

NOAA FISHERIES

PROPOSED ACTION: Issuance of an Incidental Harassment Authorization to Ocean Wind, LLC for the Site Characterization Surveys off the Coast of New Jersey

TYPE OF STATEMENT: Environmental Assessment

LEAD AGENCY: U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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LOCATION: Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS-A 0498) off New Jersey

ABSTRACT: This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources' proposal to issue an Incidental Harassment Authorization, pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act, to Ocean Wind, LLC for the take of small numbers of marine mammals incidental to Site Characterization Surveys off the Coast of New Jersey.

DATE: June 2017

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LIST OF ACRONYMS AND ABBREVIATIONS

CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
dB	decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
ft	feet
FR	Federal Register
IHA	Incidental Harassment Authorization
m	meter
mi	miles
MMO	Marine Mammal Observer
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation Management Act
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OCS	Outer Continental Shelf
OMB	Office of Management and Budget
PSO	Protected Species Observer
PTS	Permanent threshold shift
SAR	NMFS Marine Mammal Stock Assessment Report
TTS	Temporary threshold shift
USFWS	US Fish and Wildlife Service

Chapter 1 Introduction and Purpose and Need

1.1 BACKGROUND

The Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1631 et seq.) prohibits the incidental taking of marine mammals. The incidental take of a marine mammal falls under three categories: mortality, serious injury or harassment (i.e., injury and behavioral effects). Harassment¹ is any act of pursuit, torment or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild (Level A harassment) or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns (Level B harassment). Disruption of behavioral patterns includes, but is not limited to, migration, breathing, nursing, breeding, feeding or sheltering. However, there are exceptions to the prohibition on take in Section 101(a)(5)(D) of the MMPA that gives the National Marine Fisheries Service (NMFS) the authority to authorize the incidental but not intentional take of small numbers of marine mammals by harassment provided certain determinations are made and statutory and regulatory procedures are met. Refer to Chapter 2 for details regarding this exception and NMFS' IHA criteria.

NMFS also promulgated regulations to implement the provisions of the MMPA governing the taking and importing of marine mammals, 50 Code of Federal Regulations (CFR) Part 216 and produced Office of Management and Budget (OMB)-approved application instructions (OMB Number 0648-0151) that prescribe the procedures necessary to apply for permits. All applicants must comply with these regulations and application instructions in addition to the provisions of the MMPA.

1.1.1. Applicant's Incidental Take Authorization Request

On December 22, 2016, NMFS received an application from Ocean Wind, LLC (Ocean Wind) for the taking of marine mammals incidental to 2017 geophysical and geotechnical survey investigations in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) lease area #OCS-A-0498 ("Lease Area"). After NMFS provided comments on the draft IHA application, Ocean Wind submitted revised IHA application in February and April 2017 with updated information regarding species, take numbers, and additional mitigation measures. NMFS determined that the revised application was adequate and complete on April 18, 2017.

Ocean Wind proposes to conduct a geophysical and geotechnical survey in the Lease Area to support the characterization of the existing seabed and subsurface geological conditions in the Lease Area. Surveys will include the use of the following equipment: multi-beam depth sounder, side-scan sonar, sub-bottom profiler, and cone penetration tests (CPTs). The proposed geophysical survey activities are scheduled to commence in June 2017 and last for approximately 42 days and the geotechnical survey activities are scheduled to commence in September 2017 and last for approximately 12 days.

Marine Mammals in the Action Area

The proposed construction project could adversely affect the following marine mammal species under our jurisdiction:

- Short-beaked common dolphin (*Delphinus delphis*)
- Common bottlenose dolphin (*Tursiops truncatus*)
- Harbor porpoise (*Phocoena phocoena*)
- Fin whale (*Balaenoptera physalus*)
- Harbor seal (*Phoca vitulina*)

1.2. Purpose and Need

1.2.1. Description of the Proposed Action

NMFS proposes to issue an IHA to Ocean Wind pursuant to Section 101(a)(5)(D) of the MMPA and 50 CFR Part 216. The IHA will be valid from June 8, 2017 through June 7, 2018, and authorizes takes, by Level B harassment, of marine mammals incidental to geophysical and geotechnical survey investigations in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development in the Lease Area. The impact of the underwater noise associated with marine site characterization surveys have the potential to cause marine mammals within or near the proposed area to be behaviorally disturbed, warranting an IHA from NMFS. NMFS proposed action is a direct outcome of Ocean Wind's request for an IHA to take marine mammals.

1.2.2. Purpose:

The purpose of our proposed action is to authorize take of marine mammals incidental to Ocean Wind's marine site characterization survey investigations in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development in the Lease Area. The IHA, if issued, would provide an exception to Ocean Wind from the take prohibitions contained in the MMPA. To authorize the incidental take of small numbers of marine mammals, NMFS evaluates the best available scientific information to determine whether the take would have a negligible impact on marine mammals or stocks and whether the activity would have an unmitigable impact on the availability of affected marine mammal species for subsistence use. NMFS cannot issue this IHA if it cannot make those findings in the affirmative. In addition, we must prescribe the permissible methods of taking and other means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat, paying particular attention to rookeries, mating grounds, and other areas of similar significance. If appropriate, we must prescribe means of effecting the least practicable impact on the availability of the species or stocks of marine mammals for subsistence uses. IHAs must also include requirements or conditions pertaining to the monitoring and reporting.

1.2.3. Need:

U.S. citizens seeking to obtain authorization for the incidental take of marine mammals under NMFS jurisdiction must submit such a request (in the form of an application). On April 17, 2017, Ocean Wind submitted an adequate and complete application demonstrating both the need and potential eligibility for an IHA under the MMPA. NMFS now has a corresponding duty to

determine whether and how to authorize take of marine mammals incidental to the activities described in Ocean Wind's application. NMFS' responsibilities under Section 101(a)(5)(D) of the MMPA and its implementing regulations establish and frame NMFS' proposed action.

Any alternatives considered under NEPA must meet the agency's statutory and regulatory requirements. Our described purpose and need guide us in developing reasonable alternatives for consideration, including alternative means of mitigating potential adverse effects.

1.3. The Environmental Review Process

In accordance with the Council on Environmental Quality (CEQ) Regulations for implementing the National Environmental Policy Act (NEPA), NMFS, to the fullest extent possible, integrates the requirements of NEPA with other regulatory processes required by law or by agency practice so that all procedures run concurrently, rather than consecutively. This includes coordination within National Oceanic Atmospheric Administration (NOAA), (e.g., the Office of the National Marine Sanctuaries) and with other regulatory agencies (e.g., the U.S. Fish and Wildlife Service), as appropriate, during NEPA reviews prior to implementation of a proposed action to ensure that requirements are met. Regarding the issuance of IHAs, we rely substantially on the public process required by the MMPA for proposed IHAs to develop and evaluate relevant environmental information and provide a meaningful opportunity for public participation when we prepare corresponding NEPA documents. We fully consider public comments received in response to the publication of proposed IHAs during the corresponding NEPA review process.

1.3.1. National Environmental Policy Act

NEPA requires federal agencies to examine the environmental impacts of their proposed actions within the United States and its territories. A NEPA analysis is a concise public document that provides an assessment of the potential effects a major federal action may have on the human environment, which includes the natural and physical environment. Major federal actions include activities that federal agencies fully or partially fund, regulate, conduct or approve. Because our issuance of an IHA would allow for the taking of marine mammals, consistent with provisions under the MMPA and incidental to the applicant's activities, we consider this as a major federal action subject to NEPA; therefore, NMFS analyzes the environmental effects associated with authorizing incidental takes of protected species and prepares the appropriate NEPA documentation.

1.3.2. Scoping and Public Involvement

The NEPA process is intended to enable NMFS to make decisions based on an understanding of the environmental consequences and take actions to protect, restore, and enhance the environment. An integral part of the NEPA process is public involvement. Early public involvement facilitates the development of an EA and informs the scope of issues to be addressed in the EA. Although agency procedures do not require public involvement prior to finalizing an EA, NMFS determined that the publication of the proposed IHA was the

appropriate step to involve the public in order to understand the public concerns for the proposed action, identify significant issues related to the proposed action and obtain the necessary information to complete an analysis.

