



NOAA FISHERIES

PROPOSED ACTION: Issuance of Incidental Harassment Authorizations for Marine Site Characterization Surveys Associated with Wind Energy Development in the Atlantic Ocean

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: U.S. Atlantic Ocean, waters offshore Delaware, Massachusetts and Rhode Island

ABSTRACT: This Environmental Assessment analyzes the environmental impacts of the National Marine Fisheries Service, Office of Protected Resources' proposal to issue two Incidental Harassment Authorizations, pursuant to section 101(a)(5)(D) of the Marine Mammal Protection Act to Garden State Offshore Energy LLC and Deepwater Wind New England LLC incidental to Marine Site Characterization Surveys in the Atlantic Ocean.

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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. INTRODUCTION AND BACKGROUND

The National Marine Fisheries Service (NMFS) received applications from Garden State Offshore Energy LLC (GSOE) and Deepwater Wind New England LLC (DWWNE) requesting authorization for the take of marine mammals incidental to marine site characterization surveys associated with offshore wind energy development site characterization in the Outer Continental Shelf (OCS) of the Atlantic Ocean. Both of these companies are subsidiary companies of Deepwater Wind. Deepwater Wind is a developer headquartered in Providence, Rhode Island that is actively planning offshore wind energy projects to serve multiple East Coast locations 15 or more miles offshore, including areas offshore of New York, Massachusetts, Rhode Island, Maryland, and New Jersey. NMFS has a statutory responsibility to authorize incidental take of marine mammals pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.) after receipt and review of an application if certain findings and determinations are made. In general, NMFS issues incidental harassment authorizations (IHAs) for small numbers of marine mammals to an applicant if the proposed take is: incidental to an otherwise lawful activity, limited to harassment, occurs within a specific geographic area, will have a negligible impact on affected marine mammal species, is subject to appropriate mitigation and monitoring, and is limited to one year.

In addition, the National Environmental Policy Act (NEPA), 40 Code of Federal Regulations (CFR) Parts 1500 -1508, and National Oceanic and Atmospheric Administration (NOAA) policy and procedures¹ require all proposals for major federal actions be reviewed with respect to environmental consequences on the human environment. Since both applicants would be conducting similar survey efforts in the same geographic region (Northwest Atlantic OCS), NMFS determined that conducting NEPA review and preparing a single Environmental Assessment (EA) is appropriate to analyze environmental impacts associated with NMFS's issuance of separate IHAs. NMFS further determined that the issuance of these two IHAs are "similar" but not "connected actions" per 40 C.F.R. 1508.25(a)(3) due to general commonalities in geography, timing, and type of activity, which provides a reasonable basis for evaluating them together in a single environmental analysis.

This Chapter presents a summary of NMFS' authority to authorize take of marine mammals incidental to specified activities other than commercial fishing (Section 1.2) and a summary of the applicants' requests and survey locations (Sections 1.3), and identifies NMFS' proposed action and purpose and need (Section 1.4). This Chapter also explains the environmental review process (1.5) and provides other information relevant to the analysis in this EA, such as compliance with applicable environmental laws (Section 1.6) and the scope of the analysis (Section 1.7). The remainder of this EA is organized as follows:

¹ NOAA Administrative Order (NAO) 216-6A "Compliance with the National Environmental Policy Act, Executive Orders 12114, Environmental Effects Abroad of Major Federal Actions; 1988 and 13690, Floodplain Management; and 11990, Protection of Wetlands" issued April 22, 2016 and the Companion Manual for NAO 216-6A "Policy and Procedures for Implementing the National Environmental Policy Act and Related Authorities" issued January 13, 2017.

- Chapter 2 describes the applicants’ activities and the alternatives carried forward for analysis as well as alternatives not carried forward for analysis.
- Chapter 3 describes the baseline conditions of the affected environment.
- Chapter 4 describes the direct, indirect, and cumulative impacts to the affected environment, specifically impacts to marine mammals and their habitat associated with NMFS’s proposed action and alternatives.
- Chapter 5 lists document preparers and agencies consulted and Chapter 6 lists references cited.

1.2. MARINE MAMMAL PROTECTION ACT OVERVIEW

When the MMPA was enacted in 1972, Congress made several findings concerning the conservation of marine mammals, including, but not limited to, indicating that “certain species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities” (16 U.S.C. 1361(1)) [and] “such species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part[...].” (16 U.S.C. 1361(2)) [and that] “marine mammals...[are] resources of great international significance... [that] should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management and that the primary objective of their management should be to maintain the health and stability of the marine ecosystem[....]” (16 U.S.C. 1361(6)). These and other findings in Section 2 of the MMPA speak to the need to maintain a broad scope in marine mammal protection that considers species- and ecosystem-level impacts.

To serve these broader goals, Section 101(a) of the MMPA prohibits the incidental taking of marine mammals. The incidental take² of a marine mammal falls under three categories: mortality, serious injury, or harassment (i.e., injury and/or disruption of behavioral patterns). Harassment³ 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, Sections 101(a)(5)(A) and (D) of the MMPA provide exceptions to the prohibition on take, which give NMFS the authority to authorize the incidental but not intentional take of small numbers of marine mammals, provided certain determinations are made and statutory and regulatory procedures are met. ITAs may be issued as either (1) regulations and associated Letters of Authorization (LOA) or (2) IHAs, when a proposed action will not result in a potential for serious injury and/or mortality or where any such potential can be negated through required mitigation measures. IHAs may be issued for a maximum period of one year.

² The term “take” means “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.” (16 U.S.C. §1362(3)(13))

³ As defined in the MMPA for non-military readiness activities (Section 3(18)(A))

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.

1.3. APPLICANT'S INCIDENTAL TAKE AUTHORIZATION REQUESTS

On November 22, 2017, NMFS received a request from GSOE for an IHA to take marine mammals incidental to marine site characterization surveys off the coast of Delaware in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development OCS (OCS-A 0482) and along potential submarine cable routes to a landfall location in Maryland or Delaware. A revised application was received on March 19, 2018, and NMFS deemed that request to be adequate and complete.

On January 3, 2018, NMFS received a request from DWWNE for an IHA to take marine mammals incidental to marine site characterization surveys off the coast of Rhode Island and Massachusetts in the area of the Commercial Lease of Submerged Lands for Renewable Energy Development OCS (OCS-A 0486) and along potential submarine cable routes to a landfall location in either Rhode Island, Massachusetts or New York. A revised application was received on April 18, 2018, and NMFS deemed that request to be adequate and complete.

Both GSOE and DWWNE plan to conduct High-Resolution Geophysical (HRG) and geotechnical surveys. This will include the use of multi-beam depth sounders, side-scan sonars, sub-bottom profilers, marine magnetometers, vibracores, deep boring cores and cone penetration tests.

GSOE survey activities off the coast of Delaware will last for approximately 183 days and the DWWNE survey activities off the coasts of Massachusetts and Rhode Island will last approximately 200 days. However, the start dates for each of these companies will be different. Initially, both GSOE and DWWNE planned to conduct their surveys starting in May 2018. However, after applications were submitted and before NMFS published a proposed IHA, DWWNE informed NMFS their planned survey would not start until at least June 15, 2018. While the companies planned survey activities vary in terms of survey dates, duration, and specific survey locations, both companies are using the same survey techniques and equipment and will be conducting similar efforts in the Northwest Atlantic Ocean (e.g., a similar geography).

The general area for GSOE's and DWWNE's planned surveys is in the Northwest Atlantic Ocean OCS (herein Project Area) specifically within the Bureau of Ocean Energy Management (BOEM) Delaware Wind Energy Area (WEA) and Rhode Island WEA.

1.4. PURPOSE AND NEED

1.4.1. Description of the Proposed Action

NMFS proposes to issue separate IHAs to GSOE and DWWNE pursuant to Section 101(a)(5)(D) of the MMPA and 50 CFR Part 216. Each IHA will be valid for one year from the date the IHA is issued, and will authorize takes, by Level B harassment, of marine mammals incidental to the surveys in the Project Area. The impacts of underwater noise associated with the surveys have the potential to cause marine mammals within or near the survey areas to be behaviorally disturbed, thus, the activities warrant authorization, in the form of IHAs, from NMFS. NMFS' proposed action is a direct outcome of GSOE's and DWWNE's requests for IHAs to take marine mammals.

1.4.2. Purpose

The purpose of NMFS' action is to authorize take of marine mammals incidental to the marine site characterization surveys proposed by GSOE and DWWNE, consistent with applicable legal requirements. Acoustic stimuli from use certain equipment has the potential to cause harassment of marine mammals, and thus the survey activities warrant IHAs from NMFS. IHAs will allow GSOE and DWWNE to take small numbers of marine mammals within a specific geographic region incidental to and as part of the specified activities.

To authorize the incidental take 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 determines whether mitigation will achieve the least practicable impact on species. NMFS also determines whether the activity would have an unmitigable impact on the availability of affected marine mammal species for subsistence use pursuant to the MMPA.

NMFS cannot issue the IHA if it would result in more than a negligible impact on marine mammals or stocks or would result in an unmitigable impact on subsistence uses. 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. The IHA must also include requirements or conditions pertaining to monitoring and reporting.

