighttime hours in the future.

*NMFS 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. In recognition of the commenters' concerns, we have also added a requirement that the final report submitted to NMFS must include an assessment of the effectiveness of night vision equipment used during nighttime surveys, including comparisons of relative effectiveness among the different types of night vision equipment used.

### **Description of Marine Mammals in the Area of Specified Activity**

Sections 3 and 4 of DWW's IHA application summarize available information regarding status and trends, distribution and habitat preferences, and behavior and life history, of the potentially affected species. Additional information regarding population trends and threats may be found in NMFS' Stock Assessment Reports (SAR; [www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region](http://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-region)) and more general information about these species (*e.g.*, physical and behavioral descriptions) may be found on NMFS' website ([www.fisheries.noaa.gov/species-directory](http://www.fisheries.noaa.gov/species-directory)). All species that could potentially occur in the proposed survey area are included in Table 5 of the IHA application. However, the temporal and/or spatial occurrence of several species listed in Table 5 of the IHA application is such that take of these species is not expected to occur, and they are not discussed further beyond the explanation provided here. Take of these species is not anticipated either because they have very low densities in the project area, are known to occur further offshore than the project area, or are considered very unlikely to occur in the project area during the proposed survey due to the species' seasonal occurrence in the area.

Table 2 lists all species with expected potential for occurrence in the survey area and with the potential to be taken as a result of the proposed survey 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 (2017). PBR is defined by the MMPA as the maximum number of animals, not including natural mortalities, that may be removed from a marine mammal stock while allowing that stock to reach or maintain its optimum sustainable population (as described in NMFS’ SARs). While no mortality is anticipated or authorized here, PBR is included here as a gross indicator 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’ 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 2 are the most recent available at the time of publication and are available in the 2017 draft Atlantic SARs (Hayes *et al.*, 2018).

**Table 1. Marine Mammals Known to Occur in the Survey Area That May be Affected by Deepwater Wind New England’s Survey Activities.**

Common Name	Stock	NMFS MMPA and ESA Status; Strategic (Y/N) <sup>1</sup>	Stock Abundance (CV, N <sub>min</sub> , most recent abundance survey) <sup>2</sup>	Predicted abundance (CV) <sup>3</sup>	PBR <sup>4</sup>	Occurrence and seasonality in the survey area
<b>Toothed whales (Odontoceti)</b>						
Sperm whale ( <i>Physeter macrocephalus</i> )	North Atlantic	E; Y	2,288 (0.28; 1,815; n/a)	5,353 (0.12)	3.6	Rare
Long-finned pilot whale ( <i>Globicephala melas</i> )	W. North Atlantic	--; Y	5,636 (0.63; 3,464; n/a)	18,977 (0.11) <sup>5</sup>	35	Rare
Atlantic white-	W. North	--; N	48,819 (0.61;	37,180 (0.07)	304	Rare

sided dolphin ( <i>Lagenorhynchus acutus</i> )	Atlantic		30,403; n/a)			
Atlantic spotted dolphin ( <i>Stenella frontalis</i> )	W. North Atlantic	--; N	44,715 (0.43; 31,610; n/a)	55,436 (0.32)	316	Rare
Bottlenose dolphin ( <i>Tursiops truncatus</i> )	W. North Atlantic, Offshore	--; N	77,532 (0.40; 56,053; 2011)	97,476 (0.06) <sup>5</sup>	561	Common year round
Common dolphin <sup>6</sup> ( <i>Delphinus delphis</i> )	W. North Atlantic	--; N	173,486 (0.55; 55,690; 2011)	86,098 (0.12)	557	Common year round
Risso's dolphin ( <i>Grampus griseus</i> )	W. North Atlantic	--; N	18,250 (0.46; 12,619; 2011)	7,732 (0.09)	126	Rare
Harbor porpoise ( <i>Phocoena phocoena</i> )	Gulf of Maine/Bay of Fundy	--; N	79,833 (0.32; 61,415; 2011)	45,089 (0.12)*	706	Common year round
<b>Baleen whales (Mysticeti)</b>						
North Atlantic right whale ( <i>Eubalaena glacialis</i> )	W. North Atlantic	E; Y	458 (0; 455; n/a)	535 (0.45)*	1.4	Year round in continental shelf and slope waters, occur seasonally to forage.
Humpback whale <sup>7</sup> ( <i>Megaptera novaeangliae</i> )	Gulf of Maine	--; N	823 (0.42; 239; n/a)	1,637 (0.07)*	3.7	Common year round
Fin whale <sup>6</sup> ( <i>Balaenoptera physalus</i> )	W. North Atlantic	E; Y	3,522 (0.27; 1,234; n/a)	4,633 (0.08)	2.5	Year round in continental shelf and slope waters, occur seasonally to forage
Sei whale ( <i>Balaenoptera borealis</i> )	Nova Scotia	E; Y	357 (0.52; 236; n/a)	717 (0.30)*	0.5	Year round in continental shelf and slope waters, occur seasonally to forage
Minke whale <sup>6</sup> ( <i>Balaenoptera acutorostrata</i> )	Canadian East Coast	--; N	20,741 (0.3; 1,425; n/a)	2,112 (0.05)*	162	Year round in continental shelf and slope waters, occur seasonally to forage

Earless seals (Phocidae)						
Gray seal <sup>8</sup> ( <i>Halichoerus grypus</i> )	W. North Atlantic	--; N	27,131 (0.10; 25,908; n/a)		1,554	Rare
Harbor seal ( <i>Phoca vitulina</i> )	W. North Atlantic	--; N	75,834 (0.15; 66,884; 2012)		2,006	Common year round

1 ESA status: Endangered (E), Threatened (T) / MMPA status: Depleted (D). A dash (-) indicates that the species is not listed under the ESA or designated as depleted under the MMPA. Under the MMPA, a strategic stock is one for which the level of direct human-caused mortality exceeds PBR (see footnote 3) or which is determined to be declining and likely to be listed under the ESA within the foreseeable future. Any species or stock listed under the ESA is automatically designated under the MMPA as depleted and as a strategic stock.

2 Stock abundance as reported in NMFS marine mammal stock assessment reports (SAR) except where otherwise noted. SARs available online at: [www.nmfs.noaa.gov/pr/sars](http://www.nmfs.noaa.gov/pr/sars). CV is coefficient of variation;  $N_{\min}$  is the minimum estimate of stock abundance. In some cases, CV is not applicable. For certain stocks, abundance estimates are actual counts of animals and there is no associated CV. The most recent abundance survey that is reflected in the abundance estimate is presented; there may be more recent surveys that have not yet been incorporated into the estimate. All values presented here are from the 2017 draft Atlantic SARs.