The Draft EA and Federal Register notice of the proposed IHA, combined with our preliminary determinations, supporting analyses, and corresponding public comment period were instrumental in providing the public with information on relevant environmental issues and offering the public a meaningful opportunity to provide comments to us for consideration in both the MMPA and NEPA decision-making processes. Ocean Wind's application was posted on our website concurrently with the release of the Federal Register notice of the proposed IHA and the Draft EA. Those comments were incorporated in the Final EA.

1.4. Other Environmental Laws or Consultations

NMFS must comply with all applicable federal environmental laws, regulations, and Executive Orders (EO) necessary to implement a proposed action. NMFS evaluation of and compliance with environmental laws, regulations and EOs is based on the nature and location of the applicants proposed activities and NMFS proposed action. Therefore, this section only summarizes environmental laws and consultations applicable to NMFS issuance of an IHA to Ocean Wind. There are no other environmental laws, regulations, EOs, consultations, federal permits or licenses applicable NMFS issuance of an IHA to Ocean Wind.

1.4.1 Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSA; 16 U.S.C. 1801 et seq.), Federal agencies are required to consult with the Secretary of Commerce with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency, which may adversely affect essential fish habitat (EFH) identified under the MSA.

EFH has been identified in the waters in the OCS near New Jersey. EFH is present in the study area for several species of shark, flounder, tuna, hake, monkfish, dogfish, surfclam, squid, mackerel, cod, herring, bluefish, bass, skate, scup, and butterfish. No habitat areas of particular concern were identified for this area. In accordance with the EFH requirements of the MSA, NMFS notified the NMFS Greater Atlantic Regional Fisheries Office (GARFO) about this activity, and EFH consultation was not considered necessary for issuance of this IHA.

1.4.2 Endangered Species Act

The Endangered Species Act (ESA) established protection over and conservation of threatened and endangered species (T&E) and the ecosystems upon which they depend. An endangered species is a species in danger of extinction throughout all or a significant portion of its range. A threatened species is one that is likely to become endangered within the near future throughout all or in a significant portion of its range. The USFWS and NMFS jointly administer the ESA and are responsible for the listing of species (designating a species as either threatened or

endangered) and designating geographic areas as critical habitat for (T&E) species. The ESA generally prohibits the “take” of an ESA-listed species unless an exception or exemption applies. The term “take” as defined in section 3 of the ESA means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Section 7(a)(2) requires each federal agency to ensure that any action it authorizes, funds or carries out is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species. When a federal agency's action may affect a listed species, that agency is required to consult with NMFS and/or the USFWS under procedures set out in 50 CFR Part 402. NMFS and USFWS can also be action agencies under section 7. Informal consultation is sufficient for species the action agency determines are not likely to be adversely affected if NMFS or USFWS concurs with the action agency's findings, including any additional measures mutually agreed upon as necessary and sufficient to avoid adverse impacts to listed species and/or designated critical habitat.

NMFS issuance of an IHA is a federal action that is also subject to the requirements of section 7 of the ESA. As a result, we are required to ensure that the issuance of an IHA to Ocean Wind is not likely to jeopardize the continued existence of any T&E species or result in the destruction or adverse modification of critical habitat for these species. Two ESA listed marine mammal species that could potentially occur in the action area are the fin whale and the North Atlantic right whale, which are both listed as endangered under the ESA. Although the area proposed for the geophysical and geotechnical survey activities will not occur within any designated critical habitat areas, we do acknowledge that the Northern right whale critical habitat includes waters adjacent to the coasts of Georgia and the east coast of Florida, portions of Cape Cod Bay and Stellwagen Bank, and the Great South Channel (each off the coast of Massachusetts), which is near the action area but not likely to result in the destruction or adverse modification of critical habitat for these species.

A Biological Opinion on site assessment activities within the NJ WEA was issued by NMFS' GARFO to BOEM in April 2013. OPR initiated consultation with GARFO in April 2017 to amend the existing incidental take statement that is consistent with the IHA. Following issuance of the Ocean Wind's IHA, the Biological Opinion may be amended to include an incidental take exemption for these marine mammal species, as appropriate.

1.5. Scope of the Environmental Analysis

This Final EA was prepared in accordance with NEPA (42 USC 4321, et seq.) and CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508). The analysis in this EA addresses potential impacts to the human environment and natural resources, specifically marine mammals and their habitat, resulting from NMFS' proposed action to authorize incidental takes associated with Ocean Wind's site characterization surveys. We analyze direct, indirect, and cumulative impacts related to authorizing incidental take of marine mammals under the MMPA. The scope of our analysis is limited to the decision for which we

are responsible (i.e. whether or not to issue the IHA). This EA is intended to provide focused information on the primary issues and impacts of environmental concern, which is our issuance of the IHA authorizing the take of marine mammals incidental Ocean Wind’s activity, and the mitigation and monitoring measures to minimize the effects of that take. For these reasons, the Final EA does not provide a detailed evaluation of the effects to the elements of the human environment listed in Table 1 below.

Table 1. Components of the human environment not affected by our issuance of an IHA.

Biological	Physical	Socioeconomic / Cultural
Amphibians	Air Quality	Commercial Fishing
Humans	Essential Fish Habitat	Military Activities
Non-Indigenous Species	Geography	Oil and Gas Activities
Seabirds	Land Use	Recreational Fishing
	Oceanography	Shipping and Boating
	State Marine Protected Areas	National Historic Preservation Sites
	Federal Marine Protected Areas	National Trails and Nationwide Inventory of Rivers
	National Estuarine Research Reserves	Low Income Populations
	National Marine Sanctuaries	Minority Populations
	Park Land	Indigenous Cultural Resources
	Prime Farmlands	Public Health and Safety
	Wetlands	Historic and Cultural Resources
	Wild and Scenic Rivers	
	Ecologically Critical Areas	

In summary, the analysis herein supports our conclusion that, with the incorporation of the monitoring and mitigation measures, the issuance of the IHA to Ocean Wind for site characterization survey activities would not result in any significant direct, indirect, or cumulative impacts. Based on our MMPA analysis, the limited harassment from the proposed activities would allow adequate time for the marine mammals to recover from potentially adverse effects. Furthermore, the analysis concluded that the cumulative effects of the project on its own or in combination with other activities are not expected to occur.

Chapter 2 Alternatives

2.1. Introduction

As described in Chapter 1, the National Marine Fisheries Service (NMFS) Proposed Action is to issue an Incidental Harassment Authorization (IHA) to authorize the take of small numbers of marine mammals incidental to Ocean Wind's proposed site characterization activities. NMFS Proposed Action is triggered by Ocean Wind's request for an IHA per the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq.*). In accordance with the NEPA and the CEQ Regulations, NMFS is required to consider alternatives to the Proposed Action. This includes the no action and other reasonable course of action associated with authorizing incidental take of protected species. The evaluation of alternatives under NEPA assists NMFS with ensuring that any unnecessary impacts are avoided through an assessment of alternative ways to achieve the purpose and need for our Proposed Action that may result in less environmental harm. To warrant detailed evaluation under NEPA, an alternative must be reasonable along with meeting the stated purpose and need for the proposed action. For the purposes of this Final EA, an alternative will only meet the purpose and need if it satisfies the requirements under section 101(a)(5)(D) the MMPA. Therefore, NMFS applied the following screening criteria to the alternatives to identify which alternatives to carry forward for analysis. Accordingly, an alternative must meet the following criteria to be considered "reasonable."

