BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648-XD163

Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Construction of the Block Island Wind Farm

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

ACTION: Notice; proposed incidental harassment authorization; request for comments.

SUMMARY: NMFS has received an application from Deepwater Wind Block Island, LLC (DWBI) for an Incidental Harassment Authorization (IHA) to take marine mammals, by harassment, incidental to development of the Block Island Wind Farm. Pursuant to the Marine Mammal Protection Act (MMPA), NMFS is requesting comments on its proposal to issue an IHA to DWBI to incidentally take, by Level B harassment only, marine mammals during the specified activity.

DATES: Comments and information must be received no later than [insert date 30 days after date of publication in the FEDERAL REGISTER].

ADDRESSES: Comments on the application should be addressed to Jolie Harrison, Supervisor, Incidental Take Program, Permits and Conservation Division, Office of Protected Resources, National Marine Fisheries Service, 1315 East-West Highway, Silver Spring, MD 20910. The mailbox address for providing email comments is itp.magliocca@noaa.gov. Comments sent via e-mail, including all attachments, must not exceed a 25-megabyte file size. NMFS is not responsible for comments sent to addresses other than those provided here.

Instructions: All comments received are a part of the public record and will generally be posted to http://www.nmfs.noaa.gov/pr/permits/incidental.htm without change. All Personal Identifying Information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit Confidential Business Information or otherwise sensitive or protected information.

An electronic copy of the application may be obtained by writing to the address specified above, telephoning the contact listed below (see FOR FURTHER INFORMATION CONTACT), or visiting the internet at: http://www.nmfs.noaa.gov/pr/permits/incidental.htm. Documents cited in this notice may also be viewed, by appointment, during regular business hours, at the aforementioned address.

NMFS is also preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and will consider comments submitted in response to this notice as part of that process. The EA will be posted at the website listed above once it is finalized.

FOR FURTHER INFORMATION CONTACT: Michelle Magliocca, Office of Protected Resources, NMFS, (301) 427-8401.

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 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."

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 March 11, 2013, NMFS received an application from DWBI for the taking of marine mammals incidental to construction of the Block Island Wind Farm. The application went through a series of revisions and the final version was submitted on October 17, 2013. NMFS determined that the application was adequate and complete on December 2, 2013.

DWBI proposes to develop the Block Island Wind Farm (BIWF), a 30 megawatt offshore wind farm. The proposed activity could begin in late 2014 and last through late 2015; however,

portions of the project would only occur for short, sporadic periods of times over the 1-year period. The following specific aspects of the proposed activities are likely to result in the take of marine mammals: impact pile driving and the use of dynamically positioned (DP) vessel thrusters. Take, by Level B Harassment only, of individuals of nine species is anticipated to result from the specified activity.

Description of the Specified Activity

Overview

The BIWF will consist of five, 6 megawatt wind turbine generators (WTGs), a submarine cable interconnecting the WTGs, and a transmission cable. Construction of the BIWF will involve the following activities: cable landfall construction on Block Island via a short-distance horizontal directional drill (HDD) from an excavated trench box located on Crescent Beach, Block Island; jacket foundation installation; inter-array and export cable installation; and WTG installation. Installation of the jacket foundation would require impact pile driving. The generation of underwater noise from impact pile driving and the DP vessel thruster may result in the incidental take of marine mammals.

In connection with the BIWF, Deepwater Wind Block Island Transmission System, LLC (a different applicant) proposes to construct the Block Island Transmission System, a bi-directional submarine transmission cable that will run from Block Island to the Rhode Island mainland. Incidental take of marine mammals resulting from construction of the Block Island Transmission System will be assessed separately.

Dates and Duration

Construction activities could begin in late 2014 and are scheduled to be complete by December 2015. The anticipated project work windows are provided in Table 1.

Table 1. Anticipated project work windows.

Activity	Anticipated Work Window
Contracting, mobilization, and verification	January 2014 – December 2014
Onshore short-distance HDD installation	December 2014 – June 2015
Onshore/offshore long-distance HDD installation	January 2015 – June 2015
Onshore cable installation	October 2014 – May 2015
Offshore cable installation	April 2015 – August 2015
Landfall demobilization and remediation	May 2015 – June 2015
Foundation fabrication and transportation	October 2015 – September 2015
WTG jacket foundation – non-pile driving activity	April – July or August – October
WTG jacket foundation – pile driving	May – July or August – October
WTG installation and commissioning	July - December

NMFS is proposing to issue an authorization effective December 2014 through November 2015, based on the anticipated work windows for in-water construction that could result in the incidental take of marine mammals. While project activities may occur for 1 year, in-water pile driving is only expected to occur for up to 20 days (4 days for each WTG). Use of the DP vessel thruster during cable installation activities is expected to occur for 28 days maximum. Impact pile driving would occur during daylight hours only, starting approximately 30 minutes after dawn and ending 30 minutes prior to dusk, unless a situation arises where stopping pile driving would compromise safety (either human health or environmental) and/or the integrity of the project. Cable installation (and subsequent use of the DP vessel thruster) would be conducted 24 hours per day.

Specified Geographic Region

The offshore components of the BIWF will be located in state territorial waters. Construction staging and laydown for offshore construction is planned to occur at the Quonset Point port facility in North Kingstown, Rhode Island. The WTGs will be located on average of about 4.8 kilometers (km) southeast of Block Island, and about 25.7 km south of the Rhode Island mainland. The WTGs will be arranged in a radial configuration spaced about 0.8 km

apart. The inter-array cable will connect the five WTGs for a total length of 3.2 km from the northernmost WTG to the southernmost WTG (Figure 1.2-1 of DWBI's application). Water depths along the WTG array and inter-array cable range up to 23.3 meters (m).

The submarine portions of the export cable will be installed by a jet plow supported by a DP vessel. The export cable will originate at the northernmost WTG and travel 10 km to a manhole on Block Island. Water depths along the export cable submarine route range up to 36.9 m. Terrestrial cables, an interconnection switchyard, and other ancillary facilities associated with the BIWF will be located in the town of New Shoreham in Washington County, Rhode Island.

Detailed Description of Activities

The following sections provide additional details associated with each portion of the BIWF construction.

1. Landfall Construction

On Block Island, DWBI plans to bring the export cable ashore via a short-distance HDD. DWBI would use the short-distance HDD to install either a steel or high density polyethylene conduit for the cable under the beach. The excavated trench on Crescent Beach would be approximately 2 to 3 m wide, 4 m deep, and 11 m long. Spoils from the trench excavation would be stored on the respective beach and returned to the trench after cable installation. The HDD would enter through the shore side of the excavated trench and the cable conduit would be installed between the trench and the manhole. The export cable would then be pulled from the excavated trench into the respective manhole through the newly installed conduit. Sheet piling installations would occur at low tide.

The coupling of land-based vibrations and nearshore sounds into the underwater acoustic field is not well understood and cannot be accurately predicted using current models. However, because the excavation for the cable trench and the HDD installation on the beach would occur onshore and because sand is generally a very poor conductor of vibrations, NMFS considers it unlikely that the underwater noise generated from either of these installations would result in harassment of marine mammals.

A jet plow, supported by a DP cable installation barge, would be used to install the export cable below the seabed. The jet plow would be positioned over the trench at the mean low water mark on Crescent Beach and be pulled from shore by the cable installation barge.

2. Jacket Foundation Installation

Offshore installation of the WTG jacket foundations would be carried out from a derrick barge moored to the seabed. Each jacket foundation would be lifted from the derrick barge, placed onto the seafloor, leveled, and made ready for piling. The piles would then be inserted above sea level into each corner of the jacket foundation in two segments. First, the lead sections of the piles would be inserted into the jacket foundation legs and then driven into the seafloor. Then, the second length of the piles would be placed on the lead pile section and welded into place. The jacket foundation piles would then be driven into the seafloor to the final penetration design depth or until refusal, whichever comes first. DWBI anticipates a final pile depth of up to 76.2 m. For the purpose of analysis, DWBI assumes that impact pile driving would start with a 200 kilojoule (kJ) rated hydraulic hammer, followed by a 600 kJ rated hammer to reach final design penetration. A 1,000-kilowatt unit would power the hammers. Changing out the hammers from 200 to 600 kJ would be required once the driving forces become ineffective, and would take about 30 to 60 minutes to complete, during which time impact pile

driving would cease. Once pile driving is complete, the top of the piles would be welded to the jacket foundation legs using shear plates and cut to allow for horizontal placement of the WTG transition deck. Finally, the boat landing and transition decks would be welded into place.