3 This information represents species- or guild-specific abundance predicted by recent habitat-based cetacean density models (Roberts *et al.*, 2016). These models provide the best available scientific information regarding predicted density patterns of cetaceans in the U.S. Atlantic Ocean, and we provide the corresponding abundance predictions as a point of reference. Total abundance estimates were produced by computing the mean density of all pixels in the modeled area and multiplying by its area. For those species marked with an asterisk, the available information supported development of either two or four seasonal models; each model has an associated abundance prediction. Here, we report the maximum predicted abundance.

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

5 Abundance estimates are in some cases reported for a guild or group of species when those species are difficult to differentiate at sea. Similarly, the habitat-based cetacean density models produced by Roberts *et al.* (2016) are based in part on available observational data which, in some cases, is limited to genus or guild in terms of taxonomic definition. Roberts *et al.* (2016) produced density models to genus level for *Globicephala* spp. and produced a density model for bottlenose dolphins that does not differentiate between offshore and coastal stocks.

6 Abundance as reported in the 2007 Canadian Trans-North Atlantic Sighting Survey (TNASS), which provided full coverage of the Atlantic Canadian coast (Lawson and Gosselin, 2009). Abundance estimates from TNASS were corrected for perception and availability bias, when possible. In general, where the TNASS survey effort provided superior coverage of a stock's range (as compared with NOAA shipboard survey effort), the resulting abundance estimate is considered more accurate than the current NMFS abundance estimate (derived from survey effort with inferior coverage of the stock range). NMFS stock abundance estimate for the common dolphin is 70,184. NMFS stock abundance estimate for the fin whale is 1,618.

7 2017 U.S. Atlantic draft SAR for the Gulf of Maine feeding population lists a current abundance estimate of 335 individuals; this estimate was revised from the previous estimate of 823 individuals. However, the newer estimate is based on a single aerial line-transect survey in the Gulf of Maine. The 2017 U.S. Atlantic draft SAR notes that that previous estimate was based on a minimum number alive calculation which is generally more accurate than one derived from line-transect survey (Hayes *et al.*, 2017), and that the abundance estimate was revised solely because

the previous estimate was greater than 8 years old. Therefore, the previous estimate of 823 is more accurate, and we note that even that estimate is defined on the basis of feeding location alone (*i.e.*, Gulf of Maine).

8 NMFS stock abundance estimate applies to U.S. population only, actual stock abundance is approximately 505,000.

Four marine mammal species that are listed under the Endangered Species Act (ESA) may be present in the survey area and are included in the take request: the North Atlantic right whale, fin whale, sei whale, and sperm whale.

Though marine mammal species other than those listed in Table 1 are known to occur in the Northwest Atlantic Ocean, the temporal and/or spatial occurrence of several of these species is such that take of these species is not expected to occur, and they are therefore not discussed further beyond the explanation provided here. Take of these species is not anticipated either because they have very low densities in the project area (*e.g.*, blue whale, Clymene dolphin, pantropical spotted dolphin, striped dolphin, spinner dolphin, killer whale, false killer whale, pygmy killer whale,), or, they are known to occur further offshore than the project area (*e.g.*, beaked whales, short-finned pilot whale, rough toothed dolphin, *Kogia spp.*).

For the majority of species potentially present in the specific geographic region, NMFS has designated only a single generic stock (*e.g.*, “western North Atlantic”) for management purposes. This includes the “Canadian east coast” stock of minke whales, which includes all minke whales found in U.S. waters. For humpback and sei whales, NMFS defines stocks on the basis of feeding locations, *i.e.*, Gulf of Maine and Nova Scotia, respectively. However, our reference to humpback whales and sei whales in this document refers to any individuals of the species that are found in the specific geographic region.

A detailed description of the species and stocks likely to be affected by DWW’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 of the proposed IHA (83 FR 19711; May 4, 2018); 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 that *Federal Register* notice for these descriptions. Please also refer to NMFS' web site ([www.fisheries.noaa.gov/species-directory](http://www.fisheries.noaa.gov/species-directory)) for generalized species accounts.

Information concerning marine mammal hearing, including marine mammal functional hearing groups, was provided in the *Federal Register* notice of the proposed IHA (83 FR 19711; May 4, 2018), therefore that information is not repeated here. Please refer to that *Federal Register* notice for this information. For further information about marine mammal functional hearing groups and associated frequency ranges, please see NMFS (2016) for a review of available information. Fifteen marine mammal species (thirteen cetacean and two pinniped (both phocid) species) have the reasonable potential to co-occur with the survey activities. Please refer to Table 1. Of the cetacean species that may be present, five are classified as low-frequency cetaceans (*i.e.*, all mysticete species), seven are classified as mid-frequency cetaceans (*i.e.*, all delphinid species and the sperm whale), and one is classified as a high-frequency cetacean (*i.e.*, harbor porpoise).

### **Potential Effects of Specified Activities on Marine Mammals and their Habitat**

The effects of underwater noise from DWW's geophysical survey activities have the potential to result in behavioral harassment of marine mammals in the vicinity of the survey area. The *Federal Register* notice of the proposed IHA (83 FR 19711; May 4, 2018) included a discussion of the effects of anthropogenic noise on marine mammals and their habitat, therefore that information is not repeated here; please refer to that *Federal Register* notice for that

information. No instances of hearing threshold shifts, injury, 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 the 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, the MMPA defines "harassment" as any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment).

Authorized takes are by Level B harassment, as use of the HRG equipment has the potential to result in disruption of behavioral patterns for individual marine mammals. NMFS has determined take by Level A harassment is not an expected outcome of the proposed activity and thus we do not authorize the take of any marine mammals by Level A harassment. This is discussed in greater detail below. As described previously, no mortality or serious injury is anticipated or authorized for this activity. Below we describe how the take is estimated for this project.

Described in the most basic way, 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) and the number of days of activities.

Below, we describe these components in more detail and present the take estimate.

### *Acoustic Thresholds*

NMFS uses 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 permanent threshold shift (PTS) of some degree (equated to Level A harassment).