The MMPA requires NMFS to prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider Ocean Wind's proposed mitigation measures, as well as other potential measures, and assess how such measures could minimize impacts on the affected species or stocks and their habitat. Our evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, we expect the successful implementation of the measure to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the specific measure to minimize adverse impacts as planned; and (3) the practicability of the measure for applicant implementation.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death, wherever possible;
- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);
- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);
- A reduction in the intensity of the anticipated takes (either total number or number at biologically important time or location);
- 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; and

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

Alternative 1 (the Preferred Alternative) includes a suite of mitigation measures intended to minimize potentially adverse interactions with marine mammals.

2.2. Description of Ocean Wind's Proposed Activities

Ocean Wind plans to conduct geophysical survey investigations in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) lease area #OCS-A-0498 ("Lease Area"). Our notice of the proposed IHA and Ocean Wind's IHA application provide detailed descriptions of Ocean Wind's proposed activities for the Project. That information is incorporated herein by reference and summarized below.

2.2.1. Specified Time and Specified Area

The project may require up to 42 days for geophysical activities and 12 days for geotechnical survey for completion. The proposed IHA is will be effective from June 8, 2017 to June 7, 2018.

Ocean Wind's survey activities will occur in the approximately 160,480-acre Lease Area designated and offered by the U.S. Bureau of Ocean Energy Management (BOEM). The Lease Area is located approximately nine miles (mi) southeast of Atlantic City, New Jersey, at its closest point (Figure 1) and falls within the New Jersey Wind Energy Area (NJ WEA; Figure 1 of the IHA application) with water depths ranging from 15-40 meters (m) (49-131 feet (ft)).

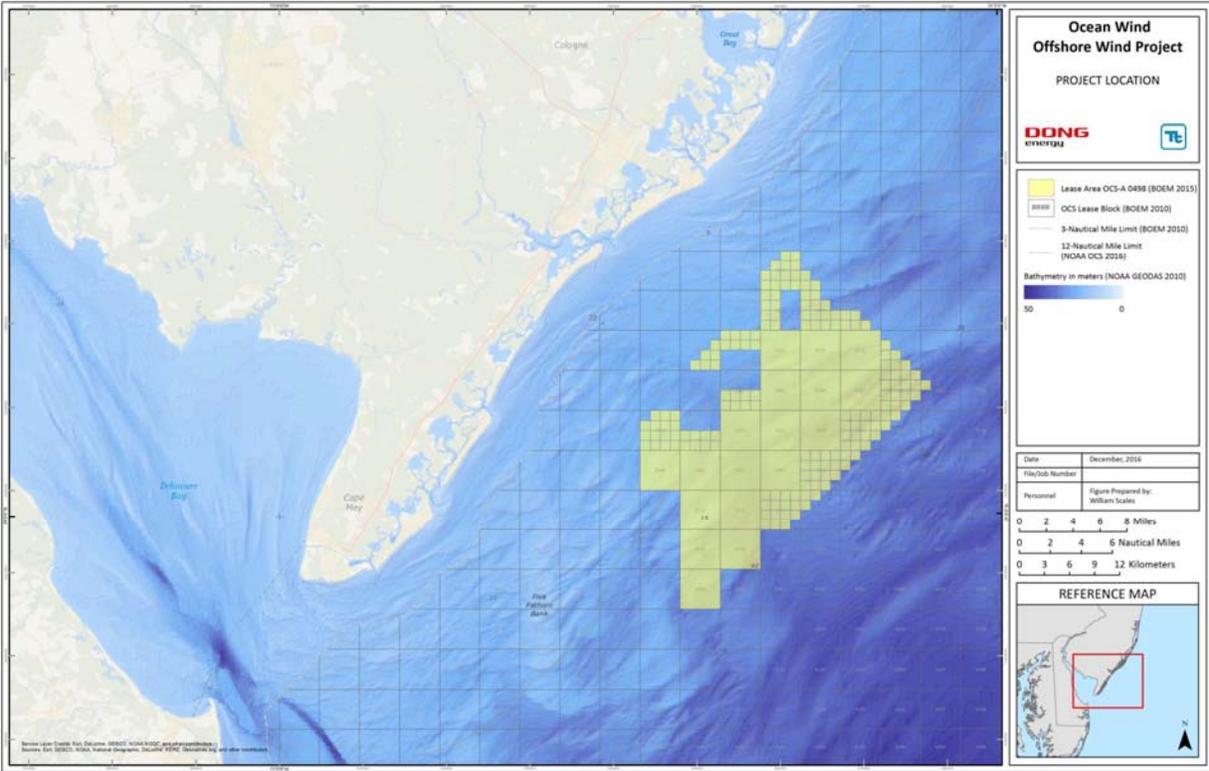


Figure 1. Project location.

Detailed Description of Construction Activities

The project includes the following elements:

High-Resolution Geophysical (HRG) Survey Activities

- Depth sounding (multibeam depth sounder) to determine water depths and general bottom topography;
- Magnetic intensity measurements for detecting local variations in regional magnetic field from geological strata and potential ferrous objects on and below the bottom;
- Seafloor imaging (sidescan sonar survey) for seabed sediment classification purposes, and to identify natural and man-made acoustic targets resting on the bottom as well as any anomalous features;
- Shallow penetration sub-bottom profiler (chirper) to map the near surface stratigraphy (top 0-5 meter (m) soils below seabed);
- Medium penetration sub-bottom profiler (sparker) to map deeper subsurface stratigraphy as needed (soils down to 75-100 m below seabed);

The project will require use of multiple types of survey equipment; representative survey equipment that is being considered is summarized in Table 2 below. The make and model of the listed equipment will vary depending on availability, but will be finalized as part of the survey

preparations and contract negotiations with the survey contractor, and therefore the final selection of the survey equipment will be confirmed prior to the start of the HRG survey program.

Table 2. Summary of representative Ocean Wind survey equipment.

HRG Equipment	Operating Frequencies	Source Level (Manufacturer)	Source Level (Bay State Wind Survey)*	Beamwidth (degree)	Pulse Duration (millisec)
Sonardyne Ranger 2 USBL	35-50kHz	200 dB _{Peak}	194 dB _{Peak}	180	1
Klein 3000H Sidescan Sonar ¹	445/900 kHz	245 dB _{Peak}	n/a	0.2	0.0025 to 0.4
GeoPulse Sub-bottom Profiler (chirper)	1.5 to 18 kHz	223.5 dB _{Peak}	203 dB _{Peak}	55	0.1 to 22
Geo-Source 600/800 (sparker)	50 to 5000 Hz	222 dB _{Peak} / 223 dB _{Peak}	2016 dB _{Peak} / 212 dB _{Peak}	110	1 to 10
SeaBat 7125 Multibeam Sonar ²	200/400 kHz	220 dB _{Peak}	n/a	2	0.03 to .3

*Gardline 2016, 2017

¹It should be noted that only one of the representative sidescan sonars would be selected for deployment.

²It should be noted that only one of the representative multibeam sonars would be selected for deployment.

Geotechnical Survey Activities

- Sample boreholes to determine geological and geotechnical characteristics of sediments;
- Deep cone penetration tests (CPTs) to determine stratigraphy and in-situ conditions of the deep surface sediments; and
- Shallow CPTs to determine stratigraphy and in-situ conditions of the near surface sediments.

The HRG survey activities will be supported by a vessel approximately 98 to 180 feet (ft) in length and capable of maintaining course and a survey speed of approximately 4.5 knots while transiting survey lines. HRG survey activities across the Lease Area will generally be conducted at 900-meter (m) line spacing. Up to two FLIDARs and two wave buoys would be deployed within the Lease Area, and up to three potential locations for FLIDAR deployment will be investigated. At each FLIDAR and wave buoy deployment locations the survey will be

conducted along a tighter 30-m line spacing to meet the BOEM requirements as set out in the July 2015 Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant and Archeological and Historic Property Information to 30 CFR Part 585.

Given the size of the Lease Area (160,480 acres), to minimize cost, the duration of survey activities, and the period of potential impact on marine species, Ocean Wind has proposed conducting continuous HRG survey operations 24 hours per day. Based on 24-hour operations, the estimated duration of the survey activities would be approximately 42 days (including estimated weather down time).