Pile driving activities would occur during daylight hours only, unless a situation arises where stopping pile driving would compromise safety (either human health or environmental) and/or the integrity of the project. Installation of each jacket foundation would require 7 days to complete; the duration of pile driving within this timeframe is anticipated to be 4 days for each jacket foundation. The jacket foundations would be installed one at a time at each WTG location for a total of 5 weeks assuming no delays due to weather or other circumstances.

3. Offshore Cable Installation

DWBI would use a jet plow, supported by a DP cable installation barge, to install the export cable and inter-array cable below the seabed. The jet plow would be positioned over the trench and pulled from shore by the cable installation vessel. The jet plow would likely be a rubber-tired or skid-mounted plow with a maximum width of about 4.6 m, and pulled along the seafloor behind the cable-laying barge with assistance of a non-DP material barge. High-pressure water from vessel-mounted pumps would be injected into the sediments through nozzles situated along the plow, causing the sediments to temporarily fluidize and create a liquefied trench. DWBI anticipates a temporary trench width of up to 1.5 m. As the plow is pulled along the route behind the barge, the cable would be laid into the temporary, liquefied trench through the back of the plow. The trench would be backfilled by the water current and the natural settlement of the suspended material. Umbilical cords would connect the submerged jet plow to control equipment on the vessel to allow the operators to monitor and control the installation

process and make adjustments to the speed and alignment as the installation proceeds across the water.

The export cable and inter-array cable would be buried to a target depth of 1.8 m beneath the seafloor. The actual burial depth depends on substrate encountered along the route and could vary from 1.2 to 2.4 m. If less than 1.2 m burial is achieved, DWBI may elect to install additional protection, such as concrete matting or rock piles. At each of the WTGs, the inter-array cable would be pulled into the jacket foundation through J-tubes installed on the sides of the jacket foundations. At the J-tubes, additional cable armoring such as sand bags and/or rocks would be used to protect the inter-array cable.

A DP vessel would be used during cable installation in order to maintain precise coordinates. DP systems maintain their precise coordinates in waters through the use of automatic controls. These control systems use variable levels of power to counter forces from current and wind. During cable-lay activities, DWBI expects that a reduced 50 percent power level will be used by DP vessels. DWBI modeled scenarios using a source level of 180 dB re 1 micro Pascal for the DP vessel thruster, assuming water depths of 7, 10, 20, and 40 m, and thruster power of 50 percent. Detailed information on the acoustic modeling for this source is provided in Appendix A of DWBI's application (see ADDRESSES).

Depending on bottom conditions, weather, and other factors, installation of the export cable and inter-array cable is expected to take 2 to 4 weeks. This schedule assumes a 24-hour work window with no delays due to weather or other circumstances.

4. WTG Installation

The WTGs would be installed upon completion of the jacket foundations and the pull-in of the inter-array cable. The WTGs would be transported by a transportation barge to the BIWF

from a temporary storage facility on the mainland. The transportation barge would set up at the installation site adjacent to a jack-up material barge. The jack-up barge legs would be lowered to the seafloor to provide a level work surface and begin the WTG installation. The WTGs would be installed in sections with the lower tower section lifted onto the transition deck followed by the upper tower section.

Installation of each WTG would require 2 days to complete, assuming a 24-hour work window and no delays due to weather or other circumstances. None of the activities associated with installation of the WTGs is expected to result in the harassment of marine mammals.

Description of Marine Mammals in the Area of the Specified Activity

There are 34 marine mammal species with possible or confirmed occurrence in the proposed area of the specified activity (Table 2).

Table 2. Marine mammal species with possible or confirmed occurrence in the proposed project area.

Common Name	**Scientific Name**	**Status**	**Occurrence**	**Seasonality**	**Range**	**Abundance**
Toothed whales (Odontocetes) Atlantic white-sided dolphin	Lagenorhynchus acutus	-	Confirmed	Year-round	North Carolina to Canada	23,390
Atlantic spotted dolphin	Stenella frontalis					50,978
Bottlenose dolphin	Tursiops truncatus	Strategic (northern coastal stock)				9,604
Short-beaked common dolphin	Delphinus delphis	-	Common	Year-round	North Carolina to Canada	120,743
Harbor porpoise	Phocoena phocoena	Strategic	Common	Year-round	North Carolina to Greenland	89,054
Killer whale	Orcinus orca					Unknown
False killer whale	Pseudorca crassidens					Unknown
Long-finned pilot whale	Globicephala malaena					12,619
Short-finned	Globicephala					24,674

pilot whale	macrohynchus					
Risso's dolphin	Grampus griseus					20,479
Striped dolphin	Stenella coeruleoalba					94,462
White-beaked dolphin	Lagenorhynchus albirostris					2,003
Sperm whale	Physeter macrocephalus	Endangered				4,804
Pygmy sperm whale	Kogia breviceps	Strategic				395
Dwarf sperm whale	Kogia sima					395
Cuvier's beaked whale	Ziphius cavirostris	Strategic				3,513
Blainville's beaked whale	Mesoplodon densirostris					3,513
Gervais' beaked whale	Mesoplodon europaeus	Strategic				3,513
True's beaked whale	Mesoplodon mirus	Strategic				3,513
Bryde's whale	Balaenoptera edeni					
Northern bottlenose whale	Hyperoodon ampullatus					
Baleen whales (Mysticetes) Minke whale	Balaenoptera acutorostrata	-	Common (spring and summer)	Spring, summer, fall	Caribbean to Greenland	8,987
Blue whale	Balaenoptera musculus	Endangered				Unknown
Fin whale	Balaenoptera physalus	Endangered	Common	Year-round	Caribbean to Greenland	3,985
Humpback whale	Megaptera novaeangliae	Endangered	Confirmed	Year-round	Caribbean to Greenland	11,570
North Atlantic right whale	Eubalaena glacialis	Endangered	Confirmed	Year-round	Southeastern U.S. to Candada	444
Sei whale	Balaenoptera borealis	Endangered				Unknown
Pinnipeds Gray seals	Halichoerus grypus	-	Confirmed	Year-round	New England to Canada	348,900
Harbor seals	Phoca vitulina	-	Common	Spring, summer, winter	Florida to Canada	99,340
Hooded seals	Cystophora cristata					Unknown
Harp seal	Phoca groenlandica					Unknown
West Indian manatee	Trichechus manatus	Endangered				3,802

The highlighted species in Table 2 are pelagic and/or northern species, or are so rarely sighted that their presence in the proposed project area, and therefore take, is unlikely. These species are not considered further in this proposed IHA notice. The West Indian manatee is managed by the U.S. Fish and Wildlife Service and is also not considered further in this proposed IHA notice. Further information on the biology and local distribution of these species can be found in section 4 of DWBI's application (see ADDRESSES), and the NMFS Marine Mammal Stock Assessment Reports, which are available online at: http://www.nmfs.noaa.gov/pr/species/.

Potential Effects of the Specified Activity on Marine Mammals

This section includes a summary and discussion of the ways that the types of stressors associated with the specified activity (i.e., impact pile driving and use of the DP vessel thruster) have been observed to impact marine mammals. This discussion may also include reactions that we consider to rise to the level of a take and those that we do not consider to rise to the level of a take (for example, with acoustics, we may include a discussion of studies that showed animals not reacting at all to sound or exhibiting barely measurable avoidance). This section is intended as a background of potential effects and does not consider either the specific manner in which this activity will be carried out or the mitigation that will be implemented, and how either of those will shape the anticipated impacts from this specific activity. The "Estimated Take by Incidental Harassment" section later in this document will include a quantitative analysis of the number of individuals that are expected to be taken by this activity. The "Negligible Impact Analysis" section will include the analysis of how this specific activity will impact marine mammals and will consider the content of this "Potential Effects of the Specified Activity on Marine Mammals" section, the "Estimated Take by Incidental Harassment" section, the

"Proposed Mitigation" section, and the "Anticipated Effects on Marine Mammal Habitat" section to draw conclusions regarding the likely impacts of this activity on the reproductive success or survivorship of individuals, and from that on the affected marine mammal populations or stocks.