*Level B Harassment* – Though significantly driven by received level, the onset of behavioral disturbance from anthropogenic noise exposure is also informed to varying degrees by other factors related to the sound source (*e.g.*, frequency, predictability, duty cycle); the environment (*e.g.*, bathymetry); and the receiving animals (hearing, motivation, experience, demography, behavioral context); therefore can be difficult to predict (Southall *et al.*, 2007, Ellison *et al.* 2012). NMFS uses a generalized acoustic threshold based on received level to estimate the onset of Level B (behavioral) harassment. NMFS predicts that marine mammals may be behaviorally harassed when exposed to underwater anthropogenic noise above received levels 160 dB re 1  $\mu$ Pa (rms) for non-explosive impulsive (*e.g.*, seismic HRG equipment) or intermittent (*e.g.*, scientific sonar) sources. DWW’s activity includes the use of impulsive sources. Therefore, the 160 dB re 1  $\mu$ Pa (rms) criteria is applicable for analysis of Level B harassment.

*Level A harassment* - NMFS’ Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 2016) identifies dual criteria to assess auditory injury (Level A harassment) to five different marine mammal groups (based on

hearing sensitivity) as a result of exposure to noise from two different types of sources (impulsive or non-impulsive). The Technical Guidance identifies the received levels, or thresholds, above which individual marine mammals are predicted to experience changes in their hearing sensitivity for all underwater anthropogenic sound sources, reflects the best available science, and better predicts the potential for auditory injury than does NMFS’ historical criteria.

These thresholds were developed by compiling and synthesizing the best available science and soliciting input multiple times from both the public and peer reviewers to inform the final product, and are provided in Table 2 below. The references, analysis, and methodology used in the development of the thresholds are described in NMFS 2016 Technical Guidance, which may be accessed at: [www.nmfs.noaa.gov/pr/acoustics/guidelines.htm](http://www.nmfs.noaa.gov/pr/acoustics/guidelines.htm). As described above, DWW’s activity includes the use of intermittent and impulsive sources

**Table 2. Thresholds Identifying the Onset of Permanent Threshold Shift in Marine Mammals.**

Hearing Group	PTS Onset Thresholds	
	Impulsive*	Non-impulsive
<b>Low-Frequency (LF) Cetaceans</b>	$L_{pk,flat}$ : 219 dB $L_{E,LF,24h}$ : 183 dB	$L_{E,LF,24h}$ : 199 dB
<b>Mid-Frequency (MF) Cetaceans</b>	$L_{pk,flat}$ : 230 dB $L_{E,MF,24h}$ : 185 dB	$L_{E,MF,24h}$ : 198 dB
<b>High-Frequency (HF) Cetaceans</b>	$L_{pk,flat}$ : 202 dB $L_{E,HF,24h}$ : 155 dB	$L_{E,HF,24h}$ : 173 dB
<b>Phocid Pinnipeds (PW) (Underwater)</b>	$L_{pk,flat}$ : 218 dB $L_{E,PW,24h}$ : 185 dB	$L_{E,PW,24h}$ : 201 dB

Note: \*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  $\mu$ Pa, and cumulative sound exposure level (LE) has a reference value of 1  $\mu$ Pa<sup>2</sup>s. 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 estimating the area ensonified above the acoustic thresholds.

The survey would entail the use of HRG survey equipment. The distance to the isopleth corresponding to the threshold for Level B harassment was calculated for all HRG survey equipment with the potential to result in harassment of marine mammals using the spherical transmission loss (TL) equation:  $TL=20\log_{10}r$ . Results of modeling indicated that, of the HRG survey equipment planned for use that has the potential to result in harassment of marine mammals, the AA Dura-Spark would be expected to produce sound that would propagate the furthest in the water (Table 3); therefore, for the purposes of the take calculation, it was assumed the AA Dura-Spark would be active during the entirety of the survey. Thus the distance to the isopleth corresponding to the threshold for Level B harassment for the AA Dura-Spark (estimated at 447 m; Table 3) was used as the basis of the Level B take calculation for all marine mammals.

**Table 3. Modeled Radial Distances from HRG Survey Equipment to Isopleths Corresponding to Level B Harassment Threshold.**

HRG System	Radial Distance (m) to Level B Harassment Threshold (160 dB re 1 $\mu$ Pa)
TB Chirp	70.79
EdgeTech Chirp	6.31
AA Boomer	5.62
AA S-Boom	141.25
Bubble Gun	63.1

800J Spark	141.25
AA Dura Spark	446.69

Predicted distances to Level A harassment isopleths, which vary based on marine mammal functional hearing groups (Table 4), were also calculated. The updated acoustic thresholds for impulsive sounds (such as HRG survey equipment) contained in the Technical Guidance (NMFS, 2016) were presented as dual metric acoustic thresholds using both cumulative sound exposure level ( $SEL_{cum}$ ) and peak sound pressure level metrics. As dual metrics, NMFS considers onset of PTS (Level A harassment) to have occurred when either one of the two metrics is exceeded (*i.e.*, metric resulting in the largest isopleth).

The  $SEL_{cum}$  metric considers both level and duration of exposure, as well as auditory weighting functions by marine mammal hearing group. In recognition of the fact that calculating Level A harassment ensonified areas could be more technically challenging to predict due to the duration component and the use of weighting functions in the new  $SEL_{cum}$  thresholds, NMFS developed an optional User Spreadsheet that includes tools to help predict a simple isopleth that can be used in conjunction with marine mammal density or occurrence to facilitate the estimation of take numbers. DWW used the NMFS optional User Spreadsheet to calculate distances to Level A harassment isopleths based on  $SEL_{cum}$ . To calculate distances to the Level A harassment isopleths based on peak pressure, the spherical spreading loss model was used (similar to the method used to calculate Level B isopleths as described above).

Modeling of distances to isopleths corresponding to Level A harassment was performed for all types of HRG equipment planned for use with the potential to result in harassment of marine mammals. Of the HRG equipment types modeled, the AA Dura Spark resulted in the

largest distances to isopleths corresponding to Level A harassment for all marine mammal functional hearing groups; therefore, to be conservative, the isopleths modeled for the AA Dura Spark were used to estimate potential Level A take. Based on a conservative assumption that the AA Dura Spark would be operated at 1,000 joules during the survey, a peak source level of 223 dB re 1 $\mu$ Pa was used for modeling Level A harassment isopleths based on peak pressure (Crocker & Fratantonio, 2016). Inputs to the NMFS optional User Spreadsheet for the AA Dura Spark are shown in Table 4. Modeled distances to isopleths corresponding to Level A harassment thresholds for the AA Dura Spark are shown in Table 5 (modeled distances to Level A harassment isopleths for all other types of HRG equipment planned for use are shown in Table 6 of the IHA application). As described above, NMFS considers onset of PTS (Level A harassment) to have occurred when either one of the two metrics is exceeded (*i.e.*, metric resulting in the largest isopleth). In this case, modeled distances to isopleths corresponding to the Level A harassment threshold are greater based on the peak SPL metric than the SEL<sub>cum</sub> metric for all marine mammal functional hearing groups (Table 5).