1.4.3. Need

U.S. citizens seeking to obtain authorization for the incidental take of marine mammals under NMFS's jurisdiction must submit such a request (in the form of an application). Because GSOE and DWWNE submitted adequate and complete applications demonstrating the need and potential eligibility for an IHA under the MMPA, NMFS has a corresponding duty to determine whether and how to authorize take of marine mammals incidental to the activities described in the application. Therefore, NMFS's responsibilities under Section 101(a)(5)(D) of the MMPA and its implementing regulations establish and frame the need for NMFS's proposed action.

1.5. THE ENVIRONMENTAL REVIEW PROCESS

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. Major federal actions include activities that federal agencies fully or partially fund,

regulate, conduct or approve. Because our issuance of IHAs would allow for the taking of marine mammals, consistent with provisions under the MMPA and incidental to the applicant's lawful activities, NMFS considers 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. In addition, 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 the National Oceanic Atmospheric and 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, NMFS relies 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 NMFS prepares NEPA documents. NMFS fully considers public comments received in response to the publication of proposed IHAs during the NEPA review process.

1.5.1. 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. Although NOAA policy and procedures do not require public involvement prior to finalizing an EA, NMFS relied substantially on the public process pursuant to the MMPA to develop and evaluate environmental information relevant to an analysis under NEPA. NMFS made the IHA applications available for public review and comment and, separately, published the proposed IHAs in the Federal Register on April 4, 2018 (83 FR 14417) (GSOE) and on May 4, 2018 (83 FR 19711) (DWWNE). There, NMFS alerted the public it intended to use the MMPA public review process for the proposed IHA to solicit relevant environmental information and provide the public an opportunity to submit comments.

The Federal Register notices for the proposed IHAs included detailed descriptions of the proposed actions resulting from the MMPA incidental take authorization process; consideration of environmental issues and impacts of relevance related to the proposed issuance of the IHAs; and potential mitigation and monitoring measures to avoid and minimize potential adverse impacts to marine mammals and their habitat. The Federal Register notices of the proposed IHAs and the corresponding public comment period are instrumental in providing the public with information on relevant environmental issues and offering the public a meaningful opportunity to provide comments for our consideration in both the MMPA and NEPA decision-making processes. GSOE's and DWWNE's IHA applications are posted on our web site concurrently with the release of the Federal Register notices of the proposed IHAs at:

www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable.

1.6. OTHER ENVIRONMENTAL LAWS OR CONSULTATIONS

NMFS must comply with all applicable federal environmental laws and regulations necessary to implement a proposed action. NMFS's evaluation of and compliance with environmental laws and regulations is based on the nature and location of the applicants proposed activities and NMFS's proposed action. Therefore, this section only summarizes environmental laws applicable to NMFS's issuance of IHAs to the two applicants, GSOE and DWWNE.

1.6.1. Endangered Species Act

The ESA establishes a national program for conserving threatened and endangered species of fish, wildlife, plants, and the habitat they depend on. An endangered species is a species in danger of extinction throughout all or a significant portion of its range, and a threatened species is one that is likely to become endangered within the foreseeable future throughout all or in a significant portion of its range. The U.S. Fish and Wildlife Service (USFWS) and NMFS jointly administer the ESA and are responsible for listing a species as either threatened or endangered, as well as designating critical habitat where applicable, developing recovery plans for these species, and undertaking other conservation actions pursuant to the ESA. 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) of the ESA requires federal agencies to insure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their designated critical habitat. Federal agencies must do so in consultation with NMFS (or the USFWS) for actions that may affect species listed as threatened or endangered or critical habitat designated for such species under Section 4 of the ESA (50 C.F.R. §402.14(a)). If a federal action agency determines that an action "may affect, but is not likely to adversely affect" endangered species, threatened species, or designated critical habitat and the consulting agency concurs with that determination, consultation concludes informally (50 C.F.R. §402.14(b)).

The federal action agency, pursuant to Section 7(a)(4), shall confer with the consulting agency on any action which is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat (50 C.F.R. §402.10). If requested by the federal agency and deemed appropriate, the conference may be conducted in accordance with the procedures for formal consultation in 50 C.F.R §402.14 (50 C.F.R §402.10(d)).

Section 7(b)(3) of the ESA requires that at the conclusion of consultation, the consulting agency provides an opinion stating whether the federal agency's action is likely to jeopardize ESA-listed species or destroy or adversely modify designated critical habitat. A similar opinion is included for proposed species or proposed critical habitat if either or both were part of the consultation. If the consulting agency determines that the action is likely to jeopardize ESA-listed species or destroy or adversely modify critical habitat, they then provide a reasonable and prudent alternative that allows the action to proceed in compliance with Section 7(a)(2) of the ESA. If incidental take is expected and certain conditions are met, Section 7(b)(4) requires the consulting agency to provide an incidental take statement that specifies the impact of any incidental taking and includes mandatory reasonable and prudent measures to minimize such impacts and terms and conditions to implement the reasonable and prudent measures.

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, NMFS is required to ensure that the issuance of IHAs to GSOE and DWWNE is not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. NMFS determined that there are four ESA-listed marine mammal species could potentially occur in the Project Area and that may potentially be taken by harassment as a result of the activities proposed by GSOE and DWWNE: the fin whale, sei whale, sperm whale, and North Atlantic right whale. All four species were listed in 1970 as endangered throughout their range. GSOE's and DWWNE's proposed survey activities will not occur within any designated critical habitat areas, and are therefore not likely to result in the destruction or adverse modification of critical habitat for these species.

NMFS's Greater Atlantic Regional Fisheries Office (GARFO) issued a Biological Opinion to BOEM in April 2013 for commercial wind lease issuance and site assessment activities on the Atlantic OCS for Massachusetts, Rhode Island, New York and New Jersey wind energy areas. NMFS's Office of Protected Resources (OPR) initiated consultation with GARFO Protected Resources Division (PRD) in April 2018 to amend the existing incidental take statement of the Biological Opinion to include and be consistent with NMFS's issuance of an IHA to DWWNE for their proposed survey activities off the coast of Rhode Island and Massachusetts. The Biological Opinion would therefore be amended to include an incidental take exemption for ESA-listed marine mammal species associated with DWWNE's proposed survey activities off of Massachusetts and Rhode Island. GARFO PRD determined this approach was appropriate.

In addition, because the April 2013 Biological Opinion did not include analysis of site assessment activities offshore of Delaware, OPR initiated consultation with GARFO PRD in March 2018 on the issuance of an IHA to GSOE for their proposed surveys off the coast of Delaware. In May 2018, NMFS GARFO determined OPR's action of issuing the IHA to GSOE for site characterization surveys off Delaware was not likely to adversely affect any ESA-listed species or critical habitat and issued a Letter of Concurrence stating this determination.

1.6.2. 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, undertaken or proposed to be authorized by such agency that may adversely affect essential fish habitat (EFH) identified under the MSFCMA.

EFH was identified and is present in the Project Area for several species of shark, flounder, tuna, hake, pout, monkfish, spearfish, squid, cod, herring, bluefish, bass, skate, scup, and butterfish while no habitat areas of particular concern were identified. Authorizing the take of marine mammals through the issuance of the two IHAs is unlikely to affect the ability of the water column or substrate to provide necessary spawning, feeding, breeding or growth to maturity functions for managed fish. Likewise, authorizing the take of marine mammals is not likely to reduce (directly or indirectly) the quantity or quality of EFH by affecting the physical, biological or chemical parameters of EFH. Marine mammals were not identified as a prey component of EFH for managed fish species in this area, so authorizing the incidental take of marine mammals

will likely not reduce the quantity and/or quality of EFH. Finally, none of the required mitigation or monitoring elements in either IHA have the ability to affect EFH. Therefore, pursuant to NMFS Office of Habitat Conservation 2017 guidance on EFH and ITAs, NMFS determined issuance of IHAs to GSOE and DWWNE will not result in adverse impacts to EFH and that a separate consultation per Section 305(B)(2) of the MSFCMA as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267) is not required. NMFS’s GARFO concurs with OPRs determination.

1.7. SCOPE OF THE ENVIRONMENTAL ANALYSIS

NMFS prepared this draft EA in accordance with NEPA (42 USC 4321, et seq.), CEQ Regulations (40 CFR 1500-1508), and NOAA policy and procedures set forth in the Companion Manual for NAO 216-6A. The analysis in this EA addresses potential direct, indirect, and cumulative impacts to marine mammals and their habitat, resulting from NMFS’s proposed action to authorize incidental take associated with the GSOE’s and DWWNE’s proposed survey activities. However, the scope of this analysis is limited to the decision for which we are responsible (i.e., whether to issue the IHAs to each applicant). Therefore, this EA is intended to provide focused information on the primary impacts of environmental concern specific to authorizing take of marine mammals and the mitigation and monitoring measures to minimize the effects of that take. For these reasons, this EA does not provide a detailed evaluation of the effects to the elements of the human environment listed in Table 1 below because these components of the human environment are not affected by the issuance of an IHA.