2.3. Description of Alternatives

2.3.1. Alternative 1 – Issuance of an Authorization with Mitigation Measures

The proposed action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, we would issue an IHA (valid for 1 year from June 2017) to Ocean Wind allowing the incidental take, by Level B harassment, of five species of marine mammals, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the IHA, if issued, along with any additions based on consideration of public comments.

MITIGATION, MONITORING, AND REPORTING MEASURES

As described in Section 1.2.1, we must prescribe the means of effecting the least practicable impact on the species or stocks of marine mammals and their habitat. In order to do so, we must consider Ocean Wind's proposed mitigation measures, as well as other potential measures, and assess how such measures could benefit the affected species or stocks and their habitat. Our evaluation of potential measures includes consideration of the following factors in relation to one another: (1) the manner in which, and the degree to which, we expect the successful implementation of the measures to minimize adverse impacts to marine mammals; (2) the proven or likely efficacy of the measures to minimize adverse impacts as planned; and (3) the practicability of the measures for applicant implementation.

Any additional mitigation measure proposed by us beyond what the applicant proposes should be able to or have a reasonable likelihood of accomplishing or contributing to the accomplishment of one or more of the following goals:

- Avoidance or minimization of marine mammal injury, serious injury, or death wherever possible;
- A reduction in the numbers of marine mammals taken (total number or number at biologically important time or location);
- A reduction in the number of times the activity takes individual marine mammals (total number or number at biologically important time or location);

- A reduction in the intensity of the anticipated takes (either total number or number at biologically important time or location);
- 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; and
- For monitoring directly related to mitigation, an increase in the probability of detecting marine mammals, thus allowing for more effective implementation of the mitigation.

To reduce the potential for disturbance associated with the activities, Ocean Wind has proposed to implement several monitoring and mitigation measures for marine mammals. NMFS has proposed some additional measures. The proposed monitoring and mitigation measures include:

1. Vessel strike avoidance procedures: Ocean Wind will ensure that vessel operators and crew maintain a vigilant watch for cetaceans and pinnipeds and slow down or stop their vessels to avoid striking these species. All vessel operators will comply with 10 knot (<18.5 km per hour [km/h]) speed restrictions in any Dynamic Management Area (DMA). In addition, all vessels operating from November 1 through July 31 will operate at speeds of 10 knots (<18.5 km/h) or less. All survey vessels will maintain a separation distance of 500 m or greater from any sighted North Atlantic right whale. All vessels will maintain a separation distance of 100 m or greater from any sighted non-delphinoid (*i.e.*, mysticetes and sperm whales) cetaceans. All vessels will maintain a separation distance of 50 m or greater from any sighted delphinoid cetacean. All vessels will maintain a separation distance of 50 m (164 ft) or greater from any sighted pinniped;
2. Seasonal operating requirements: The proposed survey activities will occur outside of the seasonal management area (SMA) located off the coasts of Delaware and New Jersey for North Atlantic right whales. The proposed survey activities will also occur in June/July and September, which is outside of the seasonal mandatory speed restriction period for this SMA (November 1 through April 30) for North Atlantic right whales;
3. Visual monitoring: Visual monitoring of the established exclusion zone(s) for the HRG and geotechnical surveys will be performed by qualified and NMFS-approved PSOs. An observer team comprising a minimum of four NMFS-approved PSOs and two certified Passive Acoustic Monitoring (PAM) operators (PAM operators will not function as PSOs), operating in shifts, will be stationed aboard either the survey vessel or a dedicated PSO-vessel. PSOs will be responsible for visually monitoring and identifying marine mammals approaching or within the established exclusion zone(s) during survey activities;

4. Passive Acoustic Monitoring (PAM): To support 24-hour HRG survey operations, Ocean Wind will use certified PAM operators with experience reviewing and identifying recorded marine mammal vocalizations, as part of the project monitoring during nighttime operations to provide for optimal acquisition of species detections at night, or as needed during periods when visual observations may be impaired;
5. Implementation of Exclusion zone shut-down and power-down procedures: A 200-m exclusion zone during HRG surveys and a 500-m monitoring zone during the use of DP thrusters during geotechnical survey activities.
6. Implement use of ramp-up techniques for HRG activities: A ramp-up procedure will be used at the beginning of HRG survey activities in order to provide additional protection to marine mammals near the Lease Area by allowing them to vacate the area prior to the commencement of survey equipment use. The ramp-up procedure will not be initiated during daytime, night time, or periods of inclement weather if the exclusion zone cannot be adequately monitored by the PSOs using the appropriate visual technology (*e.g.*, reticulated binoculars, night vision equipment) and/or PAM for a 60-minute period. A ramp-up would begin with the power of the smallest acoustic HRG equipment at its lowest practical power output appropriate for the survey. The power would then be gradually turned up and other acoustic sources added such that the source level would increase in steps not exceeding 6 dB per 5-minute period. If marine mammals are detected within the HRG survey exclusion zone prior to or during the ramp-up, activities will be delayed until the animal(s) has moved outside the monitoring zone and no marine mammals are detected for a period of 60 minutes.

Ocean Wind is required to submit a draft monitoring report to NMFS Office of Protected Resources within 90 days after the conclusion of the activities. A final report shall be prepared and submitted within 30 days following resolution of any comments on the draft report from NMFS. A description of the activities conducted by Ocean Wind and the monitoring protocols would be included in the report.

In our *Federal Register* notice for the issuance of the IHA, which is incorporated by reference, we determined that the measures included in the proposed IHA were sufficient to reduce the effects of Ocean Wind's activity on marine mammals to the level of least practicable impact. In addition, we described our analysis of impacts and preliminarily determined that the taking of small numbers of marine mammals, incidental to Ocean Wind's project would have a negligible impact on the relevant species or stocks and would not have an unmitigable adverse impact on affected species or stocks for taking for subsistence uses. Accordingly, this Preferred Alternative would satisfy the purpose and need of our proposed action under the MMPA— issuance of an IHA, along with required mitigation measures and monitoring that meets the standards set forth in section 101(a)(5)(D) of the MMPA and the implementing regulations.

2.3.2. Alternative 2 – No Action Alternative

For NMFS, denial of an MMPA authorization constitutes the NMFS No Action Alternative, which is consistent with our statutory obligation under the MMPA to grant or deny permit applications and to prescribe mitigation, monitoring and reporting with any authorizations. Under the NMFS No Action Alternative, there are two potential outcome scenarios. One is that the site characterization surveys occur in the absence of an MMPA authorization. In this case, (1) Ocean Wind would be in violation of the MMPA if takes occur; (2) mitigation, monitoring and reporting would not be prescribed by NMFS; and 3) mitigation measures might not be performed voluntarily by the applicant. Another outcome scenario is Ocean Wind could choose to not proceed with their proposed activities.

By undertaking prescribing measures to protect minimize impacts on marine mammals species or stocks from incidental take through the authorization program, we can potentially lessen the impacts of these activities on the marine environment. While NMFS does not authorize the site characterization survey activities, NMFS does authorize the unintentional, incidental take of marine mammals (under its jurisdiction) in connection with these activities and prescribes, where applicable, the methods of taking and other means of effecting the least practicable impact on the species and stocks and their habitats. Although the No Action Alternative would not meet the purpose and need to allow incidental takes of marine mammals under certain conditions, the CEQ's regulations require consideration and analysis of a No Action Alternative for the purposes of presenting a comparative analysis to the action alternatives.

2.4. Alternatives Considered but Eliminated from Further Consideration

NMFS considered whether other alternatives could meet the purpose and need and support Ocean Wind's proposed project. An alternative that would allow for the issuance of an IHA with no required mitigation or monitoring was considered but eliminated from consideration, as it would not be in compliance with the MMPA and therefore would not meet the purpose and need. For that reason, this alternative is not analyzed further in this document.

Chapter 3 Affected Environment

This chapter describes existing conditions in the proposed action areas. Complete descriptions of the physical, biological, and social environment of the action area are contained in the documents listed in Section 1.3.1 of this EA. We incorporate those descriptions by reference and briefly summarize or supplement the relevant sections for marine mammals in the following subchapters.