**Table 4. Inputs to the NMFS Optional User Spreadsheet for the AA Dura Spark.**

Source Level (rms SPL) <sup>1</sup>	213 dB re 1 $\mu$ Pa
Source Level (peak) <sup>1</sup>	223 dB re 1 $\mu$ Pa
Weighting Factor Adjustment (kHz) <sup>1</sup>	3.2
Source Velocity (meters/second)	2.07
Pulse Duration (seconds)	0.0021
1/Repetition rate (seconds)	2.42
Duty Cycle	0.00

<sup>1</sup> Derived from Crocker & Fratantonio (2016), based on operation at 1,000 joules.

**Table 5. Modeled Radial Distances to Isopleths Corresponding to Level A Harassment Thresholds.**

<b>Functional Hearing Group (Level A harassment thresholds)</b>	<b>Radial distance (m) to Level A harassment threshold (<math>SEL_{cum}</math>)</b>	<b>Radial distance (m) to Level A harassment threshold (Peak <math>SPL_{flat}</math>)</b>
Low frequency cetaceans ( $L_{pk,flat}$ : 219 dB; $L_{E,LF,24h}$ : 183 dB)	1.3	1.6
Mid frequency cetaceans ( $L_{pk,flat}$ : 230 dB; $L_{E,MF,24h}$ : 185 dB)	0.0	0.5
High frequency cetaceans ( $L_{pk,flat}$ : 202 dB; $L_{E,HF,24h}$ : 155 dB)	8.6	11.2
Phocid Pinnipeds (Underwater) ( $L_{pk,flat}$ : 218 dB; $L_{E,HF,24h}$ : 185 dB)	0.7	1.8

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Due to the small estimated distances to Level A harassment thresholds for all marine mammal functional hearing groups, based on both  $SEL_{cum}$  and peak SPL (Table 5), and in consideration of the mitigation measures (see the Mitigation section for more detail), NMFS has determined that the likelihood of Level A take of marine mammals occurring as a result of the planned survey is so low as to be discountable.

We note that because of some of the assumptions included in the methods used, isopleths produced may be overestimates to some degree. Most of the acoustic sources planned for use in DWW's survey (including the AA Dura Spark) do not radiate sound equally in all directions but were designed instead to focus acoustic energy directly toward the sea floor. Therefore, the acoustic energy produced by these sources is not received equally in all directions around the source but is instead concentrated along some narrower plane depending on the beamwidth of the source. However, the calculated distances to isopleths do not account for this directionality of the sound source and are therefore conservative. Two types of geophysical survey equipment planned for use in the planned survey are omni-directional, however the modeled distances to isopleths corresponding to the Level B harassment threshold for these sources are smaller than that for the Dura Spark, and the Dura Spark was used to conservatively estimate take for the duration of the survey. For mobile sources, such as the planned survey, 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.

### *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 best available scientific information was considered in calculating marine mammal exposure estimates (the basis for estimating take). For cetacean species, densities calculated by Roberts *et al.* (2016) were used. The density data presented by Roberts *et al.* (2016) incorporates aerial and shipboard line-transect survey data from NMFS and from other organizations collected over the period 1992-2014. Roberts *et al.* (2016) modeled density from 8 physiographic and 16 dynamic oceanographic and biological covariates, and controlled for the influence of sea state, group size, availability bias, and perception bias on the probability of making a sighting. NMFS considers the models produced by Roberts *et al.* (2016) to be the best available source of data regarding cetacean densities for this project. More information, including the model results and supplementary information for each model, is available online at:

[seamap.env.duke.edu/models/Duke-EC-GOM-2015/](http://seamap.env.duke.edu/models/Duke-EC-GOM-2015/).

For the purposes of the take calculations, density data from Roberts *et al.* (2016) were mapped using a geographic information system (GIS), using density data for the months June through December. Mean density per month for each species within the survey area was calculated by selecting 13 random raster cells selected from 100 square kilometers (km<sup>2</sup>) raster cells that were inside, or adjacent to, the RI-MA WEA (see Figure 1 in the IHA application). Estimates provided by the models are based on a grid cell size of 100 km<sup>2</sup>; therefore, model grid cell values were then divided by 100 to determine animals per km<sup>2</sup>.

Systematic, offshore, at-sea survey data for pinnipeds are more limited than those for cetaceans. The best available information concerning pinniped densities in the planned survey area is the U.S. Navy's Operating Area (OPAREA) Density Estimates (NODEs) (DoN, 2007). These density models utilized vessel-based and aerial survey data collected by NMFS from 1998-2005 during broad-scale abundance studies. Modeling methodology is detailed in DoN (2007). For the purposes of the take calculations, NODEs Density Estimates (DoN, 2007) as reported for the summer and fall seasons were used to estimate harbor seal and gray seal densities.

#### *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 trackline distance traveled per day by the survey vessel. DWW estimates a maximum daily track line distance of 110 km per day during HRG surveys. Based on the maximum estimated distance to the Level B harassment threshold of 447 m (Table 3) and the maximum estimated daily track line distance of 110 km, an area of 98.9 km<sup>2</sup> would be ensonified to the Level B harassment threshold per day during HRG surveys.



The number of marine mammals expected to be incidentally taken per day is then calculated by estimating the number of each species predicted to occur within the daily ensonified area, using estimated marine mammal densities as described above. Estimated numbers of each species taken per day are then multiplied by the number of survey days (*i.e.*, 200), and the product is then rounded, to generate an estimate of the total number of each species expected to be taken over the duration of the survey (Table 6).

The applicant estimated a total of 11 takes by Level A harassment of harbor porpoises, 5 takes by Level A harassment of harbor seals, and 7 takes by Level A harassment of gray seals would occur, in the absence of mitigation. However, as described above, due to the very small estimated distances to Level A harassment thresholds (Table 5), and in consideration of the mitigation measures, the likelihood of the planned survey resulting in take in the form of Level A harassment is considered so low as to be discountable; therefore, we do not authorize take of any marine mammals by Level A harassment. Although there are no exclusion zones (EZs) required for pinnipeds, the estimated distance to the isopleth corresponding to the Level A harassment threshold for pinnipeds is less than 2 m (Table 6); therefore, we determined the likelihood of an animal being taken within this proximity of the survey equipment to be so low as to be discountable. Authorized take numbers are shown in Table 6.