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	Low Income Populations

	Research Reserves	
	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	Subsistence ⁴
	Ecologically Critical Areas	

⁴ No subsistence activity currently occurs within the action area

Chapter 2 Alternatives

2.1. INTRODUCTION

As described in Chapter 1, the NMFS Proposed Action is to issue IHAs to authorize the take of small numbers of marine mammals incidental to GSOE's and DWWNE's marine site characterization survey activities. NMFS' Proposed Action is triggered by GSOE's and DWWNE's request for IHAs per the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq.*). In accordance with the National Environmental Policy Act (NEPA) and the Council on Environmental Quality (CEQ) Regulations, NMFS is required to consider a range of alternatives to the Proposed Action as well as the No Action. 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. For the purposes of this 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 screening criteria and considerations outlined in Section 2.1 to the alternatives to identify which alternatives to carry forward for analysis. Accordingly, reasonable alternatives are carried forward for evaluation under NEPA while alternatives considered but determined not to meet purpose and need are not carried forward.

2.2. CRITERIA AND CONSIDERATIONS FOR SELECTING ALTERNATIVES

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 adverse 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 ("least practicable adverse impact"). Consideration of the availability of marine mammal species or stocks for taking for subsistence uses pertains only to Alaska, and is therefore not relevant here. NMFS does not have a regulatory definition for "least practicable adverse impact." However, NMFS's implementing regulations require applicants for incidental take authorizations to include information about the availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of effecting the least practicable adverse impact upon the affected species or stocks and their habitat (50 CFR 216.104(a)(11)). In evaluating how mitigation may or may not be appropriate to ensure the least practicable adverse impact on species or stocks and their habitat, NMFS carefully considers two primary factors:

- (1) The manner in which, and the degree to which, implementation of the measure(s) is expected to reduce impacts to marine mammal species or stocks, their habitat, and their availability for subsistence uses (when relevant). This analysis will consider such things as the nature of the potential adverse impact (such as likelihood, scope, and range), the likelihood that the measure will be effective if implemented, and the likelihood of successful implementation.
- (2) The practicability of the measure for applicant implementation includes consideration of cost and the impact on operations and personnel safety.

While the language of the least practicable adverse impact standard calls for minimizing impacts to affected species or stocks, NMFS recognizes that the reduction of impacts to those species or stocks accrues through the application of mitigation measures that limit impacts to individual animals. Accordingly, our analysis focuses on measures designed to avoid or minimize impacts on marine mammals from activities that are likely to increase the probability or severity of population-level effects, including auditory injury or disruption of important behaviors, such as foraging, breeding, or mother/calf interactions. In order to satisfy the MMPA's least practicable adverse impact standard, NMFS proposes a suite of basic mitigation protocols that are required regardless of the status of a stock. Additional or enhanced protections are proposed for species whose stocks are in poor health and/or are subject to some significant additional stressor that lessens that stock's ability to weather the effects of the specified activity without worsening its status.

In the evaluation of specific measures for GSOE's and DWWNE's proposed site characterization activities, the details of the specified activity will necessarily inform each of the two primary factors discussed above (expected reduction of impacts and practicability), and will be carefully considered to determine the types of mitigation that are appropriate under the least practicable adverse impact standard. Analysis of how a potential mitigation measure may reduce potential adverse impacts on a marine mammal stock or species and practicability of implementation are not issues meaningfully evaluated through a "binary lens". The manner in which, and the degree to which, implementation of a measure is expected to reduce potential impacts, as well as its practicability in terms of these considerations, can vary widely. Expected effects of the activity and of the mitigation as well as status of the stock all weigh into these considerations. Accordingly, the greater the likelihood that a measure will contribute to reducing the probability or severity of adverse impacts to the species or stock, the greater the weight that measure is given when considered in combination with practicability to determine the appropriateness of the mitigation measure, and vice versa. No quantitative formula is provided by the MMPA or by regulation, and it is not reasonable to expect an assessment of the mitigation required to achieve the least practicable adverse impact other than as described here. We discuss consideration of these factors in detail below.

The emphasis given to a measure's ability to reduce the impacts on a species or stock considers the degree, likelihood, and context of the anticipated reduction of impacts to individuals as well as the status of the species or stock. The ultimate impact on any individual from a disturbance event (which informs the likelihood of adverse species- or stock-level effects) is dependent on the circumstances and associated contextual factors, such as duration of exposure to stressors.

Though any proposed mitigation needs to be evaluated in the context of the specific activity and the species or stocks affected, measures with the following goals are often applied to reduce the likelihood or severity of adverse species- or stock-level impacts.

- avoiding or minimizing injury or mortality
- limiting interruption of known feeding, breeding, mother/calf, or resting behaviors; minimizing the abandonment of important habitat (temporally and spatially)
- minimizing the number of individuals subjected to these types of disruptions; and limiting degradation of habitat.

Mitigating these types of effects is intended to reduce the likelihood that the activity will result in energetic or other types of impacts that are more likely to result in reduced reproductive success or survivorship. It is also important to consider the degree of impacts expected in the absence of mitigation in order to assess the benefit of any potential measures. Finally, because the least practicable adverse impact standard authorizes NMFS to weigh a variety of factors when evaluating appropriate mitigation measures, it does not compel mitigation for every kind of individual take, even when practicable for implementation by the applicant.

2.3. DESCRIPTION OF APPLICANT'S PROPOSED ACTIVITIES

GSOE and DWWNE propose to conduct marine site characterization survey investigations in the areas of the Commercial Lease of Submerged Lands for Renewable Energy Development on the Outer Continental Shelf (OCS) lease areas OCS-A-0482 and OCS-A-0486 and coastal waters where cable route corridors will be established. Our notice of the proposed IHAs and GSOE's and DWWNE's IHA applications provide detailed descriptions of GSOE and DWWNE's proposed activities for the Projects. That information is incorporated herein by reference and summarized below.

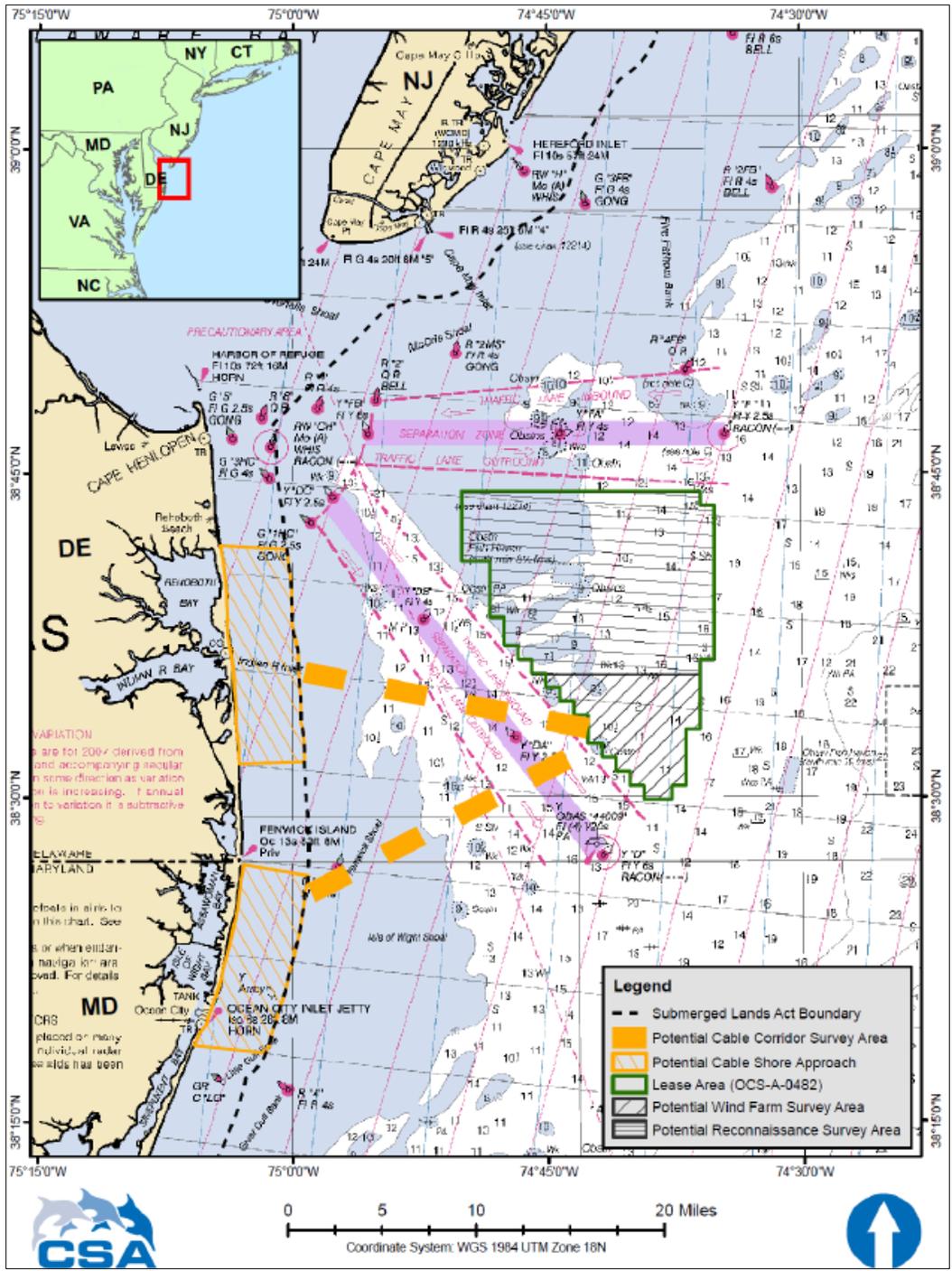


Figure 1. Project Location in OCS-A-0482 off the coast of Delaware.