3.1. Physical Environment

As discussed in Chapter 1, our proposed action and alternatives relate only to the authorization of incidental take of marine mammals and not to the physical environment. Certain aspects of the physical environment are not relevant to our proposed action (see subchapter 1.3.2 - Scope of Environmental Analysis).

3.2. Biological Environment

The primary component of the biological environment that would be impacted by the proposed action and alternatives would be marine mammals, which would be directly impacted by the IHA of incidental take. We briefly summarize this component of the biological environment here.

3.2.1. Marine Mammal Habitat

We presented information on marine mammal habitat and the potential impacts to marine mammal habitat in the *Federal Register* notice of the proposed IHA. In summary, no critical habitat is listed in the Project Area; Northern right whale critical habitat is located outside of the Project area. However, it is considered a biologically significant migratory area for right whales and an important feeding area for fin whales (Waring *et al.*, 2016). Harbor seals, harbor porpoises, Dall's porpoise, killer whales, and humpback whales are infrequent visitors to the project area but might feed in or transit through the area.

We also presented information on marine mammal habitat (including prey species) and the potential impacts to marine mammal habitat in the *Federal Register* notice for the issuance of the IHA. These are further described in Ocean Wind's IHA application. Forage fish and other marine mammal prey are generally anticipated to be present in the project area but not in high densities. Effects on EFH by the project and issuance of the IHA assessed here would be temporary and minor. The main effect would be short-term disturbance that might lead to temporary and localized relocation of the EFH species or their food. The actual physical and chemical properties of the EFH will not be impacted.

3.2.2. Ambient Sound

We presented information on ambient sound and the potential impacts to marine mammal habitat in the *Federal Register* notice of the proposed IHA.

The need to understand the marine acoustic environment is critical when assessing the effects of anthropogenic noise on marine wildlife. Sounds generated by site characterization surveys such as HRG and geotechnical activities within the marine environment can affect its inhabitants' behavior (e.g., deflection from loud sounds) or ability to effectively live in the marine environment (e.g., masking of sounds that could otherwise be heard).

Ambient sound levels are the result of numerous natural and anthropogenic sounds that can propagate over large distances and vary greatly on a seasonal and spatial scale. These ambient sounds occupy all frequencies and contributions in ocean soundscape from a few hundred Hz to 200 kHz (NRC, 2003). In typical urban coastal waters such as the one at the proposed action area, the main sources of underwater ambient sound would be associated with:

- Wind and wave action
- Precipitation
- Vessel activities
- Biological sounds (e.g. fish, snapping shrimp)

The contribution of these sources to the background sound levels differs with their spectral components and local propagation characteristics (e.g., water depth, temperature, salinity, and ocean bottom conditions). In deep water, low-frequency ambient sound from 1-10 Hz mainly comprises turbulent pressure fluctuations from surface waves and the motion of water at the air-water interfaces. At these infrasonic frequencies, sound levels depend only slightly on wind speed. Between 20-300 Hz, distant anthropogenic sound (ship transiting, etc.) dominates wind-related sounds. Above 300 Hz, the ambient sound level depends on weather conditions, with wind- and wave-related effects mostly dominating sounds. Biological sounds arise from a variety of sources (e.g., marine mammals, fish, and shellfish) and range from approximately 12 Hz to over 100 kHz. The relative strength of biological sounds varies greatly; depending on the situation, biological sound can be nearly absent to dominant over narrow or even broad frequency ranges (Richardson et al. 1995).

Ambient underwater noise levels in the project area may be high. The Lease Area is within a major shipping channel from ports in New Jersey, New York, and other areas in the New England area. Vessels will regularly transit through this area, and include large cargo and container ships, tugs, tankers, barges, passenger ships, recreational vessels, and others.

3.2.3. Marine Mammals

We provide information on the occurrence of marine mammals most likely present in the proposed activity areas in section 1.1.2 of this EA. The marine mammals most likely to be harassed incidental to conducting the site characterization activities are listed in Table 3. The marine waters in the Lease area support many species of marine mammals, including pinnipeds

and cetaceans; however, the number of species regularly occurring near the project area is limited. Of the 35 species that may occur in the area, 30 are not considered in this application because they occur seasonally and will not be present in high densities during project activities, or in low enough numbers that they are not expected to be taken.

Table 3. Marine Mammals Potentially Present in the Vicinity of Ocean Wind’s Project Area.

Common Name	Stock	NMFS MMPA and ESA Status; Strategic (Y/N) ¹	Stock Abundance (CV,Nmin, most recent abundance survey) ²	PBR ³	Occurrence and seasonality in the NW Atlantic OCS
Toothed whale (Odontoceti)					
Atlantic white-sided dolphin (<i>Lagenorhynchus acutus</i>)	W. North Atlantic	--; N	48,819 (0.61; 30,403; n/a)	304	rare
Atlantic spotted dolphin (<i>Stenella frontalis</i>)	W. North Atlantic	--; N	44,715 (0.43; 31,610; n/a)	316	rare
Bottlenose dolphin (<i>Tursiops truncatus</i>)	W. North Atlantic, Offshore	--; N	77,532 (0.40; 56,053; 2011)	561	Common year round
Clymene Dolphin (<i>Stenella clymene</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
Pantropical Spotted Dolphin (<i>Stenella attenuata</i>)	W. North Atlantic	--; N	3,333 (0.91; 1,733; n/a)	17	rare
Risso’s dolphin (<i>Grampus griseus</i>)	W. North Atlantic	--; N	18,250 (0.46; 12,619; n/a)	126	rare
Short-beaked common dolphin (<i>Delphinus delphis</i>)	W. North Atlantic	--; N	70,184 (0.28; 55,690; 2011)	557	Common year round
Striped dolphin (<i>Stenella coeruleoalba</i>)	W. North Atlantic	--; N	54,807 (0.3; 42,804; n/a)	428	rare
Spinner Dolphin (<i>Stenella longirostris</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
White-beaked dolphin (<i>Lagenorhynchus albirostris</i>)	W. North Atlantic	--; N	2,003 (0.94; 1,023; n/a)	10	rare
Harbor porpoise (<i>Phocoena phocoena</i>)	Gulf of Maine/Bay of Fundy	--; N	79,833 (0.32; 61,415; 2011)	706	Common year round
Killer whale (<i>Orcinus orca</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
False killer whale (<i>Pseudorca crassidens</i>)	W. North Atlantic	--; Y	442 (1.06; 212; n/a)	2.1	rare
Long-finned pilot whale (<i>Globicephala melas</i>)	W. North Atlantic	--; Y	5,636 (0.63; 3,464; n/a)	35	rare
Short-finned pilot whale (<i>Globicephala macrorhynchus</i>)	W. North Atlantic	--; Y	21,515 (0.37; 15,913; n/a)	159	rare
Sperm whale (<i>Physeter macrocephalus</i>)	North Atlantic	E; Y	2,288 (0.28; 1,815; n/a)	3.6	Year round in continental shelf and slope waters, occur seasonally to forage
Pygmy sperm whale (<i>Kogia breviceps</i>)	W. North Atlantic	--; N	3,785 ^{b/} (0.47; 2,598; n/a)	26	rare
Dwarf sperm whale (<i>Kogia sima</i>)	W. North Atlantic	--; N	3,785 ^{b/} (0.47; 2,598; n/a)	26	rare
Cuvier’s beaked whale (<i>Ziphius cavirostris</i>)	W. North Atlantic	--; N	6,532 (0.32; 5,021; n/a)	50	rare