**Table 6. Total Numbers of Potential Incidental Take of Marine Mammals Authorized and Takes as a Percentage of Population.**

Species	Density (# / 100 km <sup>2</sup> )	Level A Takes Authorized	Estimated Level B Takes	Level B Takes Authorized	Total Authorized Takes	Total Authorized Takes as a Percentage of Population <sup>1</sup>
North Atlantic right whale	0.01706	0	3	3	3	0.6
Humpback whale	0.14439	0	29	29	29	1.8

Fin whale <sup>2</sup>	0.21353	0	42	42	42	1.2
Sei whale <sup>3</sup>	0.005	0	1	2	2	0.3
Minke whale <sup>2</sup>	0.04745	0	9	9	9	<0.1
Sperm whale	0.00665	0	1	1	1	<0.1
Long-finned pilot whale <sup>3</sup>	0.15364	0	30	32	32	0.2
Bottlenose dolphin	1.60936	0	318	318	318	0.3
Atlantic Spotted dolphin <sup>3</sup>	0.00886	0	2	50	50	0.1
Common dolphin <sup>2</sup>	4.59986	0	910	910	910	0.5
Atlantic white-sided dolphin	1.8036	0	357	357	357	1.0
Risso's dolphin <sup>4</sup>	0	0	0	30	30	0.4
Harbor porpoise <sup>5</sup>	2.53125	0	501	501	501	1.1
Harbor seal	6.49533	0	1,285	1,285	1,285	1.7
Gray seal <sup>4</sup>	14.1160	0	2,792	2,792	2,792	10.3

1 Estimates of total takes as a percentage of population are based on marine mammal abundance estimates provided by Roberts *et al.* (2016), when available, except where noted otherwise, to maintain consistency with density estimates which are derived from data provided by Roberts *et al.* (2016). In cases where abundances are not provided by Roberts *et al.* (2016), total takes as a percentage of population are based on abundance estimates in the NMFS Atlantic SARs (Hayes *et al.*, 2018).

2 Estimates of total takes as a percentage of population are based on marine mammal abundance estimates as reported in the 2007 TNASS (Lawson and Gosselin, 2009) (Table 2). Abundance estimates from TNASS were corrected for perception and availability bias, when possible. In general, where the TNASS survey effort provided superior coverage of a stock's range (as compared with NOAA shipboard survey effort), the resulting abundance estimate is considered more accurate than abundance estimates based on NMFS surveys.

3 The number of authorized takes (Level B harassment only) for these species has been increased from the estimated take to mean group size. Source for sei whale group size estimate is: Schilling *et al.* (1992). Source for long-finned pilot whale group size estimate is: Augusto *et al.* (2017). Source for Atlantic spotted dolphin group size estimate is: Jefferson *et al.* (2008). Source for Risso's dolphin group size estimate is: Baird and Stacey (1991).

4 Take estimate for these species has been revised from the proposed IHA. See text below for further information.

5 The density estimate in the IHA application is incorrectly shown as 0.0225781 animals/km<sup>2</sup>. The correct density estimate is reflected in Table 6.

*Species with Take Estimates Less than Mean Group Size:* Using the approach described above to estimate take, the take estimates for the sei whale, long-finned pilot whale, Risso's dolphin and Atlantic spotted dolphin were less than the average group sizes estimated for these species (Table 6). However, information on the social structures and life histories of these species indicates these species are often encountered in groups. The results of take calculations support the likelihood that the survey is expected to encounter and to incidentally take these species, and we believe it is likely that these species may be encountered in groups. Therefore it is reasonable to conservatively assume that one group of each of these species will be taken during the planned survey. We authorize the take of the average group size for these species and stocks to account for the possibility that the planned survey encounters a group of any of these species or stocks (Table 6). Note that the take estimate for the sperm whale was not increased to average group size because, based on water depths in the survey area (26 to 48 m (52 to 92 ft)), it is very unlikely that groups of sperm whales, which tend to occur at greater depths, would be encountered by the survey.

We note that the IHA authorizes take of Risso's dolphins, though authorization for the take of Risso's dolphins was not proposed in the Federal Register notice of the proposed IHA (83 FR 19711; May 4, 2018). Though density estimates for Risso's dolphins in the survey area indicate they would not be expected in the survey area, based on public comments and a review of monitoring data from a previous IHA issued for a similar activity in 2017 (NMFS, 2017) we have determined that take authorization for Risso's dolphins is warranted. The monitoring report from the IHA issued to Deepwater Wind in 2017 for HRG surveys in the RI-MA WEA indicates that a single group of Risso's dolphins was observed by PSOs (though not taken by Level A or

Level B harassment) during that survey (AIS Inc., 2017). As the activities authorized through this IHA are similar to those conducted by DWW in 2017 (*i.e.*, HRG surveys conducted within the RI-MA WEA) NMFS has determined the planned survey may encounter Risso's dolphins and thus it is appropriate to authorize the take of Risso's dolphins. As take modeling based on density estimates (*e.g.*, Roberts et. al (2016)) indicated no Risso's dolphins would be taken by the survey, but we have determined take authorization for Risso's dolphins is warranted and Risso's dolphins may be encountered in groups, we have authorized the take of a group of Risso's dolphins, based on mean group size for the species (Table 6). We also note that the take estimate for gray seals has been revised from the number proposed for authorization. In the *Federal Register* notice of the proposed IHA (83 FR 19711; May 4, 2018), the take number proposed for gray seals was based on an incorrect density estimate. The average density of gray seals in the survey area was reported as 0.0941067 per km<sup>2</sup>; however the correct density is 0.14116 per km<sup>2</sup>. The correct density has been used to re-calculate the authorized number of gray seal takes (Table 6).

### **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 relative cost and impact on operations.

#### *Mitigation Measures*

Based on the applicant's request, which includes requirements relating to the BOEM lease stipulations associated with ESA-listed marine mammals, and specific information regarding the zones ensonified above NMFS thresholds, NMFS is requiring the following mitigation measures during the marine site characterization surveys.

#### *Marine Mammal Exclusion and Watch Zone*

Marine mammal exclusion zones (EZ) will be established around the HRG survey equipment and monitored by protected species observers (PSO) during HRG surveys as follows:

- 500 m EZ for North Atlantic right whales;

- 200 m EZ for all other ESA-listed cetaceans (including fin whale, sei whale and sperm whale); and
- 25 m EZ for harbor porpoises.