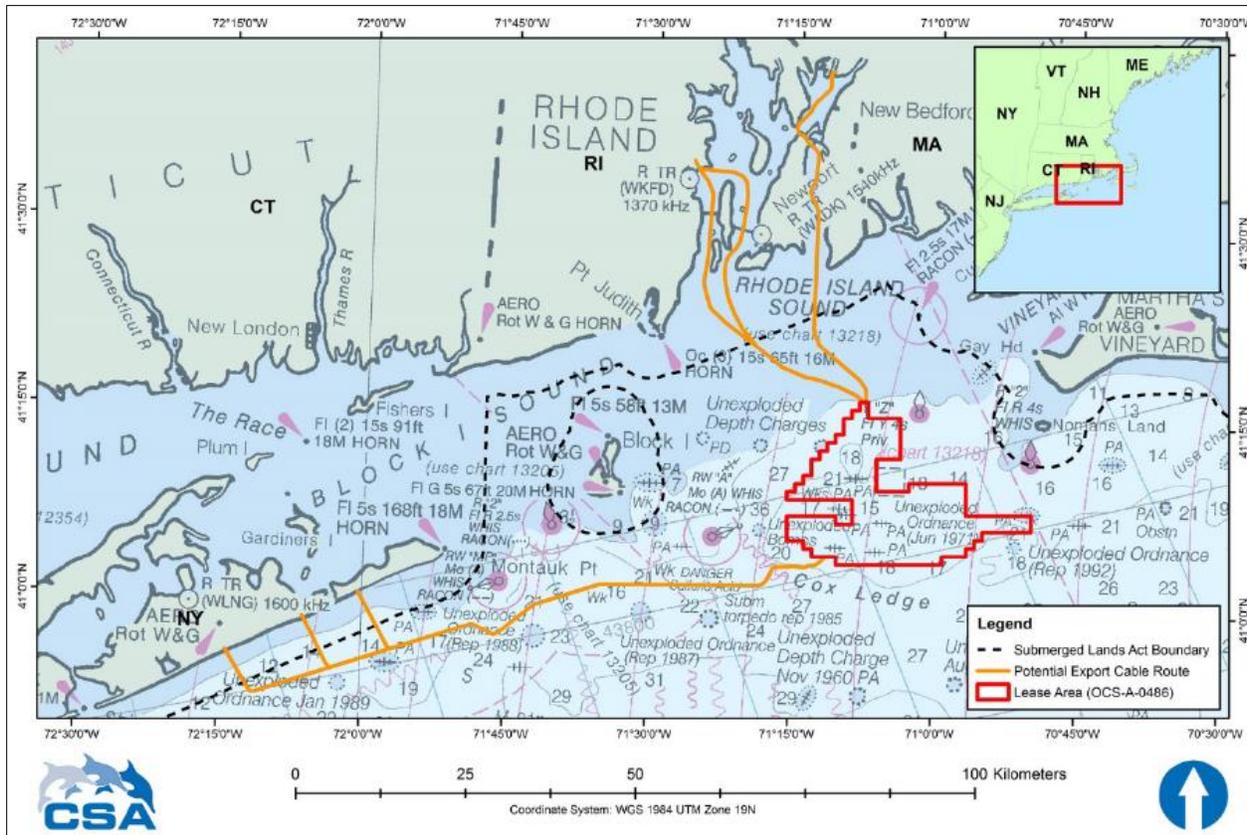


Figure 2. Project Location in OCS-A-0486 off the coast of Rhode Island and Massachusetts.

The projects would utilize multiple types of survey equipment; representative survey equipment that is being considered is summarized in Table 2. 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 survey program.

The project includes the following elements:

- Multibeam Depth Sounder to determine water depths and general bottom topography. The multibeam echosounder sonar system projects sonar pulses in several angled beams from a transducer mounted to a ship's hull. The beams radiate out from the transducer in a fan-shaped pattern orthogonally to the ship's direction;
- Shallow Penetration Sub-Bottom Profiler (Chirp) to map the near surface stratigraphy (top 0 to 5 m of sediment below seabed). A Chirp system emits sonar pulses which increase in frequency over time. The pulse length frequency range can be adjusted to meet project variables;
- Medium Penetration Sub-Bottom Profiler (Sparker and/or bubble gun) to map deeper subsurface stratigraphy as needed. Sparkers create acoustic pulses omni-directionally from the source that can penetrate several hundred meters into the seafloor. Hydrophone arrays towed nearby receive the return signals;

- Sidescan Sonar used to image the seafloor for seabed sediment classification purposes and to identify natural and man-made acoustic targets on the seafloor. The sonar device emits conical or fan-shaped pulses down toward the seafloor in multiple beams at a wide angle, perpendicular to the path of the sensor through the water. The acoustic return of the pulses is recorded in a series of cross-track slices, which can be joined to form an image of the sea bottom within the swath of the beam; and
- Marine Magnetometer to detect ferrous metal objects on the seafloor which may cause a hazard including anchors, chains, cables, pipelines, ballast stones and other scattered shipwreck debris, munitions of all sizes, unexploded ordinances, aircraft, engines and any other object with magnetic expression.
- Vibrocores to characterize the geological and geotechnical characteristics of the seabed, up to approximately 5 m deep. Vibrocoring entails use of a hydraulic or electric driven pulsating head to drive a hollow tube into the seafloor and recover a stratified representation of the sediment;
- Core Penetration Testing to determine stratigraphy and in-situ conditions of the sediments. Target penetration is 60 to 75 m; and
- Deep Boring Cores would be drilled to determine the vertical and lateral variation in seabed conditions and provide geotechnical data to depths at least 10 m deeper than design penetration of the foundations. Target penetration is 60 to 75 m.

Table 2. Summary of Representative Survey Equipment.

Equipment Type	Operating Frequencies (kHz)	Source Level (SLrms dB re 1 μ PA @ 1 m)	Operational Depth (meters below surface)	Beam width (degrees)	Pulse Duration (milliseconds)
Multibeam Depth Sounding					
Reson SeaBat 7125 ¹	200 and 400	220	4	128	0.03 to 0.3
Reson SeaBat 7101 ²	100	162	2 to 5	140	0.8 to 3.04
R2SONIC Sonic 2020 ¹	170 to 450	162	2 to 5	160	0.11
Shallow Sub-bottom Profiling					
Teledyne Benthos Chirp III ³	2 to 7	197	4	45	0.2
EdgeTech SB3200 XS SB216 ⁴	2 to 16	176	2 to 5	170	3.4
Medium Penetration Sub-bottom Profiling					

Equipment Type	Operating Frequencies (kHz)	Source Level (SLrms dB re 1 μ PA @ 1 m)	Operational Depth (meters below surface)	Beam width (degrees)	Pulse Duration (milliseconds)
Applied Acoustics Fugro boomer ¹	0.1 to 10	175	1 to 2	60	58
Applied Acoustics S-Boom system - CSP-D 2400HV (600 joule/pulse) ⁵	0.25 to 8	203	2	25 to 35	0.6
GeoResources 800 Joule Sparker ⁶	0.75 to 2.75	203	4	360 (omni-directional)	0.1 to 0.2
Falmouth Scientific HMS 620 bubble gun ⁷	0.02 to 1.7	196	1.5	360 (omni-directional)	1.6
Applied Acoustics Dura-Spark 240 ⁵	0.03 to 5	213	1 to 2	170	2.1
Side Scan Sonar					
Klein Marine Systems model 3900 ¹	445 and 900	242	20	40	0.025
EdgeTech model 4125 ¹	105 and 410	225	10	158	10 to 20
EdgeTech model 4200 ¹	300 and 600	215 to 220	1	0.5 and 0.26	5 to 12

The geophysical and shallow geotechnical survey activities are anticipated to be supported by a vessel approximately 30-60 m (100-200 ft) long which will maintain a speed of between two to five knots (kn) while transiting survey lines. Deep geotechnical survey activities and possible shallow geotechnical activities are anticipated to be conducted from an 80 to 100 m (250 to 300 ft) dynamically positioned vessel with possible support of a tug boat. Survey activities will be executed in compliance with the July 2015 *BOEM Guidelines for Providing Geophysical, Geotechnical, and Geohazard Information Pursuant to 30 CFR Part 585*.

2.3.1. Specified Time and Specified Area

The proposed authorizations will each be effective for one year from the IHA issuance dates, however the actual duration of site characterization surveys is expected to be approximately 183 days in the case of surveys off the coast of Delaware and 200 days in the case of surveys off the coast of Rhode Island and Massachusetts.

GSOE's and DWWNE's survey activities will occur within two of BOEM's Wind WEAs:

- The Delaware WEA, which is approximately 96,430 acres and is located east of Rehoboth Beach, Delaware (Figure 1), with water depths that range from 16 to 28 meters (m) (52 to 92 feet (ft)); and
- The Rhode Island-Massachusetts WEA, which is approximately 164,750 acres and is located east of Long Island, New York, west of Martha's Vineyard, Massachusetts, and south of mainland Rhode Island and Massachusetts (Figure 2), with water depths that range from 26 to 48 m (85 to 157 ft).