Blainville's beaked whale (<i>Mesoplodon densirostris</i>)	W. North Atlantic	--; N	7,092 ^{CV} (0.54; 4,632; n/a)	46	rare
Gervais' beaked whale (<i>Mesoplodon europaeus</i>)	W. North Atlantic	--; N	7,092 ^{CV} (0.54; 4,632; n/a)	46	rare
True's beaked whale (<i>Mesoplodon mirus</i>)	W. North Atlantic	--; N	7,092 ^{CV} (0.54; 4,632; n/a)	46	rare
Sowerby's Beaked Whale (<i>Mesoplodon bidens</i>)	W. North Atlantic	--; N	7,092 ^{CV} (0.54; 4,632; n/a)	46	rare
Melon-headed whale (<i>Peponocephala electra</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
Baleen whales (Mysticeti)					
Minke whale (<i>Balaenoptera acutorostrata</i>)	Canadian East Coast	--; N	20,741 (0.30; 16,199; n/a)	162	Year round in continental shelf and slope waters, occur seasonally to forage
Blue whale (<i>Balaenoptera musculus</i>)	W. North Atlantic	E; Y	Unknown (unk; 440; n/a)	0.9	Year round in continental shelf and slope waters, occur seasonally to forage
Fin whale (<i>Balaenoptera physalus</i>)	W. North Atlantic	E; Y	1,618 (0.33; 1,234; n/a)	2.5	Year round in continental shelf and slope waters, occur seasonally to forage
Humpback whale (<i>Megaptera novaeangliae</i>)	Gulf of Maine	--; N	823 (0; 823; n/a)	2.7	Common year round
North Atlantic right whale (<i>Eubalaena glacialis</i>)	W. North Atlantic	E; Y	476 (0; 476; n/a)	1	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)	0.5	Year round in continental shelf and slope waters, occur seasonally to forage
Earless seals (Phocidae)					
Gray seals (<i>Halichoerus grypus</i>)	North Atlantic	--; N	505,000 (unk; unk; n/a)	Undet	Unlikely
Harbor seals (<i>Phoca vitulina</i>)	W. North Atlantic	--; N	75,834 (0.15; 66,884; 2012)	2,006	Common year round
Hooded seals (<i>Cystophora cristata</i>)	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
Harp seal (<i>Phoca groenlandica</i>)	North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare

¹ESA 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.

²CV 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 draft 2016 Pacific SARs.

³Potential 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).

3.2.3.1. ESA-listed Marine Mammals

Fin whale

Fin whales are common in waters of the U. S. Atlantic Exclusive Economic Zone (EEZ), principally from Cape Hatteras northward (Waring *et al.*, 2016). Fin whales are present north of 35-degree latitude in every season and are broadly distributed throughout the western North Atlantic for most of the year (Waring *et al.*, 2016). New England waters also represent a major feeding ground for fin whales.

The current abundance estimate for the western North Atlantic stock of fin whales is 1,618 with PBR at 2.5 animals (Waring *et al.*, 2016). This stock is listed as endangered under the ESA and therefore is considered strategic and depleted under the MMPA. The main threats to this stock are fishery interactions and vessel collisions (Waring *et al.*, 2016).

3.2.3.2. Non-ESA-listed Marine Mammals

Bottlenose dolphin

There are two distinct bottlenose dolphin morphotypes: the coastal and offshore forms in the western North Atlantic (Waring *et al.*, 2016). The offshore form is distributed primarily along the outer continental shelf and continental slope in the Northwest Atlantic Ocean from Georges Bank to the Florida Keys, and is the only type that may be present in the Lease Area.

The current abundance estimate for this stock is 77,532 with PBR at 561 (Waring *et al.*, 2016). The main threat to this species is interactions with fisheries. This species is not listed under the ESA and is not considered strategic or deplete under the MMPA.

Short-beaked common dolphin

The short-beaked common dolphin is found world-wide in temperate to subtropical seas. In the North Atlantic, short-beaked common dolphins are commonly found over the continental shelf between the 100-m and 2000-m isobaths and over prominent underwater topography and east to the mid-Atlantic Ridge (Waring *et al.*, 2016). Only the western North Atlantic stock may be present in the Lease Area.

The current abundance estimate for this stock is 70,184, with PBR at 557 (Waring *et al.*, 2016). The main threat to this species is interactions with fisheries. This species is not listed under the ESA and is not considered strategic or deplete under the MMPA.

Harbor porpoise

In the Lease Area, only the Gulf of Maine/Bay of Fundy stock may be present. This stock is found in U.S. and Canadian Atlantic waters and are concentrated in the northern Gulf of Maine and southern Bay of Fundy region, generally in waters less than 150 m deep (Waring *et al.*, 2016). They are seen from the coastline to deep waters (>1800 m; Westgate *et al.* 1998), although the majority of the population is found over the continental shelf (Waring *et al.*, 2016).

The current abundance estimate for this stock is 79,883, with PBR at 706 (Waring *et al.*, 2016). The main threat to this species is interactions with fisheries, with documented taken in the U.S. northeast sink gillnet, mid-Atlantic gillnet, and northeast bottom trawl fisheries and in the Canadian herring weir fisheries (Waring *et al.*, 2016). This species is not listed under the ESA and is not considered strategic or deplete under the MMPA.

Harbor seal

The harbor seal (*Phoca vitulina concolor*) is found in all nearshore waters of the North Atlantic and North Pacific Oceans and adjoining seas above about 30°N (Burns 2009; Desportes *et al.* 2010). In the western North Atlantic, they are distributed from the eastern Canadian Arctic and Greenland south to southern New England and New York, and occasionally to the Carolinas (Waring *et al.*, 2016). Haulout and pupping sites are located off Manomet, MA and the Isles of Shoals, ME, but generally do not occur in areas in southern New England (Waring *et al.*, 2016).

The current abundance estimate for this stock is 75,834, with PBR at 2,006 (Waring *et al.*, 2016). The main threat to this species is interactions with fisheries. This species is not listed under the ESA and is not considered strategic or deplete under the MMPA.

3.3. Social Environment

3.3.1. Subsistence

No significant subsistence activity currently occurs within the action area.

Chapter 4 Environmental Consequences

This chapter of the EA analyzes the impacts of the two alternatives and addresses the potential direct, indirect, and cumulative impacts of our issuance of an IHA. Ocean Wind's application and other related environmental analyses identified previously, inform an analysis of the direct, indirect, and cumulative effects of our proposed issuance of an IHA.

Under the MMPA, we have evaluated the potential impacts of Ocean Wind's site characterization survey activities on the affected marine mammal species or stocks in order to determine whether to authorize incidental take of marine mammals. Under NEPA, we have determined that an EA is appropriate to evaluate the potential significance of environmental impacts resulting from the issuance of an IHA.

4.1. Effects of Alternative 1 – Issuance of an IHA with Mitigation Measures

Alternative 1 is the Preferred Alternative, under which we would issue an IHA to Ocean Wind allowing the incidental take, by Level B harassment, of five species of marine mammals from June 8, 2017 through June 7, 2018, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the IHA, if issued. We would incorporate the mitigation and monitoring measures and reporting described earlier in this EA (see Section 2.3.1) into a final IHA.

4.1.1. Impacts to Marine Mammal Habitat

No permanent impacts to marine mammal habitat are proposed to or would occur as a result of an issuance of an IHA or the applicants proposed site characterization surveys. Ocean Wind's proposed site characterization survey activities would not modify the existing habitat to a measurable extent. Geotechnical surveys may disrupt the sediment, but these impacts are considered negligible. Therefore, no restoration of the habitat would be necessary. A temporary, small-scale loss of foraging habitat may occur for marine mammals, if the marine mammals leave the area during site characterization survey activities.

The duration of fish avoidance of this area after pile driving stops is unknown. However, the affected area represents an extremely small portion of the total foraging range of marine mammals that may be present in and around the project area.

Because of the short duration of the activities and the relatively small area of the marine mammal habitat that may be affected, 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 marine mammal populations.

4.1.2. Impacts to Marine Mammals

We expect that behavioral disturbance or displacement has the potential to impact marine mammals and comprises the only likely source of effects to marine mammals. The level of impact on marine mammals from site characterization survey activities would vary depending on

the species of marine mammal, the distance between the marine mammal and the project activity, the intensity and duration of the activity, and environmental conditions. Our notice of proposed IHA and Ocean Wind’s IHA application provide detailed descriptions of these potential effects of proposed project activities on marine mammals. That information is incorporated herein by reference and summarized below.