The applicant proposed a 500 m EZ for North Atlantic right whales and 200 m EZ for all other marine mammals; however, for non-ESA-listed marine mammals, based on estimated distances to isopleths corresponding with Level A harassment thresholds (Table 5), we determined EZs for species other than those described above were not warranted. If HRG survey equipment is shut down (as described below) due to a marine mammal being observed within or approaching the relevant EZs, ramp up of survey equipment may not commence until the animal(s) has been observed exiting the relevant EZ, or until an additional time period has elapsed with no further sighting of the animal (*e.g.*, 15 minutes for harbor porpoises and 30 minutes for all large whale species). In addition to the EZs described above, PSOs will visually monitor and record the presence of all marine mammals within a 500 m Watch Zone. Marine mammals observed by PSOs within 447 m of geophysical survey equipment will be documented as taken by Level B harassment.

#### *Visual Monitoring*

As per the BOEM lease, visual and acoustic monitoring of the established exclusion and monitoring zones will be performed by qualified and NMFS-approved PSOs. It will be the responsibility of the Lead PSO on duty to communicate the presence of marine mammals as well as to communicate the action(s) that are necessary to ensure mitigation and monitoring requirements are implemented as appropriate. PSOs will be equipped with binoculars and would estimate distances to marine mammals located in proximity to the vessel and/or exclusion zone 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. Position data will be recorded using hand-held or vessel GPS units for each sighting. Observations will take place from the highest available vantage point on the survey vessel. During surveys conducted at night, night-vision equipment with infrared light-emitting diodes spotlights and/or infrared video monitoring will be available for PSO use, and passive acoustic monitoring (described below) will be used.

#### *Pre-Clearance of the Exclusion Zone*

Prior to initiating HRG survey activities, DWW will implement a 30-minute pre-clearance period. During this period, the PSOs will ensure that no North Atlantic right whales are observed within 500 m of geophysical survey equipment, and that no other marine mammal species are observed within 200 m of geophysical survey equipment. Surveys may not begin until these zones have been clear of the relevant marine mammal species for 30 minutes. This pre-clearance requirement would include small delphinoids that approach the vessel (*e.g.*, bow ride). PSOs would also continue to monitor the zone for 30 minutes after survey equipment is shut down or survey activity has concluded.

#### *Passive Acoustic Monitoring*

As proposed by the applicant and required by BOEM lease stipulations, PAM will be used to support monitoring during night time operations to provide for optimal acquisition of species detections at night. The PAM system will consist of an array of hydrophones with both broadband (sampling mid-range frequencies of 2 kHz to 200 kHz) and at least one low-frequency hydrophone (sampling range frequencies of 75 hertz (Hz) to 30 kHz). The PAM operator(s) will monitor acoustic signals in real time both aurally (using headphones) and visually (via sound

analysis software). PAM operators will communicate nighttime detections to the lead PSO on duty who will ensure the implementation of the appropriate mitigation measure.

Shutdown of geophysical survey equipment is required upon confirmed PAM detection of a North Atlantic right whale at night, even in the absence of visual confirmation, except in cases where the acoustic detection can be localized and the right whale can be confirmed as being beyond the 500 m EZ; equipment may be re-started no sooner than 30 minutes after the last confirmed acoustic detection. However, aside from the required shutdown for right whales as described above, PAM detection alone would not trigger a requirement for any mitigation action to be taken upon acoustic detection of marine mammals, per BOEM requirements.

#### *Ramp-Up of Survey Equipment*

As proposed by the applicant, where technically feasible, a ramp-up procedure will be used for geophysical survey equipment capable of adjusting energy levels at the start or re-start of survey activities. The ramp-up procedure will be used at the beginning of HRG survey activities in order to provide additional protection to marine mammals near the survey area by allowing them to detect the presence of the survey and vacate the area prior to the commencement of survey equipment use at full energy. Ramp-up of the survey equipment will not begin until the relevant EZs have been cleared by the PSOs, as described above. Systems will be initiated at their lowest power output and will be incrementally increased to full power. If any marine mammals are detected within the EZ prior to or during the ramp-up, HRG equipment will be shut down (as described below).

#### *Shutdown Procedures*

If a marine mammal is observed within or approaching the relevant EZ (as described above) an immediate shutdown of the survey equipment is required. Subsequent restart of the



survey equipment may only occur after the animal(s) has either been observed exiting the relevant EZ or until an additional time period has elapsed with no further sighting of the animal (e.g., 15 minutes for harbor porpoises and 30 minutes for North Atlantic right, fin, sei and sperm whales).

In addition, shutdown of geophysical survey equipment is required upon confirmed PAM detection of a North Atlantic right whale at night, even in the absence of visual confirmation, except in cases where the acoustic detection can be localized and the right whale can be confirmed as being beyond the 500 m EZ; equipment may be re-started no sooner than 30 minutes after the last confirmed acoustic detection.

As required in the BOEM lease, if the HRG equipment shuts down for reasons other than mitigation (*i.e.*, mechanical or electronic failure) resulting in the cessation of the survey equipment for a period greater than 20 minutes, a 30 minute pre-clearance period (as described above) will precede the restart of the HRG survey equipment. If the pause is less than 20 minutes, the equipment may be restarted as soon as practicable at its full operational level only if visual surveys were continued diligently throughout the silent period and the EZs remained clear of marine mammals during that entire period. If visual surveys were not continued diligently during the pause of 20 minutes or less, a 30-minute pre-clearance period (as described above) will precede the re-start of the HRG survey equipment. Following a shutdown, HRG survey equipment may be restarted following pre-clearance of the zones as described above.

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 an EZ or within the area encompassing the Level B harassment isopleth (450 m), shutdown will occur.

### *Vessel Strike Avoidance*

Vessel strike avoidance measures will include, but are not limited to, the following, as required in the BOEM lease, except under circumstances when complying with these requirements would put the safety of the vessel or crew at risk:

- All vessel operators and crew will maintain vigilant watch for cetaceans and pinnipeds, and slow down or stop their vessel to avoid striking these protected species;
- All survey vessels greater than or equal to 65 ft (19.8 m) in overall length will comply with 10 knot (18.5 km/hr) or less speed restriction in any SMA per the NOAA ship strike reduction rule (73 FR 60173; October 10, 2008);
- All vessel operators will reduce vessel speed to 10 knots (18.5 km/hr) or less when any large whale, any mother/calf pairs, or large assemblages of non-delphinoid cetaceans are observed near (within 100 m (330 ft)) an underway vessel;
- All survey vessels will maintain a separation distance of 500 m (1640 ft) or greater from any sighted North Atlantic right whale;
- If underway, vessels must steer a course away from any sighted North Atlantic right whale at 10 knots (18.5 km/hr) or less until the 500 m (1640 ft) minimum separation distance has been established. If a North Atlantic right whale is sighted in a vessel's path, or within 500 m (330 ft) to an underway vessel, the underway vessel must reduce speed and shift the engine to neutral. Engines will not be engaged until the North Atlantic right whale has moved outside of the vessel's path and beyond 500 m. If stationary, the vessel must not engage engines until the North Atlantic right whale has moved beyond 500 m;
- All vessels will maintain a separation distance of 100 m (330 ft) or greater from any sighted non-delphinoid cetacean. If sighted, the vessel underway must reduce speed and

shift the engine to neutral, and must not engage the engines until the non-delphinoid cetacean has moved outside of the vessel's path and beyond 100 m. If a survey vessel is stationary, the vessel will not engage engines until the non-delphinoid cetacean has moved out of the vessel's path and beyond 100 m;