Background on Sound

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and is generally characterized by several variables. Frequency describes the sound's pitch and is measured in hertz (Hz) or kilohertz (kHz), while sound level describes the sound's intensity and is measured in decibels (dB). Sound level increases or decreases exponentially with each dB of change. The logarithmic nature of the scale means that each 10-dB increase is a 10-fold increase in acoustic power (and a 20-dB increase is then a 100-fold increase in power). A 10-fold increase in acoustic power does not mean that the sound is perceived as being 10 times louder, however. Sound levels are compared to a reference sound pressure (micro-Pascal) to identify the medium. For air and water, these reference pressures are "re: 20 μPa" and "re: 1 μPa," respectively. Root mean square (RMS) is the quadratic mean sound pressure over the duration of an impulse. RMS is calculated by squaring all of the sound amplitudes, averaging the squares, and then taking the square root of the average (Urick, 1975). RMS accounts for both positive and negative values; squaring the pressures makes all values positive so that they may be accounted for in the summation of pressure levels (Hastings and Popper, 2005). This measurement is often used in the context of discussing behavioral effects, in part because behavioral effects, which often result from auditory cues, may be better expressed through averaged units rather than by peak pressures.

Acoustic Impacts

Impact pile driving and use of the DP vessel thruster during the BIWF project may temporarily impact marine mammals in the area due to elevated in-water sound levels. Marine mammals are continually exposed to many sources of sound. Naturally occurring sounds such as lightning, rain, sub-sea earthquakes, and biological sounds (e.g., snapping shrimp, whale songs) are widespread throughout the world's oceans. Marine mammals produce sounds in various contexts and use sound for various biological functions including, but not limited to: (1) social interactions; (2) foraging; (3) orientation; and (4) predator detection. Interference with producing or receiving these sounds may result in adverse impacts. Audible distance, or received levels of sound depend on the nature of the sound source, ambient noise conditions, and the sensitivity of the receptor to the sound (Richardson et al., 1995). Type and significance of marine mammal reactions to sound are likely dependent on a variety of factors including, but not limited to, (1) the behavioral state of the animal (e.g., feeding, traveling, etc.); (2) frequency of the sound; (3) distance between the animal and the source; and (4) the level of the sound relative to ambient conditions (Southall et al., 2007).

When considering the influence of various kinds of sound on the marine environment, it is necessary to understand that different kinds of marine life are sensitive to different frequencies of sound. Based on available behavioral data, audiograms have been derived using auditory evoked potentials, anatomical modeling, and other data, Southall et al. (2007) designate "functional hearing groups" for marine mammals and estimate the lower and upper frequencies of functional hearing of the groups. The functional groups and the associated frequencies are indicated below (though animals are less sensitive to sounds at the outer edge of their functional range and most sensitive to sounds of frequencies within a smaller range somewhere in the middle of their functional hearing range):

- Low frequency cetaceans (13 species of mysticetes): functional hearing is estimated to occur between approximately 7 Hz and 22 kHz (however, a study by Au et al. (2006) of humpback whale songs indicate that the range may extend to at least 24 kHz);
- Mid-frequency cetaceans (32 species of dolphins, six species of larger toothed whales, and 19 species of beaked and bottlenose whales): functional hearing is estimated to occur between approximately 150 Hz and 160 kHz;
- High frequency cetaceans (eight species of true porpoises, six species of river dolphins, Kogia, the franciscana, and four species of cephalorhynchids): functional hearing is estimated to occur between approximately 200 Hz and 180 kHz; and
- Pinnipeds in Water: functional hearing is estimated to occur between approximately 75 Hz and 75 kHz, with the greatest sensitivity between approximately 700 Hz and 20 kHz.

As mentioned previously in this document, nine marine mammal species (seven cetaceans and two pinnipeds) are likely to occur in the proposed project area. Of the seven cetacean species likely to occur in DWBI's proposed project area, four are classified as low-frequency cetaceans (i.e., minke whale, fin whale, humpback whale, and North Atlantic right whale), two are classified as mid-frequency cetaceans (i.e., Atlantic white-sided dolphin and short-beaked common dolphin), and one is classified as a high-frequency cetacean (i.e., harbor porpoise) (Southall et al., 2007). A species' functional hearing group is a consideration when we analyze the effects of exposure to sound on marine mammals.

1. Hearing Impairment

Marine mammals may experience temporary or permanent hearing impairment when exposed to loud sounds. Hearing impairment is classified by temporary threshold shift (TTS) and permanent threshold shift (PTS). There are no empirical data for onset of PTS in any marine

mammal; therefore, PTS-onset must be estimated from TTS-onset measurements and from the rate of TTS growth with increasing exposure levels above the level eliciting TTS-onset. PTS is presumed to be likely if the hearing threshold is reduced by ≥ 40 dB (that is, 40 dB of TTS). PTS is considered auditory injury (Southall et al., 2007) and occurs in a specific frequency range and amount. Irreparable damage to the inner or outer cochlear hair cells may cause PTS; however, other mechanisms are also involved, such as exceeding the elastic limits of certain tissues and membranes in the middle and inner ears and resultant changes in the chemical composition of the inner ear fluids (Southall et al., 2007).

2. Temporary Threshold Shift (TTS)

TTS is the mildest form of hearing impairment that can occur during exposure to a loud sound (Kryter, 1985). While experiencing TTS, the hearing threshold rises and a sound must be stronger in order to be heard. At least in terrestrial mammals, TTS can last from minutes or hours to (in cases of strong TTS) days, can be limited to a particular frequency range, and can occur to varying degrees (i.e., a loss of a certain number of dBs of sensitivity). For sound exposures at or somewhat above the TTS threshold, hearing sensitivity in both terrestrial and marine mammals recovers rapidly after exposure to the noise ends.

Marine mammal hearing plays a critical role in communication with conspecifics and in interpretation of environmental cues for purposes such as predator avoidance and prey capture. Depending on the degree (elevation of threshold in dB), duration (i.e., recovery time), and frequency range of TTS and the context in which it is experienced, TTS can have effects on marine mammals ranging from discountable to serious. For example, a marine mammal may be able to readily compensate for a brief, relatively small amount of TTS in a non-critical frequency range that takes place during a time when the animals is traveling through the open ocean, where

ambient noise is lower and there are not as many competing sounds present. Alternatively, a larger amount and longer duration of TTS sustained during a time when communication is critical for successful mother/calf interactions could have more serious impacts if it were in the same frequency band as the necessary vocalizations and of a severity that it impeded communication. The fact that animals exposed to levels and durations of sound that would be expected to result in this physiological response would also be expected to have behavioral responses of a comparatively more severe or sustained nature is also notable and potentially of more importance than the simple existence of a TTS.

Scientific literature highlights the inherent complexity of predicting TTS onset in marine mammals, as well as the importance of considering exposure duration when assessing potential impacts (Mooney et al., 2009a, 2009b; Kastak et al., 2007). Generally, with sound exposures of equal energy, quieter sounds (lower SPL) of longer duration were found to induce TTS onset more than louder sounds (higher SPL) of shorter duration (more similar to subbottom profilers). For intermittent sounds, less threshold shift will occur than from a continuous exposure with the same energy (some recovery will occur between intermittent exposures) (Kryter et al., 1966; Ward, 1997). For sound exposures at or somewhat above the TTS-onset threshold, hearing sensitivity recovers rapidly after exposure to the sound ends. Southall et al. (2007) considers a 6 dB TTS (that is, baseline thresholds are elevated by 6 dB) to be a sufficient definition of TTS-onset. NMFS considers TTS as Level B harassment that is mediated by physiological effects on the auditory system; however, NMFS does not consider TTS-onset to be the lowest level at which Level B harassment may occur. The potential for TTS is considered within NMFS' analysis of potential impacts from Level B harassment.

3. Tolerance

Numerous studies have shown that underwater sounds from industrial activities are often readily detectable by marine mammals in the water at distances of many kilometers. However, other studies have shown that marine mammals at distances more than a few kilometers away often show no apparent response to industrial activities of various types (Miller et al., 2005). This is often true even in cases when the sounds must be readily audible to the animals based on measured received levels and the hearing sensitivity of that mammal group. Although various baleen whales, toothed whales, and (less frequently) pinnipeds have been shown to react behaviorally to underwater sound from sources such as airgun pulses or vessels under some conditions, at other times, mammals of all three types have shown no overt reactions (e.g., Malme et al., 1986; Richardson et al., 1995; Madsen and Mohl, 2000; Croll et al., 2001; Jacobs and Terhune, 2002; Madsen et al., 2002; Miller et al., 2005). In general, pinnipeds seem to be more tolerant of exposure to some types of underwater sound than are baleen whales. Richardson et al. (1995) found that vessel sound does not seem to strongly affect pinnipeds that are already in the water. Richardson et al. (1995) went on to explain that seals on haul-outs sometimes respond strongly to the presence of vessels and at other times appear to show considerable tolerance of vessels, and Brueggeman et al. (1992) observed ringed seals (Pusa hispida) hauled out on ice pans displaying short-term escape reactions when a ship approached within 0.16-0.31 mi (0.25-0.5 km).