The majority of impacts are likely to occur from HRG activities. HRG activities associated with the site characterization surveys could cause behavioral modification and temporary displacement of marine mammals within the vicinity of the action area through noise generated from HRG equipment (the loudest sources are sparkers and side-scan sonars). Elevated sound levels could cause behavioral harassment in the form of avoidance and changes in behavior. We expect these impacts to be minor because we do not anticipate measurable changes to the population or impacts to rookeries, mating grounds, and other areas of similar significance. These activities are not anticipated to result in injury, serious injury, or mortality of any marine mammal species and none is proposed to be authorized. We expect no long-term or substantial adverse effects on marine mammals, their habitats, or their role in the environment.

Estimated Take of Marine Mammals by Level B Incidental Harassment

Geophysical and geotechnical activities generate loud noises that could potentially harass marine mammals during Ocean Wind’s proposed site characterization surveys.

Currently, NMFS uses 120 dB re 1 μPa and 160 dB re 1 μPa at the received levels for the onset of Level B harassment from non-impulse (e.g. DP thruster) and impulse sources (e.g. sparker) underwater, respectively. Table 4 summarizes the current NMFS marine mammal take criteria.

In August 2016, NMFS released its Technical Guidance for Assessing the Effects of Anthropogenic Sound on Marine Mammal Hearing (NMFS 2016), which established new thresholds for predicting auditory injury, which equates to Level A harassment under the MMPA. The August 4, 2016, Federal Register Notice announcing the Guidance (81 FR 51694), provides updated received levels, or acoustic thresholds, above which individual marine mammals under NMFS’ jurisdiction are predicted to experience changes in their hearing sensitivity (either temporary or permanent) for all underwater anthropogenic sound sources. The new guidance only determined PTS (or Level A take, injury) for marine mammal hearing groups and Level B take zones are not affected. Tables 4 and 5 detail in-water acoustic criteria for exposure of marine mammals to Disturbance Thresholds (Level B Harassment) and PTS Onset Acoustic Thresholds (Level A Harassment), respectively.

Table 4. Current Level B Acoustic Exposure Criteria for Non-explosive Sound Underwater

Criterion	Criterion Definition	Threshold
Level B Harassment	Behavioral Disruption (for impulse noises)	160 dB re 1 μPa (rms)
Level B Harassment	Behavioral Disruption (for non-impulse noise)	120 dB re 1 μPa (rms)
Level B harassment (airborne)	Behavioral disruption	90 dB (harbor seals) 100dB (other pinnipeds) (unweighted)

Table 5. In-water Acoustic Criteria for In-water Exposure of Marine Mammals to PTS Onset Acoustic Thresholds (Level A Injury) from Continuous and Impulse Sound Sources.

Hearing Group	PTS Onset Acoustic Thresholds SEL _{cum} Thresholds		
	Pile-driving (Impulsive)	Vibratory Pile- driving (Continuous)	Down-hole Drilling (Continuous) ¹
Low-Frequency Cetaceans (7 Hz to 35 kHz)	183 dB	199 dB	199 dB
Mid-Frequency Cetaceans (150 Hz to 160 kHz)	185 dB	198 dB	198 dB
High-Frequency Cetaceans (275 Hz to 160 kHz)	155 dB	173 dB	173 dB
Phocid Pinnipeds (50 Hz to 86 kHz)	185 dB	201 dB	201 dB
Otariid Pinnipeds (60Hz to 39 kHz)	203 dB	219 dB	219 dB

As explained above, ZOIs will be established that encompass the areas where received underwater SPLs exceed the applicable thresholds for Level A and Level B harassment.

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a ZOI during active HRG activities. Expected marine mammal presence is determined by marine mammal density in the project area during the survey window. For all marine mammals, local densities are available; therefore the following calculation was used: density of animals in the area multiplied by the zone of insonification (ZOI) from noise producing sources multiplied by the number of days of noise generating activities.

Table 6 outlines the number of Level B harassment takes that we propose to authorize in this IHA, the regional population estimates for marine mammals in the action area, and the percentage of each population or stock that may be taken as a result of Ocean Wind’s activities. The proposed IHA notice and Ocean Wind’s application provide detailed descriptions of how these take estimates were derived. NMFS does not expect the proposed activities to impact rates of recruitment or survival for any affected species or stock. Further, the activities would not adversely affect marine mammal habitat.

Table 6. Summary of potential marine mammal takes and percentage of stocks affected.

Species	Requested Take Authorization (No.)	Stock abundance estimate	Percentage of Stock Potentially Affected
Fin Whale (<i>Balaenoptera physalus</i>)	1	1,618	0.061
Bottlenose Dolphin (<i>Tursiops truncatus</i>)	300	77,532	0.386
Short beaked common Dolphin (<i>Delphinus delphis</i>)	33	70,184	0.047
Harbor Porpoise (<i>Phocoena phocoena</i>)	5*	79,883	0.006
Harbor Seal ¹ (<i>Phoca vitulina</i>)	1	75,834	0.001

*Modeled take of this species was increased to account for average group size.

4.1.3. Impacts to Subsistence

No significant subsistence activity currently occurs within the action area; therefore, we anticipate that Ocean Wind's site characterization survey activities will not have an effect on subsistence resources in the area.

Effects of Alternative 2 – No Action Alternative

Under the No Action Alternative, we would not issue an IHA to Ocean Wind. As a result, Ocean Wind would not receive an exemption from the MMPA prohibitions against the take of marine mammals and would be in violation of the MMPA if take of marine mammals occurs.

The impacts to elements of the human environment resulting from the No Action Alternative—conducting the site characterization surveys in the absence of required protective measures for marine mammals under the MMPA—would be greater than those impacts resulting from Alternative 1, the Preferred Alternative.

4.1.4. Impacts to Marine Mammal Habitat

Under the No Action Alternative, the effects on the components of the biological environment that function as marine mammal habitat would result from Ocean Wind's proposed survey activities, are similar to those described in Section 3.2. Even without mitigation measures, however, impacts to marine mammal habitat (including prey species) would be minimal and temporary for the following reasons:

- The area of potential effect is limited in time; and
- There are no rookeries or major haul-out sites nearby or ocean bottom structure of significant biological importance to marine mammals that may be present in the ensonified area.

The most likely impact to marine mammal habitat would be minor impacts to the immediate substrate during HRG surveys, or temporary avoidance by prey species of the immediate area. This Alternative would result in similar effects on the biological environment and components of the biological environment that function as marine mammal habitat as Alternative 1.

4.1.5. Impacts to Marine Mammals

Under the No Action Alternative, Ocean Wind's proposed survey activities could result in increased amounts of Level B harassment to marine mammals, although no takes by serious injury or mortality would be expected even in the absence of mitigation and monitoring measures. While it is difficult to provide an exact number of takes that might occur under the No Action Alternative, the numbers would be expected to be larger than those presented in Table 6 above, because Ocean Wind would not be required to follow mitigation measures designed to

warn marine mammals of the impending increased underwater sound levels, and additional species may be incidentally taken because Ocean Wind would not be required to shut down activity if any marine mammals occurred in the project vicinity.

If the activities proceeded without the protective measures and reporting requirements required by a final IHA under the MMPA, the direct, indirect, and cumulative effects on the human or natural environment of not issuing the IHA would include the following:

- Increases in the number of behavioral responses and potential takes to additional species, because of the lack of mitigation measures required in the IHA. Thus, the incidental take of marine mammals would likely occur at higher levels than we have already identified and evaluated in our *Federal Register* notice on the proposed IHA; and
- We would not be able to obtain the monitoring and reporting data needed to assess the anticipated impact of the activity upon the species or stock and to increase knowledge of the species, as required under the MMPA.

4.1.6. Impacts to Subsistence

Under the No Action Alternative, the site characterization survey activities would have no additive effects on subsistence.