- All vessels will maintain a separation distance of 50 m (164 ft) or greater from any sighted delphinoid cetacean. Any vessel underway remain parallel to a sighted delphinoid cetacean's course whenever possible, and avoid excessive speed or abrupt changes in direction. Any vessel underway reduces vessel speed to 10 knots (18.5 km/hr) or less when pods (including mother/calf pairs) or large assemblages of delphinoid cetaceans are observed. Vessels may not adjust course and speed until the delphinoid cetaceans have moved beyond 50 m and/or the abeam of the underway vessel;
- All vessels will maintain a separation distance of 50 m (164 ft) or greater from any sighted pinniped; and
- All vessels underway will not divert or alter course in order to approach any whale, delphinoid cetacean, or pinniped. Any vessel underway will avoid excessive speed or abrupt changes in direction to avoid injury to the sighted cetacean or pinniped.

DWW will ensure that vessel operators and crew maintain a vigilant watch for cetaceans and pinnipeds by slowing down or stopping the vessel to avoid striking marine mammals. Project-specific training will be conducted for all vessel crew prior to the start of the site characterization survey activities. Confirmation of the training and understanding of the requirements will be documented on a training course log sheet. Signing the log sheet will certify that the crew members understand and will comply with the necessary requirements throughout the survey activities.

### *Seasonal Operating Requirements*

The northern section of the survey area partially overlaps with a portion of a North Atlantic right whale SMA which occurs east of Long Island, New York, and south of Massachusetts and Rhode Island. This SMA is active from November 1 through April 30 of each year. Survey vessels that are >65 ft in length would be required to adhere to the mandatory vessel speed restrictions (<10 kn) when operating within the SMA during times when the SMA is active. In addition, between watch shifts, members of the monitoring team would consult NMFS' North Atlantic right whale reporting systems for the presence of North Atlantic right whales throughout survey operations. Members of the monitoring team would monitor the NMFS North Atlantic right whale reporting systems for the establishment of a Dynamic Management Area (DMA). If NMFS should establish a DMA in the survey area, within 24 hours of the establishment of the DMA DWW would coordinate with NMFS to shut down and/or alter the survey activities as needed to avoid right whales to the extent possible.

The mitigation measures are designed to avoid the already low potential for injury in addition to some Level B harassment, and to minimize the potential for vessel strikes. There are no known marine mammal rookeries or mating grounds in the survey area that would otherwise potentially warrant increased mitigation measures for marine mammals or their habitat (or both). The planned survey would occur in an area that has been identified as a biologically important area for migration for North Atlantic right whales. However, given the small spatial extent of the survey area relative to the substantially larger spatial extent of the right whale migratory area, the survey is not expected to appreciably reduce migratory habitat nor to negatively impact the migration of North Atlantic right whales, thus mitigation to address the survey's occurrence in North Atlantic right whale migratory habitat is not warranted. The survey area would partially

overlap spatially with a biologically important feeding area for fin whales. However, the fin whale feeding area is sufficiently large (2,933 km<sup>2</sup>), and the acoustic footprint of the planned survey is sufficiently small (<100 km<sup>2</sup> estimated to be ensonified to the Level B harassment threshold per day), that the survey is not expected to appreciably reduce fin whale feeding habitat nor to negatively impact the feeding of fin whales, thus mitigation to address the survey's occurrence in fin whale feeding habitat is not warranted. Further, we believe the mitigation measures are practicable for the applicant to implement.

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

### **Monitoring and Reporting**

In order to issue an 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 survey 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.

### *Monitoring Measures*

As described above, visual monitoring of the EZs and monitoring zone will be performed by qualified and NMFS-approved PSOs. PSO Qualifications will include completion of a PSO training course and documented field experience conducting similar surveys. As proposed by the applicant and required by BOEM, an observer team comprising a minimum of four NMFS-approved PSOs and a minimum of two certified PAM operator(s), operating in shifts, will be employed by DWW during the planned surveys. PSOs and PAM operators 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 one on and three off, while during nighttime operations PSOs will work in pairs. The PAM operators will also be on call as necessary during daytime operations should visual observations become impaired. Each PSO will monitor 360 degrees of the field of vision.

Also as described above, PSOs will be equipped with binoculars and have the ability to estimate distances to marine mammals located in proximity to the vessel and/or exclusion zone using range finders. Reticulated binoculars will also be available to PSOs for use as appropriate based on conditions and visibility to support the sighting and monitoring of marine species. During night operations, PAM and night-vision equipment with infrared light-emitting diode spotlights and/or infrared video monitoring will be used to increase the ability to detect marine mammals. Position data will be recorded using hand-held or vessel global positioning system (GPS) units for each sighting. Observations will take place from the highest available vantage point on the survey vessel. General 360-degree scanning will occur during the monitoring periods, and target scanning by the PSO will occur when alerted of a marine mammal presence.

Data on all PAM/PSO observations will be recorded, including dates, times, and locations of survey operations; time of observation, location and weather; details of marine mammal sightings (*e.g.*, species, numbers, behavior); and details of any observed taking (*e.g.*, behavioral disturbances or injury/mortality).

### *Reporting Measures*

Within 90 days after completion of survey activities, a final technical report will be provided to NMFS that fully documents the methods and monitoring protocols, summarizes the data recorded during monitoring, summarizes the number of marine mammals estimated to have

been taken during survey activities (by species, when known), summarizes the mitigation actions taken during surveys (including what type of mitigation and the species and number of animals that prompted the mitigation action, when known), and provides an interpretation of the results and effectiveness of all mitigation and monitoring. Any recommendations made by NMFS must be addressed in the final report prior to acceptance by NMFS.

In addition to the final technical report, DWW will provide the reports described below as necessary during survey activities. In the unanticipated event that DWW's survey activities lead to an injury (Level A harassment) or mortality (*e.g.*, ship-strike, gear interaction, and/or entanglement) of a marine mammal, DWW 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 Greater Atlantic 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 DWW to minimize reoccurrence of such an event in the future. DWW would not resume activities until notified by NMFS.