4. Masking

Masking is the obscuring of sounds of interest to an animal by other sounds, typically at similar frequencies. Marine mammals are highly dependent on sound, and their ability to recognize sound signals amid other sound is important in communication and detection of both predators and prey. Background ambient sound may interfere with or mask the ability of an

animal to detect a sound signal even when that signal is above its absolute hearing threshold. Even in the absence of anthropogenic sound, the marine environment is often loud. Natural ambient sound includes contributions from wind, waves, precipitation, other animals, and (at frequencies above 30 kHz) thermal sound resulting from molecular agitation (Richardson et al., 1995).

Background sound may also include anthropogenic sound, and masking of natural sounds can result when human activities produce high levels of background sound. Conversely, if the background level of underwater sound is high (e.g., on a day with strong wind and high waves), an anthropogenic sound source would not be detectable as far away as would be possible under quieter conditions and would itself be masked. Ambient sound is highly variable on continental shelves (Thompson, 1965; Myrberg, 1978; Chapman et al., 1998; Desharnais et al., 1999). This results in a high degree of variability in the range at which marine mammals can detect anthropogenic sounds.

Although masking is a phenomenon which may occur naturally, the introduction of loud anthropogenic sounds into the marine environment at frequencies important to marine mammals increases the severity and frequency of occurrence of masking. For example, if a baleen whale is exposed to continuous low-frequency sound from an industrial source, this would reduce the size of the area around that whale within which it can hear the calls of another whale. The components of background noise that are similar in frequency to the signal in question primarily determine the degree of masking of that signal. In general, little is known about the degree to which marine mammals rely upon detection of sounds from conspecifics, predators, prey, or other natural sources. In the absence of specific information about the importance of detecting these natural sounds, it is not possible to predict the impact of masking on marine mammals

(Richardson et al., 1995). In general, masking effects are expected to be less severe when sounds are transient than when they are continuous. Masking is typically of greater concern for those marine mammals that utilize low-frequency communications, such as baleen whales, because of how far low-frequency sounds propagate.

5. Behavioral Disturbance

Behavioral responses to sound are highly variable and context-specific. An animal's perception of and response to (in both nature and magnitude) an acoustic event can be influenced by prior experience, perceived proximity, bearing of the sound, familiarity of the sound, etc. (Southall et al., 2007). If a marine mammal does react briefly to an underwater sound by changing its behavior or moving a small distance, the impacts of the change are unlikely to be significant to the individual, let alone the stock or population. However, if a sound source displaces marine mammals from an important feeding or breeding area for a prolonged period, impacts on individuals and populations could be significant (e.g., Lusseau and Bejder, 2007; Weilgart, 2007).

The studies that address responses of low-frequency cetaceans to non-pulse sounds (such as the sound emitted from a DP vessel thruster) include data gathered in the field and related to several types of sound sources (of varying similarity to chirps), including: vessel noise, drilling and machinery playback, low-frequency M-sequences (sine wave with multiple phase reversals) playback, tactical low-frequency active sonar playback, drill ships, and non-pulse playbacks. These studies generally indicate no (or very limited) responses to received levels in the 90 to 120 dB re: 1μPa range and an increasing likelihood of avoidance and other behavioral effects in the 120 to 160 dB range. As mentioned earlier, though, contextual variables play a very important role in the reported responses and the severity of effects do not increase linearly with received

levels. Also, few of the laboratory or field datasets had common conditions, behavioral contexts, or sound sources, so it is not surprising that responses differ.

The studies that address responses of mid-frequency cetaceans to non-pulse sounds include data gathered both in the field and the laboratory and related to several different sound sources (of varying similarity to chirps) including: pingers, drilling playbacks, ship and ice-breaking noise, vessel noise, Acoustic harassment devices (AHDs), Acoustic Deterrent Devices (ADDs), mid-frequency active sonar, and non-pulse bands and tones. Southall et al. (2007) were unable to come to a clear conclusion regarding the results of these studies. In some cases animals in the field showed significant responses to received levels between 90 and 120 dB, while in other cases these responses were not seen in the 120 to 150 dB range. The disparity in results was likely due to contextual variation and the differences between the results in the field and laboratory data (animals typically responded at lower levels in the field).

The studies that address responses of high-frequency cetaceans to non-pulse sounds include data gathered both in the field and the laboratory and related to several different sound sources (of varying similarity to chirps), including: pingers, AHDs, and various laboratory non-pulse sounds. All of these data were collected from harbor porpoises. Southall et al. (2007) concluded that the existing data indicate that harbor porpoises are likely sensitive to a wide range of anthropogenic sounds at low received levels (around 90 to 120 dB), at least for initial exposures. All recorded exposures above 140 dB induced profound and sustained avoidance behavior in wild harbor porpoises (Southall et al., 2007). Rapid habituation was noted in some but not all studies.

The studies that address the responses of pinnipeds in water to non-pulse sounds include data gathered both in the field and the laboratory and related to several different sound sources

(of varying similarity to chirps), including: AHDs, various non-pulse sounds used in underwater data communication, underwater drilling, and construction noise. Few studies exist with enough information to include them in the analysis. The limited data suggest that exposures to non-pulse sounds between 90 and 140 dB generally do not result in strong behavioral responses of pinnipeds in water, but no data exist at higher received levels (Southall et al., 2007).

Given the many uncertainties in predicting the quantity and types of impacts of noise on marine mammals, it is common practice to estimate how many mammals would be present within a particular distance of activities and/or exposed to a particular level of sound. In most cases, this approach likely overestimates the numbers of marine mammals that would be affected in some biologically-important manner.

The studies that address the responses of mid-frequency cetaceans to impulse sounds include data gathered both in the field and the laboratory and related to several different sound sources (of varying similarity to boomers), including: small explosives, airgun arrays, pulse sequences, and natural and artificial pulses. The data show no clear indication of increasing probability and severity of response with increasing received level. Behavioral responses seem to vary depending on species and stimuli. Data on behavioral responses of high-frequency cetaceans to multiple pulses is not available. Although individual elements of some non-pulse sources (such as pingers) could be considered pulses, it is believed that some mammalian auditory systems perceive them as non-pulse sounds (Southall et al., 2007).

The studies that address the responses of pinnipeds in water to impulse sounds include data gathered in the field and related to several different sources (of varying similarity to boomers), including: small explosives, impact pile driving, and airgun arrays. Quantitative data on reactions of pinnipeds to impulse sounds is limited, but a general finding is that exposures in

the 150 to 180 dB range generally have limited potential to induce avoidance behavior (Southall et al., 2007).

6. Vessel Strike

Vessels and in-water structures have the potential to cause physical disturbance to marine mammals. Various types of vessels already use the water surrounding Rhode Island and Block Island in particular. Tug boats and barges, both of which would be required during the BIWF construction are slow moving and follow a predictable course. Marine mammals would be able to easily avoid these vessels and are likely already habituated to the presence of numerous vessels.

Anticipated Effects on Marine Mammal Habitat

There are no feeding areas, rookeries, or mating grounds known to be biologically important to marine mammals within the proposed project area. There is also no designated critical habitat for any ESA-listed marine mammals. Harbor seals haul out on Block Island and points along Narragansett Bay, the most important haul-out being on the edge of New Harbor, about 2.4 km from the proposed BIWF landfall on Block Island. The only consistent haul-out locations for gray seals within the vicinity of Rhode Island are around Monomoy National Wildlife Refuge and Nantucket Sound in Massachusetts (more than 80 nautical miles from the proposed project area). NMFS' regulations at 50 CFR 224 designated the nearshore waters of the Mid-Atlantic Bight as the Mid-Atlantic U.S. Seasonal Management Area (SMA) for right whales in 2008. Mandatory vessel speed restrictions are in place in that SMA from November 1 through April 30 to reduce the threat of collisions between ships and right whales around their migratory route and calving grounds.