GSOE's and DWWNE's survey activities will also occur along potential cable route corridors that extend from the aforementioned WEAs to either Delaware (in the case of surveys off the coast of Delaware) or, Rhode Island, Massachusetts or New York (in the case of surveys off the coasts of Rhode Island and Massachusetts).

2.4. DESCRIPTION OF ALTERNATIVES

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

The proposed action constitutes Alternative 1 and is the Preferred Alternative. Under this alternative, NMFS would issue IHAs to GSOE and DWWNE allowing the incidental take, by Level B harassment, of 14 species of marine mammals, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the IHAs, if issued, along with any additional measures based on consideration of public comments.

Mitigation, Monitoring, and Reporting Measures:

As described in Section 1.2.1, NMFS 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 GSOE and DWWNE'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, GSOE and DWWNE have 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 measures: GSOE and DWWNE 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) and Seasonal Management Area (SMA). 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. Visual monitoring: Visual monitoring of the established exclusion zone(s) for the geophysical and geotechnical surveys will be performed by qualified and NMFS-approved protected species observers (PSOs). An observer team comprising a minimum of four NMFS-approved PSOs and two certified Passive Acoustic Monitoring (PAM) operators, 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;
3. Passive Acoustic Monitoring: To support 24-hour survey operations, GSOE and DWWNE 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;

4. Implementation of exclusion zone (EZ) shut-down procedures: Exclusion zones during geophysical surveys as follows:
 - a 500 m EZ for North Atlantic right whales;
 - a 200 m EZ for other ESA-listed whales including fin whales, sei whales and sperm whales; and
 - a 25 m EZ for harbor porpoises.
5. Ramp-up for geophysical activities: A ramp-up procedure will be used at the beginning of geophysical 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. Ramp-up would begin with the power of the smallest geophysical 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.

GSOE and DWWNE are required to submit draft monitoring reports to the NMFS Office of Protected Resources within 90 days after the conclusion of the activities. Final reports shall be prepared and submitted within 30 days following resolution of any comments on the draft reports from NMFS. A description of the activities conducted by GSOE and DWWNE and the monitoring protocols would be included in the reports.

In our *Federal Register* notice for the proposed IHAs, which we incorporate by reference, NMFS preliminarily determined that the measures included in the proposed IHAs were sufficient to reduce the effects of GSOE's and DWWNE's activities on marine mammals to the level of least practicable adverse impact. In addition, we described our analyses of impacts and preliminarily determined that the taking of small numbers of marine mammals, incidental to GSOE's and DWWNE's projects, 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 the IHAs, along with required mitigation and monitoring measures, that meets the standards set forth in section 101(a)(5)(D) of the MMPA and the implementing regulations.

2.4.2. Alternative 2 – No Action Alternative

In accordance with NOAA's implementing procedures, the Companion Manual (CM) for NAO 216-6A, Section 6.B.i, NMFS is defining the No Action alternative as not authorizing the requested incidental take of marine mammals under Section 101(a)(5)(D) of the MMPA. This is consistent with our statutory obligation under the MMPA to either: (1) deny the requested authorization or (2) grant the requested authorization and prescribe mitigation, monitoring, and reporting requirements. Under the No Action Alternative, NMFS would not issue the IHAs to GSOE and DWWNE, in which case we assume these companies would not proceed with their proposed survey activities as described in the application. The requested take would not occur and mitigation, monitoring and reporting for marine mammals would not be implemented. Although the No Action Alternative

would not meet the purpose and need to allow incidental takes of marine mammals under certain conditions (i.e., when the statutory requirements are satisfied), the CEQ Regulations require consideration and analysis of a No Action Alternative for the purposes of presenting a comparative analysis to the action alternatives. The No Action Alternative, consistent with CEQ Guidance and the CM, serves as a baseline against which the impacts of the Preferred Alternative will be compared and contrasted.

2.5. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER CONSIDERATION

NMFS considered whether other alternatives could meet the purpose and need and support GSOE's and DWWNE's proposed project. An alternative that would allow for the issuance of IHAs 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

NMFS reviewed all relevant environmental, cultural, historical, social, and economic resources based on the specific geographic region associated with NMFS's proposed action, alternatives, and the applicants request for IHAs. Based on this review, this section describes the affected environment and existing (baseline) conditions for select resource categories (e.g., marine environment). As explained in Chapter 1, certain resource categories were not carried forward for further consideration or evaluation in this EA (see Table 1 in Section 1.5) and where appropriate, the analyses in the proposed IHAs related to select resource categories carried forward are incorporated by reference. Chapter 4 provides an analysis and description of environmental impacts associated with the affected environment.

3.1. 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 incidental take. We briefly summarize this component of the biological environment here.

3.1.1. 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. However, the area is considered part of a biologically significant migratory area for North Atlantic right whales and the survey proposed offshore Rhode Island and Massachusetts overlaps with a biologically significant feeding area for fin whales (Waring et al., 2016).

We also presented information on marine mammal habitat, including prey species, and the potential impacts to marine mammal habitat in the *Federal Register* notices of the proposed IHAs. These are further described in GSOE's and DWWNE's IHA applications. Forage fish and other marine mammal prey are generally anticipated to be present in the project area but not in high densities. Effects on Essential Fish Habitat (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 fish species or their food. The actual physical and chemical properties of the EFH will not be impacted.

3.1.2. Ambient Sound

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

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 geophysical 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 moderate in the RI-MA WEA and high in the Delaware WEA (which is near a major shipping channel). Vessels will regularly transit through this area, and include large cargo and container ships, tugs, tankers, barges, passenger ships, recreational vessels, and others.

3.1.3. Marine Mammals

The marine waters in the Project Area support several species of marine mammals, including pinnipeds and cetaceans; all species that could potentially occur in the proposed survey areas are in Table 3. However, the temporal or spatial occurrence of 23 of the 37 species listed in Table 3 is such that take of these species is not expected to occur. This is because they have very low densities in the project area, are known to occur further offshore than the project area, or are considered very unlikely to occur in the project area during the proposed surveys due to the species' seasonal occurrence in the area. Therefore these species are not discussed further beyond the information listed Table 3.

Table 3. Marine Mammals Potentially Present in the Vicinity of the Project Area.

Common Name	Stock	NMFS MMPA and ESA Status; Strategic (Y/N) ¹	Stock Abundance (CV, N _{min} , most recent abundance survey) ²	PBR ³	Occurrence and seasonality in the NW Atlantic OCS
Toothed whales (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
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	North Atlantic	E; Y	2,288 (0.28; 1,815; n/a)	3.6	Year round in continental shelf and slope

<i>(Physeter macrocephalus)</i>					waters, occur seasonally to forage
Pygmy sperm whale ⁴ <i>(Kogia breviceps)</i>	W. North Atlantic	--; N	3,785 (0.47; 2,598; n/a)	26	rare
Dwarf sperm whale ⁴ <i>(Kogia sima)</i>	W. North Atlantic	--; N	3,785 (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 ⁵ <i>(Mesoplodon densirostris)</i>	W. North Atlantic	--; N	7,092 (0.54; 4,632; n/a)	46	rare
Gervais' beaked whale ⁵ <i>(Mesoplodon europaeus)</i>	W. North Atlantic	--; N	7,092 (0.54; 4,632; n/a)	46	rare
True's beaked whale ⁵ <i>(Mesoplodon mirus)</i>	W. North Atlantic	--; N	7,092 (0.54; 4,632; n/a)	46	rare
Sowerby's Beaked Whale ⁵ <i>(Mesoplodon bidens)</i>	W. North Atlantic	--; N	7,092 (0.54; 4,632; n/a)	46	rare
Rough-toothed dolphin <i>(Steno bredanensis)</i>	W. North Atlantic	--; N	271 (1.0; 134; 2013)	1.3	rare
Melon-headed whale <i>(Peponocephala electra)</i>	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
Northern bottlenose whale <i>(Hyperoodon ampullatus)</i>	W. North Atlantic	--; N	Unknown (unk; unk; n/a)	Undet	rare
Pygmy killer whale <i>(Feresa attenuata)</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	2,591 (0.81; 1,425; 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	458 (0; 455; n/a)	1.4	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 seal ⁶ (<i>Halichoerus grypus</i>)	W. North Atlantic	--; N	27,131 (0.10; 25,908; n/a)	1,554	Unlikely
Harbor seal (<i>Phoca vitulina</i>)	W. North Atlantic	--; N	75,834 (0.15; 66,884; 2012)	2,006	Common year round
Hooded seal (<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

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

2 CV is coefficient of variation; Nmin 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 2016 Atlantic SARs.

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

4 Abundance estimate includes both dwarf and pygmy sperm whales.

5 Abundance estimate includes all species of *Mesoplodon* in the Atlantic Ocean.

6 Abundance estimate applies to U.S. population only, actual abundance including the North Atlantic is believed to be approximately 505,000 (Waring et al, 2016).