In the event that DWW 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), DWW would immediately report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources and the NMFS Greater Atlantic 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 DWW to determine if modifications in the activities are appropriate.

In the event that DWW 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), DWW would report the incident to the Chief of the Permits and Conservation Division, Office of Protected Resources, and the NMFS Greater Atlantic Regional Stranding Coordinator, within 24 hours of the discovery. DWW would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to NMFS. DWW 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. 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, our analysis applies to all the species listed in Table 6, given that NMFS expects the anticipated effects of the planned survey to be similar in nature.

NMFS does not anticipate that injury or mortality would occur as a result of DWW’s planned survey, even in the absence of mitigation. Thus the IHA does not authorize any injury or mortality. As discussed in the *Potential Effects* section, non-auditory physical effects and vessel strike are not expected to occur.

We expect that all potential takes would be in the form of short-term Level B behavioral harassment in the form of temporary avoidance of the area or decreased foraging (if such activity were occurring), reactions that are considered to be of low severity and with no lasting biological consequences (e.g., Southall *et al.*, 2007). Potential impacts to marine mammal habitat were discussed in the *Federal Register* notice of the proposed IHA (83 FR 19711; May 4, 2018) (see *Potential Effects of the Specified Activity on Marine Mammals and their Habitat*). Marine mammal habitat may be impacted by elevated sound levels, but these impacts would be temporary. In addition to being temporary and short in overall duration, the acoustic footprint of the planned survey is small relative to the overall distribution of the animals in the area and their use of the area. Feeding behavior is not likely to be significantly impacted. Prey species are mobile and are broadly distributed throughout the project area; therefore, marine mammals that may be temporarily displaced 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 temporary nature of the disturbance and the availability of similar habitat and resources in the surrounding area, 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.

There are no rookeries or mating grounds known to be biologically important to marine mammals within the planned survey area. As described above, the survey area would overlap spatially and temporally with a biologically important feeding area for fin whales. The important fin whale feeding area occurs from March through October and stretches from an area south of Montauk Point to south of Martha's Vineyard. However, the fin whale feeding area is sufficiently large (2,933 km<sup>2</sup>), and the acoustic footprint of the planned survey is sufficiently

small (<100 km<sup>2</sup> estimated to be ensonified to the Level B harassment threshold per day), that fin whale feeding habitat would not be reduced appreciably. Any fin whales temporarily displaced from the survey area would be expected to have sufficient remaining feeding habitat available to them, and would not be prevented from feeding in other areas within the biologically important feeding habitat. In addition, any displacement of fin whales from the survey area would be expected to be temporary in nature. Therefore, we do not expect fin whale feeding to be negatively impacted by the planned survey. There are no feeding areas known to be biologically important to marine mammals within the project area with the exception of the aforementioned feeding area for fin whales. There is no designated critical habitat for any ESA-listed marine mammals in the survey area.

The survey area is within 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). Off the south coast of Massachusetts and Rhode Island, this biologically important migratory area extends from the coast to beyond the shelf break. Due to the fact that the survey is temporary and short in overall duration, and the fact that the spatial acoustic footprint of the planned survey is very small relative to the spatial extent of the available migratory habitat in the area, right whale migration is not expected to be impacted by the planned survey.

The mitigation measures are expected to reduce the number and/or severity of takes by (1) giving animals the opportunity to move away from the sound source before HRG survey equipment reaches full energy; (2) preventing animals from being exposed to sound levels that may otherwise result in injury. Additional vessel strike avoidance requirements will further mitigate potential impacts to marine mammals during vessel transit to and within the survey area.

NMFS concludes that exposures to marine mammal species and stocks due to DWW's survey would result in only short-term (temporary and short in duration) effects to individuals exposed. Marine mammals may temporarily avoid the immediate area, but are not expected to permanently abandon the area. Major shifts in habitat use, distribution, or foraging success are not expected. NMFS does not anticipate the authorized take estimates to impact annual rates of recruitment or survival.

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, serious injury, or Level A harassment is anticipated or authorized;
- The anticipated impacts of the activity on marine mammals would be temporary behavioral changes due to avoidance of the area around the survey vessel;
- The availability of alternate areas of similar habitat value for marine mammals to temporarily vacate the survey area during the planned survey to avoid exposure to sounds from the activity;
- The project area does not contain areas of significance for mating or calving;
- Effects on species that serve as prey species for marine mammals from the survey would be temporary and would not be expected to reduce the availability of prey or to affect marine mammal feeding;
- The mitigation measures, including visual and acoustic monitoring, exclusion zones, and shutdown measures, are expected to minimize potential impacts to marine mammals.

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 specified activity will have a negligible impact on all affected marine mammal species or stocks.

### **Small Numbers**

As noted above, only small numbers of incidental take may be authorized under Section 101(a)(5)(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.

The numbers of marine mammals that we authorize to be taken, for all species and stocks, would be considered small relative to the relevant stocks or populations (less than 11 percent of each species and stock). See Table 6. Based on the analysis contained herein of the proposed 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 size of the affected species or stocks.

### **Unmitigable Adverse Impact Analysis and Determination**

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

## **Endangered Species Act**

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

The NMFS Office of Protected Resources is authorizing the incidental take of four species of marine mammals which are listed under the ESA: the North Atlantic right, fin, sei, and sperm whale. BOEM consulted with NMFS GARFO under section 7 of the ESA on commercial wind lease issuance and site assessment activities on the Atlantic Outer Continental Shelf in Massachusetts, Rhode Island, New York and New Jersey Wind Energy Areas. The NMFS GARFO issued a Biological Opinion concluding that these activities may adversely affect but are not likely to jeopardize the continued existence of the North Atlantic right, fin, and sperm whale. The Biological Opinion can be found online at: [www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable](http://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable). Upon request from the NMFS Office of Protected Resources, the NMFS GARFO will issue an amended incidental take statement associated with this Biological Opinion to include the takes of the ESA-listed marine mammal species authorized through this IHA.

## **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 proposed

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, as well as from a similar project proposed by Garden State Offshore Energy (a subsidiary of Deepwater Wind) off the coast of Delaware. A Finding of No Significant Impact (FONSI) was signed on June 13, 2018. A copy of the EA and FONSI is available online at: [www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable](http://www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable).

### **Authorization**

NMFS has issued an IHA to Deepwater Wind New England, LLC for conducting marine site characterization surveys offshore of Rhode Island and Massachusetts and along potential submarine cable routes, for a period of one year, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated.

Dated: June 15, 2018.

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