The BIWF involves activities that would disturb the seafloor and potentially affect benthic and finfish communities. Installation of the inter-array cable and export cable would result in the temporary disturbance of no more than 3.7 and 11.6 acres of seafloor, respectively. These installation activities would also result in temporary and localized increases in turbidity around the proposed project area. DWBI may also be required to install additional protective armoring in areas where the burial depth achieved is less than 1.2 m. DWBI expects that additional protection would be required at a maximum of 1 percent of the entire submarine cable, resulting in a conversion of up to 0.4 acres of soft substrate to hard substrate along the cable route. During the installation of additional protective armoring at the cable crossings and as necessary along the cable route, anchors and anchor chains would temporarily impact about 1.8 acres of bottom substrate during each anchoring event.

The installation of the five WTGs would result in a total impact of about 0.35 acres. In this area, soft substrate would be permanently converted to hard substrate. Construction activities associated with the installation of the jacket foundations and WTGs would also result in the temporary disturbance of 28.9 acres of substrate from the placement of jack-up barge spuds, vessel anchors, and associated anchor sweep. Additional disturbance is also expected within the top few inches of substrate from the anchor chains during foundation installation as they rest on the seafloor or sweep across the bottom in response to bottom currents.

Jet-plowing and impacts from construction vessel anchor placement and/or sweep would cause either the displacement or loss of benthic and finfish resources in the immediate areas of disturbance. This may result in a temporary loss of forage items and a temporary reduction in the amount of benthic habitat available for foraging marine mammals in the immediate proposed project area. However, the amount of habitat affected represents a very small percentage of the

available foraging habitat in the proposed project area. Increased underwater sound levels may temporarily result in marine mammals avoiding or abandoning the area.

Because of the temporary nature of the disturbance, the availability of similar habitat and resources in the surrounding area, and the lack of important or unique marine mammal habitat, the impacts to marine mammals and the food sources that they utilize are not expected to cause significant or long-term consequences for individual marine mammals or their populations.

Proposed Mitigation

In order to issue an incidental take authorization (ITA) 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 (where relevant).

Proposed Mitigation Measures

With NMFS' input during the application process, DWBI is proposing the following mitigation measures during impact pile driving and use of the DP vessel thruster:

1. Marine Mammal Exclusion Zone

At the onset of pile driving when the 200 kJ impact pile driving hammer is in use, protected species observers would visually monitor a 200-m radius around each jacket foundation to reduce the potential for injury of marine mammals. After changing to the 600 kJ impact pile driving hammer, protected species observers would visually monitor a 600-m radius. These distances are estimated to be the 180 dB isopleths based on DWBI's sound exposure model. A minimum of two observers would be stationed aboard each noise-producing construction support vessel. Each observer would visually monitor a 360-degree field of vision

from the vessel. Observers would begin monitoring at least 30 minutes prior to impact pile driving, continue monitoring during impact pile driving, and stop monitoring 30 minutes after impact pile driving has ended. If a marine mammal is seen approaching or entering the 200-m or 600-m zones during impact pile driving (and following a 50 percent reduction in energy), DWBI would stop impact pile driving as a precautionary measure to minimize noise impacts on the animal. The reduction would not be implemented at the risk of compromising safety (either human health or environmental) and/or the integrity of the project.

2. Soft-start Procedures

DWBI would use a soft-start (or ramp-up) procedure at the beginning of impact pile driving to alert marine mammals in the area. This procedure would require an initial set of three strikes from the impact hammer at 40 percent energy with a 1-minute waiting period between subsequent 3-strike sets. DWBI would repeat the procedure two additional times. DWBI would initiate a soft-start at the beginning of each day of pile driving, at the beginning of each pile segment, and if pile driving stops for more than 30 minutes. DWBI would not initiate a soft-start if the monitoring zone is obscured by fog, inclement weather, poor lighting conditions, etc.

3. Delay and Powerdown Procedures

DWBI would delay impact pile driving if a marine mammal is observed within the relevant exclusion zone and until the exclusion zone is clear of marine mammals. DWBI proposes to reduce impact pile driving if a marine mammal is seen within or approaching the 200-m or 600-m exclusion zone. DWBI would reduce the hammer energy by 50 percent to a ramp-up level. If a marine mammal continues to move towards the sound source, DWBI would stop impact pile driving operations until the exclusion zone is clear of marine mammals for at least 30 minutes. DWBI would not implement the

4. DP Thruster Power Reduction

A constant tension must be maintained during cable installation and any significant stoppage in vessel maneuverability during jet plow activities would result in damage to the cable. Therefore, during DP vessel operations, DWBI proposes to reduce DP thruster power to the maximum extent possible if a marine mammal approaches or enters a 5-m radius from the vessel (estimated to be the 160-dB isopleth from the vessel). This reduction would not be implemented at the risk of compromising safety and/or the integrity of the BIWF. DWBI would not increase power until the 5-m zone is clear of marine mammals for 30 minutes.

5. Time of Day and Weather Restrictions

DWBI would conduct impact pile driving during daylight hours only, starting approximately 30 minutes after dawn and ending 30 minutes before dusk. If a soft-start is initiated before the onset of inclement weather, DWBI would complete that segment of impact pile driving. DWBI would not initiate new impact pile driving activities until the entire monitoring zone is visible.

Mitigation Conclusions

NMFS has carefully evaluated the applicant's proposed mitigation measures and considered a range of other measures in the context of ensuring that NMFS prescribes the means of effecting the least practicable impact on the affected marine mammal species and stocks and their habitat. Our evaluation of potential measures included consideration of the following factors in relation to one another:

- The manner in which, and the degree to which, the successful implementation of the measure is expected to minimize adverse impacts to marine mammals;

- The proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and
- The practicability of the measure for applicant implementation.

Any mitigation measure(s) prescribed by NMFS should be able to accomplish, have a reasonable likelihood of accomplishing (based on current science), or contribute to the accomplishment of one or more of the general goals listed below:

1. Avoidance or minimization of injury or death of marine mammals wherever possible (goals 2, 3, and 4 may contribute to this goal).
2. A reduction in the numbers of marine mammals (total number or number at biologically important time or location) exposed to received levels of continuous noise, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only).
3. A reduction in the number of times (total number or number at biologically important time or location) individuals would be exposed to received levels of continuous noise, or other activities expected to result in the take of marine mammals (this goal may contribute to 1, above, or to reducing harassment takes only).
4. A reduction in the intensity of exposures (either total number or number at biologically important time or location) to received levels of continuous noise, or other activities expected to result in the take of marine mammals (this goal may contribute to a, above, or to reducing the severity of harassment takes only).
5. Avoidance or minimization of adverse effects to marine mammal habitat, paying special attention to the food base, activities that block or limit passage to or from biologically

important areas, permanent destruction of habitat, or temporary destruction/disturbance of habitat during a biologically important time.

6. For monitoring directly related to mitigation – an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

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

Proposed Monitoring and Reporting

In order to issue an ITA 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 ITAs 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 proposed action area.

Monitoring measures prescribed by NMFS should accomplish one or more of the following general goals:

1. An increase in the probability of detecting marine mammals, both within the mitigation zone (thus allowing for more effective implementation of the mitigation) and in general to generate more data to contribute to the analyses mentioned below;

2. An increase in our understanding of how many marine mammals are likely to be exposed to levels of continuous noise from use of a DP vessel thruster that we associate with specific adverse effects, such as behavioral harassment, TTS, or PTS;
3. An increase in our understanding of how marine mammals respond to stimuli expected to result in take and how anticipated adverse effects on individuals (in different ways and to varying degrees) may impact the population, species, or stock (specifically through effects on annual rates of recruitment or survival) through any of the following methods:
    - Behavioral observations in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict received level, distance from source, and other pertinent information);
    - Physiological measurements in the presence of stimuli compared to observations in the absence of stimuli (need to be able to accurately predict received level, distance from source, and other pertinent information);
    - Distribution and/or abundance comparisons in times or areas with concentrated stimuli versus times or areas without stimuli;
4. An increased knowledge of the affected species; and
5. An increase in our understanding of the effectiveness of certain mitigation and monitoring measures.

Proposed Monitoring Measures

DWBI submitted a marine mammal monitoring plan as part of the IHA application. It can be found in section 12 of their application. The plan may be modified or supplemented based on comments or new information received from the public during the public comment period.