4.2. Unavoidable Adverse Impacts

Ocean Wind's application, our notice of a proposed IHA, and the other environmental analyses identified previously summarize unavoidable adverse impacts to marine mammals or to their populations to which they belong or on their habitats occurring in the proposed project area. We incorporated those documents by reference.

We acknowledge that the incidental take authorized would potentially result in unavoidable adverse impacts including marine mammal behavioral responses and alterations in the distribution of local populations as a result of authorizing take incidental to Ocean Winds site characterization activities. However, we do not expect Ocean Wind's activities to have adverse consequences on the annual rates of recruitment or survival of marine mammals in Northwest Atlantic Outer Continental Shelf waters, and we do not expect the marine mammal populations in that area to experience reductions in reproduction, numbers, or distribution that might appreciably reduce their likelihood of surviving or recovering in the wild. We expect that the numbers of individuals of all species taken by harassment would be small (relative to species or stock abundance) and that the proposed Project and the take resulting from the proposed project activities would have a negligible impact on the affected species or stocks of marine mammals.

4.3. Cumulative Effects

NEPA defines cumulative effects as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other

actions” (40 CFR §1508.7). Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

This cumulative effects analysis focuses on activities that may temporally or geographically overlap with Ocean Wind’s activities and would most likely impact the marine mammals present in the proposed areas. We consider the impact of Ocean Wind’s presence and effects of conducting activities in the proposed action areas to be insignificant when compared to other human activities in the area.

Past, present, and reasonably foreseeable impacts to marine mammal populations include the following: climate change; marine pollution; disease; increased vessel traffic; marine mammal watching; and fisheries interactions. These activities account for cumulative impacts to regional and worldwide populations of marine mammals, many of which are a small fraction of their former abundance. However, quantifying the biological costs for marine mammals within an ecological framework is a critical missing link to our assessment of cumulative impacts in the marine environment and assessing cumulative effects on marine mammals (Clark *et al.*, 2009). Despite these regional and global anthropogenic and natural pressures, the site characterization surveys are not likely to add an increment of disturbance that would cumulatively result in significant adverse impacts to marine mammals or their habitats.

The proposed site characterization survey activities would add another activity in Northwest Atlantic Outer Continental Shelf waters. This activity would be limited to a small area in the Lease Area for a relatively short period of time (42 days for geophysical activities and 12 days for geotechnical activities). This section provides a brief summary of the human-related activities affecting the marine mammal species in the action area.

4.3.1. Climate Change

Climate change is a reasonably foreseeable condition that may result in cumulative effects to ESA-listed species in the Lease Area vicinity (NMFS 2011). The 2007 Intergovernmental Panel on Climate Change concluded that there is strong evidence for global warming and associated weather changes, and humans have “very likely” contributed to the problem through burning fossil fuels and adding other “greenhouse gases” to the atmosphere (IPCC 2007). This study involved numerous models to predict changes in temperature, sea level, ice pack dynamics, and other parameters under a variety of future conditions, including different scenarios for how human populations respond to the implications of the study.

Global climate change could significantly affect the marine resources of the Northwest Atlantic Outer Continental Shelf. Possible impacts include temperature and rainfall changes, potentially rising sea levels, and changes to ocean conditions. These changes may affect the coastal marine ecosystem in the proposed project area by increasing the vertical stratification of the water column and changing the intensity and rhythms of coastal winds and upwelling. Such

modifications could cause ecosystem regime shifts as the productivity of the regional ecosystem undergoes various changes related to nutrients input and coastal ocean process (USFWS 2011).

It is not clear how governments and individuals would respond to the effects of climate change, or how much future efforts would reduce greenhouse gas emissions. Although the intensity of climate change would depend on how quickly and deeply humanity responds, the models predict that the climate changes observed in the past 30 years would continue at the same or increasing rates for at least 20 years. Although we recognize that climate change is a concern for the sustainability of the entire ecosystem, it is unclear at this time the full extent to which climate change would affect marine mammals. However, given that Ocean Wind's project activities would include site characterization surveys, and these impacts are temporary in nature, the immediate project is not likely to result in an increase in vessel traffic or add an incremental disturbance that would cumulatively result in significant adverse impacts to marine mammals due to climate change.

4.3.2. Marine Pollution

Marine mammals are exposed to contaminants via the food they consume, the water in which they swim, and the air they breathe. Point and non-point source pollutants from coastal runoff, at-sea disposal of dredged materials and sewage effluent, marine debris, and potential hazardous material releases from commercial vessels and on-shore users are all lasting threats to marine mammals in the project area. The long-term impacts of these pollutants, however, are difficult to measure.

The persistent organic pollutants (POPs) tend to bioaccumulate through the food chain; therefore, the chronic exposure of POPs in the environment is perhaps of the most concern to high trophic level predators such as marine mammals.

The project activities would be temporary and are not anticipated to cause increased exposure of POPs to marine mammals in the project vicinity due to the small scale and localized nature of the activities.

4.3.3. Disease

Disease is common in many marine mammal populations and has been responsible for major die-offs worldwide, but such events are usually relatively short-lived. Ocean Wind's site characterization survey activities are not expected to affect the disease rate among marine mammals in the project vicinity.

4.3.4. Increased Vessel Traffic

The Project Area is near major shipping routes off the east coast of the U.S. Navigation lanes are frequently subject to heavy vessel traffic, which produces underwater noise. These ongoing and

future uses and activities contribute to elevated background noise levels in the project area, and increased exposure of marine mammals to vessel strikes.

While marine mammals might be exposed to vessel-related noises, any disturbance to a particular individual would be limited in space and time. Because vessels follow well-established, common navigation lanes, there is limited potential that incremental effects associated with project vessel traffic would measurably affect marine mammals in the project area.

4.3.5. Marine Mammal Watching

Although marine mammal watching is considered by many to be a non-consumptive use of marine mammals with economic, recreational, educational and scientific benefits, it is not without potential negative impacts. One concern is that animals may become more vulnerable to vessel strikes once they habituate to vessel traffic (Swingle *et al.*, 1993; Laist *et al.*, 2001; Jensen and Silber, 2004). Another concern is that preferred habitats may be abandoned if disturbance levels are too high. Several recent research efforts have monitored and evaluated the impacts of people closely approaching, swimming, touching and feeding marine mammals and has suggested that marine mammals are at risk of being disturbed (“harassed”), displaced or injured by such close interactions. Researchers investigating the adverse impacts of marine mammal viewing activities have reported boat strikes, disturbance of vital behaviors and social groups, separation of mothers and young, abandonment of resting areas, and habituation to humans (Nowacek *et al.*, 2001, Bejder et al 2006).

While marine mammal watching operations do occur in the vicinity of the proposed project area, no marine mammal-watching operations are expected to occur in the lease area. The cumulative adverse effects of the proposed action on the affected populations when added to the effects of marine mammal watching are not expected to be significant.

4.3.6. Fisheries Interactions

State-managed commercial and sport fisheries are a reasonably foreseeable non-federal activity that may result in cumulative effects to ESA-listed species in the waters off New Jersey. None of the activities would be directed at commercial fishing or would likely have any impact on commercial fishing in the action area. No significant direct impacts are expected from the action of issuing an IHA for the incidental take, by Level B harassment only, of small numbers of marine mammals to Ocean Wind. No significant indirect impacts are expected from Ocean Wind conducting site characterization survey activities in the Lease Area.

4.3.7. Conclusion

Based on the summation of activity in the area provided in this section, NMFS determined that the incremental impact of an IHA for the proposed site characterization survey activities in the Project Area would not be expected to result in a significant cumulative impact to the human environment, taking into account past, present, and reasonably foreseeable future activities. The

potential impacts to marine mammals, their habitats, and the human environment in general are expected to be minimal, based on the limited and temporary footprint of the proposed Project and the mitigation and monitoring requirements of the IHA.

Chapter 5 List of Preparers and Agencies Consulted

Agencies Consulted

No other agencies were consulted in the drafting of this EA.

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