Below is a description of the species that are both common in the Project Area and that have the highest likelihood of occurring, at least seasonally, in the Project Area and are thus expected to potentially be taken by the proposed activities. For the majority of species potentially present in the specific geographic region, NMFS has designated only a single generic stock (*e.g.*, “western North Atlantic”) for management purposes. This includes the “Canadian east coast” stock of minke whales, which includes all minke whales found in U.S. waters. For humpback and sei whales, NMFS defines stocks on the basis of feeding locations, *i.e.*, Gulf of Maine and Nova Scotia, respectively. However, our reference to humpback whales and sei whales in this document refers to any individuals of the species that are found in the specific geographic region. In addition, four marine mammal species are listed under the Endangered Species Act (ESA), are known to be present, at least seasonally, in the survey area, and are included in the take request: North Atlantic right whale, fin whale, sei whale and sperm whale.

North Atlantic Right Whale

The North Atlantic right whale ranges from the calving grounds in the southeastern United States to feeding grounds in New England waters and into Canadian waters (Waring *et al.*, 2016). Surveys have demonstrated the existence of seven areas where North Atlantic right whales congregate seasonally, including Georges Bank, Cape Cod, and Massachusetts Bay (Waring *et al.*, 2016). In the late fall months (*e.g.* October), right whales generally disappear from the feeding grounds in the North Atlantic and move south to their breeding grounds. The proposed survey area is within the North Atlantic right whale migratory corridor. During the proposed survey (*i.e.*, March through August) right whales may be migrating through the proposed survey area and the surrounding waters.

The western North Atlantic population demonstrated overall growth of 2.8 percent per year between 1990 to 2010, despite a decline in 1993 and no growth between 1997 and 2000 (Pace *et al.* 2017). However, since 2010 the population has been in decline, with a 99.99 percent probability of a decline of just under 1 percent per year (Pace *et al.* 2017). Between 1990 and 2015, calving rates varied substantially, with low calving rates coinciding with all three periods of decline or no growth (Pace *et al.* 2017). On average, North Atlantic right whale calving rates are estimated to be roughly half that of southern right whales (*Eubalaena australis*) (Pace *et al.* 2017), which are increasing in abundance (NMFS 2015).

The current abundance estimate for this stock is 458 individuals (Hayes *et al.*, 2018) Data indicates that the number of adult females fell from 200 in 2010 to 186 in 2015 while males fell from 283 to 272 in the same timeframe (Pace *et al.*, 2017). In addition, elevated North Atlantic right whale mortalities have occurred since June 7, 2017. A total of 18 confirmed dead stranded whales (12 in Canada; 6 in the United States), with an additional 5 live whale entanglements in Canada, have been documented to date. This event has been declared an Unusual Mortality Event (UME). More information is available online at:

<http://www.nmfs.noaa.gov/pr/health/mmume/2017northatlanticrightwhaleume.html>.

Humpback Whale

Humpback whales are found worldwide in all oceans. The humpback whale population within the North Atlantic has been estimated to include approximately 11,570 individuals (Waring *et al.*, 2016). Humpbacks occur off southern New England in all four seasons, with peak abundance in spring and summer. In winter, humpback whales from waters off New England, Canada, Greenland, Iceland, and Norway migrate to mate and calve primarily in the West Indies (including the Antilles, the Dominican Republic, the Virgin Islands and Puerto Rico), where spatial and genetic mixing among these groups occurs (Waring *et al.*, 2015). While migrating, humpback whales utilize the mid-Atlantic as a migration pathway between calving/mating grounds to the south and feeding grounds in the north (Waring *et al.* 2007).

Since January 2016, elevated humpback whale mortalities have occurred along the Atlantic coast from Maine through North Carolina. This event has been declared a UME. More information is available at www.nmfs.noaa.gov/pr/health/mmume/2017humpbackatlanticume.html. Partial or full necropsy examinations have been conducted on approximately half of the 68 known cases. A portion of the whales have shown evidence of pre-mortem vessel strike; however, this finding is not consistent across all of the whales examined so more research is needed. NOAA is consulting with researchers that are conducting studies on the humpback whale populations, and these efforts may provide information on changes in whale distribution and habitat use that could provide additional insight into how these vessel interactions occurred. Three previous UMEs involving humpback whales have occurred since 2000, in 2003, 2005, and 2006.

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). Fin whales are found in small groups of up to 5 individuals (Brueggeman *et al.*, 1987). The current abundance estimate for the western North Atlantic stock of fin whales is 1,618 individuals (Hayes *et al.*, 2017). The main threats to fin whales are fishery interactions and vessel collisions (Waring *et al.*, 2016).

Sei Whale

The Nova Scotia stock of sei whales can be found in deeper waters of the continental shelf edge waters of the northeastern U.S. and northeastward to south of Newfoundland. The southern portion of the stock's range during spring and summer includes the Gulf of Maine and Georges Bank. Spring is the period of greatest abundance in U.S. waters, with sightings concentrated along the eastern margin of Georges Bank and into the Northeast Channel area, and along the southwestern edge of Georges Bank in the area of Hydrographer Canyon (Waring *et al.*, 2015). Sei whales occur in shallower waters to feed. Sei whales are listed as endangered under the ESA, and the Nova Scotia stock is considered strategic and depleted under the MMPA. The main threats to this stock are interactions with fisheries and vessel collisions.

Minke Whale

Minke whales can be found in temperate, tropical, and high-latitude waters. The Canadian East Coast stock can be found in the area from the western half of the Davis Strait (45°W) to the Gulf of Mexico (Waring *et al.*, 2016). This species generally occupies waters less than 100 m deep on

the continental shelf. There appears to be a strong seasonal component to minke whale distribution in which spring to fall are times of relatively widespread and common occurrence, and when the whales are most abundant in New England waters, while during winter the species appears to be largely absent (Waring *et al.*, 2016). The main threats to this stock are interactions with fisheries, strandings, and vessel collisions.

Sperm Whale

The distribution of the sperm whale in the U.S. EEZ occurs on the continental shelf edge, over the continental slope, and into mid-ocean regions (Waring *et al.*, 2014). The basic social unit of the sperm whale appears to be the mixed school of adult females plus their calves and some juveniles of both sexes, normally numbering 20-40 animals in all. There is evidence that some social bonds persist for many years (Christal *et al.*, 1998). This species forms stable social groups, site fidelity, and latitudinal range limitations in groups of females and juveniles (Whitehead, 2002). In summer, the distribution of sperm whales includes the area east and north of Georges Bank and into the Northeast Channel region, as well as the continental shelf (inshore of the 100-m isobath) south of New England. In the fall, sperm whale occurrence south of New England on the continental shelf is at its highest level, and there remains a continental shelf edge occurrence in the mid-Atlantic bight. In winter, sperm whales are concentrated east and northeast of Cape Hatteras. The current abundance estimate for this stock is 2,288 (Hayes *et al.*, 2017).

Long-finned Pilot Whale

Long-finned pilot whales are found from North Carolina and north to Iceland, Greenland and the Barents Sea (Waring *et al.*, 2016). In U.S. Atlantic waters the species is distributed principally along the continental shelf edge off the northeastern U.S. coast in winter and early spring and in late spring, pilot whales move onto Georges Bank and into the Gulf of Maine and more northern waters and remain in these areas through late autumn (Waring *et al.*, 2016). The main threats to this species include interactions with fisheries and habitat issues including exposure to high levels of polychlorinated biphenyls and chlorinated pesticides, and toxic metals including mercury, lead, cadmium, and selenium (Waring *et al.*, 2016).

Atlantic White-sided Dolphin

White-sided dolphins are found in temperate and sub-polar waters of the North Atlantic, primarily in continental shelf waters to the 100-m depth contour from central West Greenland to North Carolina (Waring *et al.*, 2016). There are three stock units: Gulf of Maine, Gulf of St. Lawrence, and Labrador Sea stocks (Palka *et al.*, 1997). The Gulf of Maine population of white-sided dolphins is most common in continental shelf waters from Hudson Canyon (approximately 39°N) to Georges Bank, and in the Gulf of Maine and lower Bay of Fundy. Sighting data indicate seasonal shifts in distribution (Northridge *et al.*, 1997). During January to May, low numbers of white-sided dolphins are found from Georges Bank to Jeffreys Ledge (off New Hampshire), with even lower numbers south of Georges Bank, as documented by a few strandings collected on beaches of Virginia to South Carolina. From June through September, large numbers of white-sided dolphins are found from Georges Bank to the lower Bay of Fundy. From October to December, white-sided dolphins occur at intermediate densities from southern Georges Bank to southern Gulf of Maine (Payne and Heinemann 1990). Sightings south of Georges Bank, particularly around Hudson Canyon, occur year round but at low densities. The current

abundance estimate for this stock is 48,819 (Hayes *et al.*, 2017). The main threat to this species is interactions with fisheries.

Atlantic Spotted Dolphin

Atlantic spotted dolphins are found in tropical and warm temperate waters ranging from southern New England, south to Gulf of Mexico and the Caribbean to Venezuela (Waring *et al.*, 2014). This stock regularly occurs in continental shelf waters south of Cape Hatteras and in continental shelf edge and continental slope waters north of this region (Waring *et al.*, 2014). There are two forms of this species, with the larger ecotype inhabiting the continental shelf and is usually found inside or near the 200 m isobaths (Waring *et al.*, 2014). The main threat to this species is interactions with fisheries.

Common Dolphin

The common dolphin is found world-wide in temperate to subtropical seas. In the North Atlantic, 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 animals (Hayes *et al.*, 2017). The main threat to this species is interactions with fisheries.