1. Visual Monitoring

DWBI would use two protected species observers (in addition to those used for mitigation) to visually monitor the Level B harassment zone during all impact pile driving. During use of the 200 kJ impact pile driving hammer, a 3.6-km radius would be monitored, and during use of the 600 kJ impact pile driving hammer, a 7-km radius (or maximum distance visible) would be monitored. DWBI would also use two protected species observers to visually monitor a 5-m radius around the vessel during DP vessel thruster use. Observers would estimate distances to marine mammals visually, using laser range finders, or by using reticle binoculars during daylight hours. During night operations (DP vessel thruster use only), observers would use night-vision binoculars. Observers would record their position using hand-held or vessel global positioning system units for each sighting, vessel position change, and any environmental change. Each observer would scan the surrounding area for visual indication of marine mammal presence. Observers would be located from the highest available vantage point on the associated operational platform (e.g., support vessel, barge or tug), estimated to be at least 6 m above the waterline.

Prior to initiation of construction work, all crew members on barges, tugs, and support vessels would undergo environmental training, a component of which would focus on the procedures for sighting and protection of marine mammals. DWBI would also conduct a briefing with the construction supervisors and crews and observers to define chains of command, discuss communication procedures, provide an overview of the monitoring purposes, and review operational procedures. The DWBI Construction Compliance Manager (or other authorized individual) would have the authority to stop or delay impact pile driving activities if deemed necessary.

2. Acoustic Field Verification

DWBI would conduct field verification of the estimated 200-m and 600-m exclusion zones during impact pile driving to determine whether the proposed distances correspond accurately to the relevant isopleths.

DWBI would take acoustic measurements during impact pile driving of the last half (deepest pile segment) for any given open-water pile and would also measure from two reference locations at two water depths (a depth at mid-water and at about 1 m above the seafloor). If the field measurements determine that the actual Level A (180-dB isopleth) and Level B (160-dB isopleth) harassment zones are less than or beyond the proposed distances, a new zone may be established accordingly. DWBI would notify NMFS and the USACE within 24 hours if a new marine mammal exclusion zone is established that extends beyond the proposed 200-m or 600-m distances. Implementation of a smaller zone would be contingent on NMFS' review and would not be used until NMFS approves the change.

DWBI would also perform field verification of the 160-dB isopleth associated with DP vessel thruster use during cable installation. DWBI would take acoustic measurements from two reference locations at two water depths (a depth at mid-water and at about 1 m above the seafloor). Similar to field verification during impact pile driving, the DP thruster power reduction zone may be modified as necessary.

Proposed Reporting Measures

Observers would record dates and locations of construction operations; times of observations; location and weather; details of marine mammal sightings (e.g., species, age, numbers, behavior); and details of any observed take.

DWBI proposes to provide the following notifications and reports during construction activities:

- Notification to NMFS and the U.S. Army Corps of Engineers (USACE) within 24-hours of beginning construction activities and again within 24-hours of completion;
- Detailed report of field-verification measurements within 7 days of completion (including: sound levels, durations, spectral characteristics, DP thruster use, etc.) and notification to NMFS and the USACE within 24-hours if a new zone is established;
- Notification to NMFS and USACE within 24-hours if field verification measurements suggest a larger marine mammal exclusion zone;
- Final technical report to NMFS and the USACE within 120 days of completion of the specified activity documenting methods and monitoring protocols, mitigation implementation, marine mammal observations, other results, and discussion of mitigation effectiveness.

In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner not permitted by the authorization (if issued), such as an injury, serious injury, or mortality (e.g., ship-strike, gear interaction, and/or entanglement), DWBI shall immediately cease the specified activities and immediately report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Michelle.Magliocca@noaa.gov and the Northeast Regional Stranding Coordinator at 978-281-9300 (Mendy.Garron@noaa.gov). The report must 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).

DWBI shall not resume its activities until we are able to review the circumstances of the prohibited take. We will work with DWBI to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. DWBI may not resume their activities until notified by us via letter, email, or telephone.

In the event that DWBI discovers an injured or dead marine mammal, and the lead visual observer 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), DWBI shall immediately report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected Resources, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Michelle.Magliocca@noaa.gov and the Northeast Regional Stranding Coordinator at 978-281-9300 (Mendy.Garron@noaa.gov). The report must include the same information identified in the paragraph above this section. Activities may continue while we review the circumstances of the

incident. We would work with DWBI to determine whether modifications in the activities are appropriate.

In the event that DWBI discovers an injured or dead marine mammal, and the lead visual observer determines that the injury or death is not associated with or related to the authorized activities (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), DWBI would report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected Resources, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Michelle.Magliocca@noaa.gov and the Northeast Regional Stranding Coordinator at 978-281-9300 (Mendy.Garron@noaa.gov), within 24 hours of the discovery. DWBIT would provide photographs or video footage (if available) or other documentation of the stranded animal sighting to us.

Estimated Take by Incidental Harassment

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].

Project activities that have the potential to harass marine mammals, as defined by the MMPA, include noise associated with impact pile driving, and noise associated with the use of DP vessel thrusters during cable installation. Harassment could take the form of masking, temporary threshold shift, avoidance, or other changes in marine mammal behavior. NMFS anticipates that impacts to marine mammals would be in the form of behavioral harassment and

no take by injury, serious injury, or mortality is proposed. NMFS does not anticipate take resulting from the movement of vessels associated with construction because there will be a limited number of vessels moving at slow speeds over a relatively shallow, nearshore area.

NMFS' current acoustic exposure criteria for estimating take are shown in Table 3 below. DWBI's modeled distances to these acoustic exposure criteria are shown in Table 4. Details on the model characteristics and results are provided in the Underwater Acoustic Report at the end of DWBI's application (see ADDRESSES). DWBI and NMFS believe that this estimate represents the worst-case scenario and that the actual distance to the Level B harassment threshold may be shorter.

Table 3. NMFS' current acoustic exposure criteria.

Non-Explosive Sound		
Criterion	Criterion Definition	Threshold
Level A Harassment (Injury)	Permanent Threshold Shift (PTS) (Any level above that which is known to cause TTS)	180 dB re 1 microPa-m (cetaceans) / 190 dB re 1 microPa-m (pinnipeds) root mean square (rms)
Level B Harassment	Behavioral Disruption (for impulse noises)	160 dB re 1 microPa-m (rms)
Level B Harassment	Behavioral Disruption (for continuous, noise)	120 dB re 1 microPa-m (rms)

Table 4. DWBI's modeled distances to acoustic exposure criteria.

Activity	Distance to Level B Harassment (160 or 120 dB)	Distance to Level A Harassment (180/190 dB)
Impact pile driving (hammer energy = 600 kJ)	7,000 m	600 m
Impact pile driving (hammer energy = 200 kJ)	3,600 m	200 m
DP vessel thruster use	4,750 m	<5 m

DWBI estimated species densities within the proposed project area in order to estimate the number of marine mammal exposures to sound levels above 120 dB (continuous noise) or 160 dB (impulsive noise). DWBI used sightings per unit effort (SPUE) from Kenney and Vigness-Raposa (2009) for relative cetacean abundance and the Northeast Navy OPAREA Density Estimates (DoN, 2007) for seal abundance. Based on multiple reports, harbor seal abundance off the coast of Rhode Island is thought to be about 20 percent of the total abundance for southern New England. Because the seasonality and habitat use of gray seals off the coast of Rhode Island roughly overlaps with harbor seals, DWBI applied this 20 percent estimate to both pinniped species. The 2007 and 2009 density estimates relied upon for this proposed authorization are the best scientific data available. NMFS is not aware of any efforts to collect more recent density estimates than those relied upon here.

Estimated takes were calculated by multiplying the average highest species density (per 100 km^2) by the zone of influence, multiplied by a correction factor of 1.5 to account for marine mammals underwater, multiplied by the number of days of the specified activity. A detailed description of the DWBI's model used to calculate zones of influence is provided in the Underwater Acoustic Report at the end of their application (see ADDRESSES).

DWBI used a zone of influence of 89.6 km^2 and a total construction period of 20 days to estimate take from impact pile driving. This zone of influence is based on use of the largest 600 kJ impact hammer. Jacket foundation installation (requiring impact pile driving) is scheduled to occur between the months of May through July or August through October. DWBI used a zone of influence of 25.1 km^2 and a maximum installation period of 28 days to estimate take from use of the DP vessel thruster during cable installation. The zone of influence represents the average

ensonified area across the three representative water depths along the cable route (10 m, 20 m, and 40 m). DWBI expects cable installation to occur between April and August.