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 survey area as the survey area is north of the northern extent of the range of the Western North Atlantic Northern Migratory Coastal Stock. The current abundance estimate for the western north Atlantic stock is 77,532 (Hayes *et al.*, 2017). The main threat to this species is interactions with fisheries.

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 is 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). Average group size for this stock in the Bay of Fundy is approximately four individuals (Palka 2007). The current abundance estimate for this stock is 79,883 (Hayes *et al.*, 2017). The main threat to this species is interactions with fisheries, with documented take 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).

Harbor Seal

The harbor seal is found in all nearshore waters of the North Atlantic and North Pacific Oceans and adjoining seas above about 30°N (Burns, 2009). 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 (Hayes *et al.*, 2017). The main threat to this species is interactions with fisheries.

Gray Seal

There are three major populations of gray seals found in the world; eastern Canada (western North Atlantic stock), northwestern Europe and the Baltic Sea. The gray seals that occur in the Project Area belong to the western North Atlantic stock, which ranges from New Jersey to Labrador. Current population trends show that gray seal abundance is likely increasing in the U.S. Atlantic EEZ (Waring *et al.*, 2016). Although the rate of increase is unknown, surveys conducted since their arrival in the 1980s indicate a steady increase in abundance in both Maine and Massachusetts (Waring *et al.*, 2016). It is believed that recolonization by Canadian gray seals is the source of the U.S. population (Waring *et al.*, 2016).

3.2. SOCIAL ENVIRONMENT

3.2.1. Subsistence

No significant subsistence activity currently occurs within the action area.

Chapter 4 Environmental Consequences

NMFS reviewed all relevant direct, indirect, cumulative, short-term, and long-term impacts to marine mammals and their habitat associated with our action and alternatives. This chapter describes the potential environmental consequences for the affected resources described in Chapter 3 for each alternative. In addition, we rely on and incorporate by reference, certain information from GSOE's and DWWNE's IHA applications and the proposed IHAs. Impacts are categorized as follows:

- **Minor impacts** are generally those that might be perceptible but, in their context, are not amenable to measurement because of their relatively minor character;
- **Moderate impacts** are those that are more perceptible and, typically, more amenable to quantification or measurement;
- **Major impacts** are those that, in their context and due to their intensity (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR 1508.27) and, thus, warrant heightened attention and examination for potential means for mitigation to fulfill the requirements of NEPA; and
- **Short-term or long-term impacts.** These characteristics are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur only with respect to a particular activity or for a finite period. Long-term impacts are those that are more likely to be persistent and chronic.

4.1. EFFECTS OF ALTERNATIVE 1 – ISSUANCE OF IHAS WITH MITIGATION MEASURES

Alternative 1 is the Preferred Alternative, under which we would issue IHAs to GSOE and DWWNE allowing the incidental take, by Level B harassment, of 14 species of marine mammals, subject to the mandatory mitigation and monitoring measures and reporting requirements set forth in the IHAs, 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 IHAs.

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 IHAs or the applicant's proposed site characterization surveys. GSOE's and DWWNE'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 minor. 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 survey activities.

The duration of fish avoidance of the area during surveys 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, and any avoidance by fish would be expected to be short-term and temporary.

Because of the relatively 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 temporary displacement associated with GSOE's and DWW's survey activities have 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 maine 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 IHAs and GSOE's and DWWNE's applications provide detailed descriptions of these potential effects of proposed project activities on marine mammals and can be found online at:

www.fisheries.noaa.gov/national/marine-mammal-protection/incidental-take-authorizations-other-energy-activities-renewable. That information is summarized below.

The majority of impacts to marine mammals are likely to occur from geophysical survey activities. Geophysical 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 geophysical survey equipment. Elevated sound levels could cause behavioral harassment in the form of temporary avoidance of the area. 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 and short-term because they would occur only for a finite period. These activities are not anticipated to result in injury, serious injury or mortality of any marine mammal species. 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 survey activities generate sounds that could potentially harass marine mammals during GSOE's and DWWNE's proposed site characterization surveys. Currently, NMFS uses 160 dB re 1 μ Pa as the received level for the onset of Level B harassment from impulsive sound sources (e.g. geophysical survey equipment) underwater. 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 Guidance established thresholds for marine mammal injury (based on the onset of Permanent Threshold Shift (PTS)) which is considered Level A take; thresholds for Level B take were not revised. 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 μ Pa (rms)
Level B Harassment	Behavioral Disruption (for non-impulse noise)	120 dB re 1 μ Pa (rms)
Level B harassment (airborne)	Behavioral disruption	90 dB (harbor seals) 100dB (other pinnipeds) (unweighted)

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

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

Incidental take is estimated for each species by estimating the likelihood of a marine mammal being present within a Level A or Level B harassment zone of influence during geophysical surveys. Expected marine mammal presence is determined by marine mammal density estimates in the Project Area during the survey. For all marine mammals, density estimates are available; therefore the following calculation was used to estimate take of marine mammals: density of animals in the area (animals per 100 km²) multiplied by the zone of ensonification from the loudest noise producing source associated with the activity multiplied by the number of days of noise generating activities.

Table 6 shows the number of Level A and Level B harassment takes that we propose to authorize in the two IHAs. The proposed IHA notices and GSOE's and DWWNE's IHA applications 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. Total Numbers of Incidental Take of Marine Mammals Proposed for Authorization to GSOE and DWWNE.

Species	Level A Takes Authorized	Level B Takes Authorized	Total Takes Authorized
North Atlantic right whale	0	4	4
Humpback whale	0	35	35
Fin whale	0	60	60
Sei whale	0	4	4
Minke whale	0	13	13
Sperm whale	0	2	2
Long-finned pilot whale	0	64	64
Bottlenose dolphin	0	2,614	2,614
Atlantic Spotted dolphin	0	74	74
Common dolphin	0	1,445	1,445
Atlantic white-sided dolphin	0	436	436
Harbor porpoise	0	603	603
Harbor seal	0	2,640	2,640
Gray seal	0	3,036	3,036

4.1.3. Impacts to Subsistence

No significant subsistence activity currently occurs within the action area; therefore, we anticipate that GSOE's and DWWNE's survey activities will not have an effect on subsistence resources in the area

4.2. EFFECTS OF ALTERNATIVE 2 – NO ACTION ALTERNATIVE

Where a choice of "no action" by the agency would result in predictable actions by others, this consequence of the "no action" alternative should be included in the analysis." (CEQ, Forty Questions, 3.A). NMFS' view is that it is likely that the applicant would choose to undertake its action in compliance with the law rather than proceed without the take authorization. Under the No Action Alternative, NMFS would not issue the IHAs to GSOE and DWWNE authorizing take of marine mammals. As a result, the exceptions to the prohibition on take of marine mammals per the MMPA would not apply and GSOE and DWWNE would not conduct the site characterization survey as described in the application. There would be no direct or indirect impacts to marine mammals or their habitat resulting from no action. The marine mammal species and their habitat conditions would remain substantially similar to the condition described in the Affected Environment section of this EA.

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.

For purposes of this analysis, the range of past, present, and reasonably foreseeable activities that result in cumulative impacts to marine mammal populations in the proposed project area include the following: climate change; marine pollution; disease; increased vessel traffic; marine mammal watching; marine site characterization surveys; and fisheries. In aggregate, these activities are the source 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 proposed project is not likely to add an increment of disturbance that would cumulatively result in significant adverse impacts to marine mammals or their habitats.

The proposed marine site characterization survey activities would represent additional anthropogenic activities in the Project Area. NMFS has reviewed the best available scientific information and has prescribed mitigation accordingly in order to minimize potential impacts to marine mammal individuals and populations to the maximum extent practicable, as required by the MMPA. Furthermore, the two surveys are limited spatially (i.e., within the RI-MA WEA and the DE WEA) and temporally (i.e., would occur over no greater than one year) NMFS, having reviewed the potential cumulative impacts of the issuance of IHAs in association with the two surveys, finds that the effects of issuing the two IHAs, independently and collectively, will not result in significant cumulative effects to marine mammals and their habitat.

Therefore, NMFS does not anticipate these activities resulting in significant impacts on the environment, either individually, or incrementally when considered in addition to other 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 marine mammal species in the Project 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 GSOE’s and DWWNE’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. Bottlenose dolphins in the Northwest Atlantic Ocean experienced elevated strandings from 2013 to 2015, resulting in an unusual mortality event (UME) attributable to cetacean morbillivirus (NMFS, 2015). Morbillivirus can lead to death or secondary infections, like skin lesions, pneumonia, brain infections, and other impacts. This UME has ended, but morbillivirus could reappear as a potential risk and it can spread to cetaceans through the eye, mouth, stomach, skin wounds, or sexual contact (NMFS, 2014). There are no other known diseases threatening marine mammals in the project area at this time. Issuance of IHAs will not result in any additive effects or spreading of disease.

4.3.4. 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. Vessel strike also represents a mortality risk to marine mammals. The North Atlantic right whale is particularly susceptible to vessel strike due to its nearshore habitat, which brings it into close proximity of shipping lanes with high levels of vessel traffic. Vessel strike has been identified as one of the two primary threats to North Atlantic right whales (the other being fishery interactions, described below).

Though vessel strike may adversely impact some marine mammal species in the project area, none of the proposed activities would be directed at vessel traffic. The action would result in a slightly elevated level of vessel traffic as the survey is performed from a vessel. NMFS has required vessel strike avoidance measures in the IHAs and has determined the likelihood of vessel strike as a result of the proposed surveys to be so low as to be discountable.

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. The cumulative adverse effects of the proposed action on the affected populations, when added to the effects of vessel traffic, are not expected to be significant.

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, Higham et al 2009).

While marine mammal watching operations do occur in the vicinity of the proposed project area, no marine mammal-watching operations are expected to occur within the project area itself. 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. Geophysical and Geotechnical Surveys

Marine site characterization surveys associated with offshore wind development in the Northwest Atlantic Ocean, and in the nearshore waters off Rhode Island, Massachusetts and Delaware, are a reasonably foreseeable activity that is expected to result in increased amounts of sound in the marine environment. Marine survey activities associated with offshore wind development are reasonably foreseeable in the Northwest Atlantic Ocean, including in areas offshore New York, Rhode Island, Massachusetts, Delaware and Virginia. We expect future activities to utilize geophysical and geotechnical survey equipment similar in nature to the equipment proposed for use by GSOE and DWWNE as described in Chapter 2.

Deep-penetration seismic surveys associated with oil and gas exploration are also a reasonably foreseeable activity in the Northwest Atlantic Ocean, though not in the nearshore waters off Rhode Island, Massachusetts and Delaware, that is expected to result in increased amounts of sound in the marine environment. These surveys use airgun arrays as an acoustic source. Airguns emit low-frequency noise into the water column, which has the potential to behaviorally disturb marine mammals and, for some species, cause auditory injury.

Seismic surveys for hydrocarbon exploration were conducted in the U.S. Mid- and South Atlantic Ocean between 1976 and 1983. Fifty-one wells were drilled in the Atlantic OCS between 1975 and 1984, including one well in the Mid-Atlantic OCS Planning Area and seven in the South Atlantic OCS Planning Area. One drillable prospect was identified in the early 1980s roughly 72 km northeast of Cape Hatteras, North Carolina in waters roughly 820 m deep (USDOJ, MMS, 1998). Since the 1970s and 1980s, the only other geophysical surveys that have occurred in this area were conducted by the National Science Foundation for academic and research purposes (79 FR 38496, 79 FR 57512).

BOEM manages oil and gas development activity under the National OCS Oil and Gas Leasing Program, which establishes a schedule of oil and gas lease sales on the U.S. OCS. BOEM is working under the current five-year lease plan for 2017-2022, in which the U.S. Atlantic Ocean was excluded from oil and gas development. However, as directed by Executive Order 13795 (April 28, 2017) and Secretary’s Order 3350 (May 1, 2017), BOEM has initiated the process to develop a new National OCS Program for 2019-2024, which would replace the 2017-2022 Program. BOEM published a Draft Proposed Program in January 2018. NMFS received IHA applications from several companies seeking authorization to take marine mammals incidental to geophysical surveys in the BOEM Mid-Atlantic and South Atlantic planning areas which include offshore waters from Delaware to just south of Cape Canaveral, Florida, extending from the

shoreline (excluding estuaries) to 648 km from shore, covering a total area of 854,779 km². On June 6, 2017, NMFS published proposed IHAs in the Federal Register for the authorization of small numbers of marine mammals incidental to geophysical surveys proposed by five separate companies (82 FR 26244). NMFS anticipates that additional companies could apply for IHAs to conduct geophysical surveys if the finalized program allows for lease sales within the Mid-Atlantic and South Atlantic planning areas. Other than the surveys described above, there are no other known deep-penetration seismic surveys scheduled to occur in the Northwest Atlantic Ocean at the time of GSOE's and DWWNE's proposed surveys and NMFS is not aware of future surveys outside of the surveys described above.

Low-energy seismic surveys conducted by research institutions are also a reasonably foreseeable activity in the Northwest Atlantic Ocean, though not in the nearshore waters off Rhode Island, Massachusetts and Delaware, that is expected to result in increased amounts of sound in the marine environment. These surveys also typically use airgun arrays as an acoustic source, albeit at a lower volume than the seismic surveys described above. NMFS has received an IHA application from the United States Geological Society (USGS) for authorization to take marine mammals incidental to a low-energy seismic survey that would occur offshore the Mid-Atlantic Bight, south of Hudson Canyon to approximately Cape Hatteras, in 2018. The seismic study would use up to four airguns with a total volume of up to 840 in³. The survey's purpose is to acquire data on the distribution of gas hydrates and shallow gas, particularly in areas considered highly prospective for methane hydrate deposits. Other than this survey, there are no other known low-energy seismic surveys planned by research institutions scheduled to occur in the Northwest Atlantic Ocean at the time of GSOE's and DWWNE's proposed surveys and NMFS is not aware of future surveys outside of the survey described above.

The cumulative adverse effects of the proposed action on the affected populations, when added to the effects of reasonably foreseeable marine site characterization surveys, are not expected to be significant. Marine mammals may temporarily avoid areas of the surveys associated with renewable energy development but these surveys are not expected to result in injury or in any long-term avoidance of survey areas, and thus population level effects are not expected.

4.3.7. Fisheries Interactions

State-managed commercial and sport fisheries represent a past, present and a reasonably foreseeable non-federal activity that may result in cumulative effects to marine mammal species in the nearshore waters off Rhode Island, Massachusetts and Delaware. Certain fisheries are known to result in adverse impacts to marine mammals. In particular, pot/trap fisheries, some of which occur near shore, have been implicated in entanglement of baleen whales, including North Atlantic right whales. Research has indicated that approximately 50 North Atlantic right whales (representing approximately 11 percent of the remaining population) become entangled in fishing gear each year, and about 83 percent of all North Atlantic right whales have been entangled at least once. Entangled whales often drown or die from starvation or injuries; overall, it has been estimated that 58 percent of the right whale deaths since 2009 were due to entanglements.

In recent decades, NMFS has created multiple Take Reduction Plans for some fisheries that result in substantial bycatch of marine mammals. These include the Harbor Porpoise Take Reduction Plan to reduce interaction between harbor porpoises and commercial gillnet gear (here

relevant in the Mid-Atlantic); the Atlantic Trawl Gear Take Reduction Team, which addresses bycatch of common dolphins and white-sided dolphins in Atlantic trawl fisheries, and the Pelagic Longline Take Reduction Plan, which addresses incidental mortality and serious injury for pilot whales and Risso's dolphins from pelagic longline fisheries. NMFS also implemented an Atlantic Large Whale Take Reduction Plan (ALWTRP) in 1997 to reduce injuries and deaths of large whales due to incidental entanglement in fishing gear.

The North Atlantic right whales in particular is severely impacted through entanglement in fishing gear, primarily in lines associated with trap and pot gear. The ALWTRP was developed to address these issues, with a group consisting of fishermen, scientists, and state and federal officials providing advice towards requirements for commercial fishermen to use certain gear types that are less harmful to North Atlantic right whales, and in establishing areas where fishing cannot take place during certain times when North Atlantic right whales are present. NMFS and the ALWTRP are currently developing management measures to reduce the number of buoy lines in the water column in an effort to further reduce the risk of entanglement in fishing gear. For the period 2011 through 2015, the minimum rate of annual human-caused mortality and serious injury to right whales from incidental fishery entanglement was 4.35 per year. However, since the beginning of the ongoing North Atlantic right whale UME, there has been a total of 18 confirmed dead stranded whales. Full necropsy examinations have been conducted on 11 of the 18 whales, with results currently available for seven of these that occurred in Canada. Results indicate that two whales died from entanglement in fishing gear. In response, the Canadian government has enacted fishery closures to help reduce future entanglements and has modified fixed gear fisheries.

Though fisheries may adversely impact some marine mammal species in the project area, none of the proposed activities would be directed at commercial or recreational 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 IHAs for the incidental take of small numbers of marine mammals to GSOE and DWWNE. No significant indirect impacts are expected from GSOE and DWWNE conducting site characterization survey activities in the Project Area. The cumulative adverse effects of the proposed action on the affected populations, when added to the effects of fisheries, are not expected to be significant.

4.4. CONCLUSION

Based on the summation of activity in the area provided in this section, NMFS determined that the incremental impact of IHAs issued for GSOE's and DWWNE's proposed site characterization survey activities 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 IHAs.

In summary, based on the description and analysis of NMFS's activity provided in this EA and in the notice of proposed IHAs, the analysis herein supports our conclusion that, with the incorporation of the proposed monitoring and mitigation measures, the issuance of the two IHAs to GSOE and DWWNE for take of marine mammals incidental to conducting marine site

characterization survey activities would not result in any significant direct, indirect, or cumulative impacts to the human environment as we anticipate no adverse effects at the population level. We do not expect the applicants' activities to affect annual rates of recruitment or survival of marine mammal species or stocks. We expect impacts to marine mammals to be temporary and localized around the survey vessels, remain within the bounds of the established take authorizations (Table 6), and that the required mitigation and monitoring provide substantial protection to marine mammals and their habitat.

Chapter 5 List of Preparers and Agencies Consulted

Agencies Consulted

As indicated in Chapter 1, we coordinate within NOAA, including ESA Section 7 consultations, and with other regulatory agencies, as appropriate. No other agencies were consulted in the preparation of this EA.

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