To be conservative, DWBI based take calculations on the highest seasonal species density over which impact pile driving and use of the DP vessel thruster was scheduled to occur. DWBI's requested take numbers are provided in Table 5 and this is also the number of takes NMFS is proposing to authorize. DWBI's calculations do not take into account whether a single animal is harassed multiple times or whether each exposure is a different animal. Therefore, the numbers in Table 5 are the maximum number of animals that may be harassed during impact pile driving (i.e., DWBI assumes that each exposure event is a different animal). These estimates do not account for mitigation measures that DWBI would implement during the specified activities.

DWBI did not request, and NMFS is not proposing, take from vessel strike. We do not anticipate marine mammals to be impacted by vessel movement because a limited number of vessels would be involved in construction activities and they would mostly move at slow speeds throughout construction.

Table 5. DWBI's estimated take for the BIWF project.

Common Species Name	Maximum Seasonal Density (per 100 km^2)	Estimated Take by Level B Harassment	Maximum Seasonal Density (per 100 km^2)	Estimated Take by Level B Harassment	Total Estimated Take
	Impact Pile Driving		DP Vessel Thruster		
Atlantic white-sided dolphin	7.46	201	1.23	13	214
Short-beaked common dolphin	8.21	221	2.59	28	249
Harbor porpoise	0.47	13	0.74	8	21
Minke whale	0.44	12	0.14	2	14
Fin whale	1.92	52	2.15	23	75
Humpback whale	0.11	3	0.11	2	5
North Atlantic right whale	0.04	2	0.06	1	3

Gray seal	14.16	77	14.16	30	107
Harbor seal	9.74	53	9.74	21	74

Table 6. Species information and take proposed for authorization by NMFS.

Common Species Name	Take Proposed for Authorization	Abundance of Stock	Percentage of Stock Potentially Affected	Population Trend
Atlantic white-sided dolphin	214	23,390	0.91%	N/A
Short-beaked common dolphin	249	120,743	0.21%	N/A
Harbor porpoise	21	89,054	0.02%	N/A
Minke whale	14	8,987	0.16%	N/A
Fin whale	75	3,985	1.88%	N/A
Humpback whale	5	11,570	0.04%	Increasing
North Atlantic right whale	3	444	0.67%	Increasing
Gray seal	107	348,900	0.03%	Increasing
Harbor seal	74	99,340	0.07%	N/A

Analysis and Preliminary Determinations

Negligible Impact

Negligible impact is "an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival" (50 CFR 216.103). A negligible impact finding is based on the lack of likely adverse effects on annual rates of recruitment or survival (i.e., population-level effects). An estimate of the number of Level B harassment 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 behavioral harassment, NMFS must consider other factors, such as the likely nature of any responses (their intensity, duration, etc.), the context of any responses (critical reproductive time or location, migration, etc.), as well as the number and nature of estimated Level A harassment takes, the number of estimated mortalities, and effects on habitat.

DWBI did not request, and NMFS is not proposing, take of marine mammals by injury, serious injury, or mortality. NMFS expects that take would be in the form of behavioral harassment. Exposure to sound levels above 160 dB during impact pile driving would not last for more than 12 hours per day for 20 non-consecutive days. Exposure to sound levels above 120 dB during use of the DP vessel thruster may last for 24 hours per day for 28 days. While use of the DP thruster may last for consecutive days, the vessel would be moving and therefore not focused on one specific area for the entire duration. Given the duration and intensity of the activity, and the fact that shipping contributes to the ambient sound levels around Rhode Island, NMFS does not anticipate the proposed take estimates to impact annual rates of recruitment or survival. Animals may temporarily avoid the immediate area, but are not expected to permanently abandon the area. Marine mammal habitat may be impacted by elevated sound levels and sediment disturbance, but these impacts would be temporary. Furthermore, there are no feeding areas, rookeries, or mating grounds known to be biologically important to marine mammals within the proposed project area. There is also no designated critical habitat for any ESA-listed marine mammals. The proposed 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 the pile driver reaches full energy; (2) reducing the intensity of exposure within a certain distance by reducing the DP vessel thruster power; and (3) preventing animals from being exposed to sound levels reaching 180 dB during impact pile driving.

Based on the analysis contained herein of the likely effects of the specified activity on marine mammals and their habitat, and taking into consideration the implementation of the proposed monitoring and mitigation measures, NMFS preliminarily finds that the total marine

mammal take from DWBI's BIWF project will have a negligible impact on the affected marine mammal species or stocks.

Small Numbers

The number of individual animals that may be exposed to sound levels above 160 dB (impact pile driving) and 120 dB (DP vessel thruster) is small relative to the species or stock size (Table 6). The proposed take numbers are the maximum numbers of animals that are expected to be harassed during the BIWF project; it is possible that some of these exposures may occur to the same individual. NMFS preliminarily finds that small numbers of marine mammals will be taken relative to the populations of the affected species or stocks.

Impact on Availability of Affected Species for Taking for Subsistence Uses

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

Endangered Species Act (ESA)

There are three marine mammal species that are listed as endangered under the ESA: fin whale, humpback whale, and North Atlantic right whale. Under section 7 of the ESA, the USACE (the federal permitting agency for the actual construction) consulted with NMFS on the proposed BIWF project. NMFS Northeast Region issued a Biological Opinion on January 30, 2014, concluding that the Block Island Wind Farm project (which includes the BIWF) may adversely affect but is not likely to jeopardize the continued existence of fin whale, humpback whale, or North Atlantic right whale. NMFS is also consulting internally on the issuance of an

IHA under section 101(a)(5)(D) of the MMPA for this activity. The Biological Opinion may be amended to include an incidental take exemption for these marine mammal species.

National Environmental Policy Act (NEPA)

The USACE is preparing an Environmental Assessment on the construction and operation of the BIWF. The USACE's EA is not expected to be finalized prior to NMFS making a determination on the issuance of an IHA. Therefore, NMFS is currently conducting an analysis, pursuant to the NEPA, to determine whether or not DWBI's proposed activity may have a significant effect on the human environment. This analysis will be completed prior to the issuance or denial of this proposed IHA.

Proposed Authorization

As a result of these preliminary determinations, NMFS proposes to issue an IHA to DWBI for conducting impact pile driving and use of a DP vessel thruster during construction of the BIWF from late 2014 to late 2015, provided the previously mentioned mitigation, monitoring, and reporting requirements are incorporated. The proposed IHA language is provided next.

This section contains a draft of the IHA itself. The wording contained in this section is proposed for inclusion in the IHA (if issued).

Deepwater Wind Block Island, LLC (DWBI) (56 Exchange Terrace, Suite 101, Providence, RI 02903-1772) is hereby authorized under section 101(a)(5)(D) of the Marine Mammal Protection Act (16 U.S.C. 1371(a)(5)(D)) and 50 CFR 216.107, to harass marine mammals incidental to impact pile driving and DP vessel thruster use during construction of the Block Island Wind Farm (BIWF).

1. This Authorization is valid from December 1, 2014 through November 31, 2015.

2. This Authorization is valid for construction of the BIWF off Block Island, Rhode Island, as described in the Incidental Harassment Authorization (IHA) application.
3. The holder of this authorization (Holder) is hereby authorized to take, by Level B harassment only, 214 Atlantic white-sided dolphins (Lagenorhynchus acutus), 249 short-beaked common dolphins (Delphinus delphis), 21 harbor porpoises (Phocoena phocoena), 14 minke whales (Balaenoptera acutorostrata), 75 fin whales (Balaenoptera physalus), 5 humpback whales (Megaptera novaeangliae), 3 North Atlantic right whales (Eubalaena glacialis), 107 gray seals (Halichoerus grypus), and 74 harbor seals (Phoca vitulina) incidental to impact pile driving DP vessel thruster use associated with construction of the BIWF.
4. The taking of any marine mammal in a manner prohibited under this IHA must be reported immediately to NMFS' Northeast Region, 55 Great Republic Drive, Gloucester, MA 01930-2276; phone 978-281-9328, and NMFS' Office of Protected Resources, 1315 East-West Highway, Silver Spring, MD 20910; phone 301-427-8401; fax 301-713-0376.
5. The Holder or designees must notify NMFS' Northeast Region and Headquarters at least 24 hours prior to the seasonal commencement of the specified activity (see contact information in 4 above).
6. Mitigation Requirements

   The Holder is required to abide by the following mitigation conditions listed in 6(a)-(e). Failure to comply with these conditions may result in the modification, suspension, or revocation of this IHA.

   (a) Marine Mammal Exclusion Zone: Protected species observers shall visually monitor an estimated 180-dB isopleth during all impact pile driving activity to ensure that no marine mammals enter this zone. A minimum of two observers shall be stationed aboard the noise-

producing support vessel and shall monitor a 360-degree field of vision. Observers shall begin monitoring at least 30 minutes prior to impact pile driving, continue monitoring during impact pile driving, and stop monitoring 30 minutes after impact pile driving has ended.

(b) Soft-start Procedures: Soft-start procedures shall be implemented at the beginning of each day and if pile driving has stopped for more than 30 minutes. Contractors shall initiate a set of three strikes form the impact hammer at 40 percent energy with a 1-minute waiting period between subsequent three-strike sets. This procedure shall be repeated two additional times before full energy is reached.

(c) Delay and Powerdown Procedures: The Holder shall delay impact pile driving if a marine mammal is observed within the estimated 180-dB isopleth marine mammal exclusion zone and until the exclusion zone is clear of marine mammals. The Holder shall reduce impact pile driving energy by 50 percent if a marine mammal continues toward or enters the 180 dB isopleth.

(d) DP Thruster Power Reduction: The Holder shall reduce DP thruster power to the maximum extent possible if a marine mammal approaches or enters the estimated 160-dB isopleth from the vessel. The Holder shall not increase power until the zone is clear of marine mammals for 30 minutes.

(e) Time of Day and Weather Restrictions: The Holder shall conduct impact pile driving during daylight hours only, starting approximately 30 minutes after dawn and ending 30 minutes before dusk unless a situation arises where stopping pile driving would compromise safety (either human health or environmental) and/or the integrity of the project. The Holder shall not initiate impact pile driving until the entire marine mammal exclusion zone is visible.

7. Monitoring Requirements

The Holder is required to abide by the following monitoring conditions listed in 7(a)-(b). Failure to comply with these conditions may result in the modification, suspension, or revocation of this IHA.

(a) General: If the Level B harassment area is obscured by fog or poor lighting conditions, the start of impact pile driving shall be delayed until the area is visible.

(b) Visual Monitoring: Protected species observers shall survey the estimated 160-dB isopleths 30 minutes before, during, and 30 minutes after all in-water impact pile driving and the estimated 120-dB isopleth 30 minutes before, during, and 30 minutes after use of DP vessel thrusters. The observers shall be stationed on the highest available vantage point on the associated operating platform. Observers shall estimate distances to marine mammals visually, using laser range finders, or by using reticle binoculars during daylight hours. During night operations (DP vessel thruster use only), observers shall use night-vision binoculars. Information recorded during each observation shall be used to estimate numbers of animals potentially taken and shall include the following:

- Numbers of individuals observed;
- Frequency of observation;
- Location (i.e., distance from the sound source);
- Impact pile driving status (i.e., soft-start, active, post pile driving, etc.);
- DP vessel thruster status (i.e., energy level); and
- Reaction of the animal(s) to relevant sound source (if any) and observed behavior, including bearing and direction of travel.

(c) Acoustic Field Verification: The Holder shall conduct field verification of the estimated 180-dB isopleths during impact pile driving. Acoustic measurements shall be taken during

impact pile driving of the last half (deepest pile segment) for any given open-water pile and from two reference locations at two water depths (a depth at mid-water and at about 1 m above the seafloor). If the field measurements show that the 180-dB isopleth is less than or beyond the initially proposed distances, a new zone may be established accordingly. The Holder shall notify NMFS within 24 hours if a new marine mammal exclusion zone is established that extends beyond what is initially established. Implementation of a smaller zone shall be contingent on NMFS' review and shall not be used until NMFS approves the change.

The Holder shall also perform field verification of the 160-dB isopleth associated with DP vessel thruster use during cable installation. Acoustic measurements shall be taken from two reference locations at two water depths (a depth at mid-water and at about 1 m above the seafloor). Similar to field verification during impact pile driving, the DP thruster power reduction zone may be modified as necessary.

8. Reporting Requirements

The Holder shall provide the following notifications during construction activities:

- Notification to NMFS within 24-hours of beginning construction and again within 24-hours of completion;
- Detailed report of field-verification measurements within 7 days of completion and notification to NMFS within 24-hours if a new zone is established; and
- Notification to NMFS within 24-hours if field verification measurements suggest a larger marine mammal exclusion zone.

The Holder shall submit a technical report to the Office of Protected Resources, NMFS, within 120 days of the conclusion of monitoring.

(a) The report shall contain the following information:

- A summary of the activity and monitoring plan (i.e., dates, times, locations);
- A summary of mitigation implementation;
- Monitoring results and a summary that addresses the goals of the monitoring plan, including the following:
    - Environmental conditions when observations were made:
    - Water conditions (i.e., Beaufort sea-state, tidal state)
    - Weather conditions (i.e., percent cloud cover, visibility, percent glare)
    - Date and time survey initiated and terminated
    - Date, time, number, species, and any other relevant data regarding marine mammals observed (for pre-activity, during activity, and post-activity surveys)
    - Description of the observed behaviors (in both the presence and absence of activities):
        - If possible, the correlation to underwater sound level occurring at the time of any observable behavior
- Estimated exposure/take numbers during activities; and
- An assessment of the implementation and effectiveness of prescribed mitigation and monitoring measures.

(b) In the unanticipated event that the specified activity clearly causes the take of a marine mammal in a manner not permitted by the authorization (if issued), such as an injury, serious injury, or mortality (e.g., ship-strike, gear interaction, and/or entanglement), the Holder shall immediately cease the specified activities and immediately report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected

Resources, NMFS, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Michelle.Magliocca@noaa.gov and the Northeast Regional Stranding Coordinator at 978-281-9300 (Mendy.Garron@noaa.gov). The report must 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).

The Holder shall not resume its activities until we are able to review the circumstances of the prohibited take. NMFS will work with the Holder to determine what is necessary to minimize the likelihood of further prohibited take and ensure MMPA compliance. The Holder may not resume activities until notified by us via letter, email, or telephone.

(c) In the event that the Holder discovers an injured or dead marine mammal, and the lead visual observer 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 as we describe in the next paragraph), the Holder shall immediately report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected Resources, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Michelle.Magliocca@noaa.gov and the Northeast Regional Stranding Coordinator at 978-281-9300 (Mendy.Garron@noaa.gov). The report must include the same information identified in the paragraph above this section. Activities may continue while we review the circumstances of the incident. NMFS will work with the Holder to determine whether modifications in the activities are appropriate.

(d) In the event that the Holder discovers an injured or dead marine mammal, and the lead visual observer determines that the injury or death is not associated with or related to the authorized activities (e.g., previously wounded animal, carcass with moderate to advanced decomposition, or scavenger damage), the Holder shall report the incident to the Incidental Take Program Supervisor, Permits and Conservation Division, Office of Protected Resources, at 301-427-8401 and/or by email to Jolie.Harrison@noaa.gov and Michelle.Magliocca@noaa.gov and the Northeast Regional Stranding Coordinator at 978-281-9300 (Mendy.Garron@noaa.gov) within 24 hours of the discovery. The Holder shall provide photographs or video footage (if available) or other documentation of the stranded animal sighting to us.

9. A copy of this IHA must be in the possession of the lead contractor on site and protected species observers operating under the authority of this authorization.

10. This IHA may be modified, suspended, or withdrawn if the Holder fails to abide by the conditions prescribed herein or if the authorized taking is having more than a negligible impact on the species or stock of affected marine mammals.

Request for Public Comments

NMFS requests comment on our analysis, the draft authorization, and any other aspect of the Notice of Proposed IHA for DWBI's construction of the BIWF. Please include with your comments any supporting data or literature citations to help inform our final decision on DWBI's request for an MMPA authorization.

Dated: March 20, 2014.

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Donna S. Wieting,
Director,
Office of Protected Resources,
National Marine Fisheries Service.

[FR Doc. 2014-06533 Filed 03/24/2014 at 8:45 am; Publication Date: 03/25/2014]